

1931

TRANSACTIONS

National Safety Council

Incorporated

TWENTIETH ANNUAL
SAFETY CONGRESS



Chicago

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PLAINTIFF'S EXHIBIT

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The Council is not responsible for the views expressed in the Papers submitted at the Congress nor in the discussions thereon. These manifestly are the product of individual opinion.

NOTE

Volume III of these Transactions, containing the Street and Highway Traffic sessions, Traffic School, Child Education Section, Home Safety, and Statistics Section, is being mailed automatically to members who are believed to be interested. Any other member of the Council may receive a copy of Volume III by requesting it.

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Incorporated

20 North Wacker Drive, Chicago

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Council Purposes and Policies

The fundamental purpose of the National Safety Council is to conserve human life. It seeks this goal through a continuous campaign of accident prevention that is nationwide in scope, applies to all lines of hazardous activity, and directly or indirectly reaches our entire citizenry. It is a non-profit organization, non-sectarian, and free from political affiliations. Since its organization in 1913, it has won respect as an essential national institution.

Inseparable from accident prevention is the Council's work in improving health conditions and preventing vocational diseases in American industry.

Today there are 5,000 members, representing every state in the Union, and many of the Canadian Provinces. There are 600 foreign members. The membership includes industrial corporations, firms, individuals, public officials, schools, chambers of commerce, clubs and civic organizations. About 70 per cent are industrial concerns, including the big steel companies, the oil companies, practically every railroad in the United States, the automotive industry, and others of outstanding importance in our national industrial field.

Thus the National Safety Council is like a fruitful tree with many branches and firmly imbedded roots that reach out in all directions, lending strength and permanence to the organized safety movement.

Pioneering in Safety

The history of the Council is an absorbing story. Unfortunately it cannot be detailed here. Suffice to say that the First Co-operative Safety Congress was held under auspices of the Association of Iron and Steel Electrical Engineers in Milwaukee, in 1912, and, as a result, the National Safety Council was organized in New York the following year with fourteen members. During the first year the membership increased to 971.

The pioneers of American safety went to work on the sound premise that accidents were an unnecessary part of our social order and that through application of proper remedial measures they could be avoided. They set about to nationalize this theory, and to develop the detailed methods and materials through which accidents could be prevented. The members of the organization now are more than ever convinced that accidents are unnecessary and that they can be and are being prevented. Striking examples of reductions in many different fields during recent years prove this contention.

Results of Organized Safety

Since the National Safety Council was organized in 1913, the national accident death rate in all fields excepting motor vehicle has been reduced 30 per cent. The motor vehicle accident problem is a comparatively new one, yet there are evidences of progress. Recent studies show that accidents among commercial vehicles have slightly decreased; that grade crossing tragedies have not increased during the past year; that deaths of school children have decreased; that deaths in states having effective license laws with centralized administration and in cities having community safety councils have increased much less than in other states and cities; that deaths to pedestrians of all ages throughout the country increased very slightly last year. These facts indicate the engineering, educational, and legal remedies for the highway accident problem are producing results where conscientiously applied.

Since the National Safety Council started as an industrial safety organization, the best results are to be expected in this field. Here spectacular achievements have been made. The steam railroads, for instance have reduced accidents among employees

74 per cent during the past 14 years. A group of our largest steel industries have cut their accidents 90 per cent since 1913. During 1930, 26 plants of the Portland Cement Association went through the entire year without a single lost-time accident among thousands of workers. Two, three, four, and even five year "no-accident" records among smaller plants and in certain departments of the larger plants are not at all uncommon.

Along with these reductions the whole psychology of accidents has changed. Employer and employee both look at the proposition from a different viewpoint than they did 15 years ago. Accidents now are really out of date. In many plants they are considered a disgrace that casts a cloud over good management and efficiency. There is very little room today for the careless worker in modern industry.

Looking Ahead

The safety problem is a universal one—and always will be—just as long as human beings inhabit the earth. Safety applies to everybody and to everything, physical or material: to every human act, to every man, woman, and child. It is only natural, therefore, that the idea which seems to have so firmly taken root in the United States should branch forth into other countries of the world. Organizations similar in purposes and activity to that of the National Safety Council have sprung up in many countries. Council posters have been widely copied for foreign use and several Council publications have been translated into other tongues.

All of these are hopeful signs of the times in the world of Safety. The National Safety Council is still young—as institutions go. A great amount of worthwhile work has been crowded into its short life. Foundation work is always slow, whether one is building safe skyscrapers or safe men. The National Safety Council has been digging away at the bed-rock of public consciousness. It has made real progress and its achievements furnish ample inspiration for continuing its humanitarian efforts.

To bring the accident situation under control there must be a wider interest in the Safety Movement; a much larger membership in the Council, and the active co-operation of all industrial, business, civic, and governmental bodies.

Cooperation

The purposes and policies of the National Safety Council are not always understood by those not in close touch with the Council's work. To meet the need for a brief and definite presentation of the Council's objectives, the following has been approved by the Executive Committee as an official statement of policy:

"The National Safety Council's objective is the elimination of accidents to men, women and children, as being deplorable, unnecessary and wasteful. It seeks memberships, cooperation and contacts to insure that its services may provide the instrumentalities and finances to accomplish this objective.

"Through education it seeks to demonstrate that the safe way is the right way and the best way, from the standpoint not only of human satisfaction but of social efficiency and economy. It seeks those ways and means for safety that satisfactorily fit into the practical affairs of life.

"Its financial policy is to return in service all moneys received, so operating without profit, and to undertake only those activities which can be assured of reasonable permanence. Much of its administrative personnel consists of volunteer workers.

"The National Safety Council holds itself open to give fullest and most cordial co-operation to all individuals, industries, organizations, communities, states and nations that are in accord with the principles and objectives of the organization, and the National Safety Council likewise asks and seeks cooperation from all these in carrying out its purposes."

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Annual Meeting of Members

Monday Morning Session

October 12, 1931

C. W. BERGQUIST, Chairman

President, National Safety Council, Inc.

The Annual Meeting of Members of the National Safety Council, held at the Hotel Stevens, at Chicago, Ill., October 12, 1931, convened at nine forty-five o'clock, C. W. Bergquist, president of the National Safety Council, presiding.

PRESIDENT BERGQUIST: The Twentieth Annual Meeting of the National Safety Council will please come to order. Our deliberations will be opened with prayer by the Right Reverend George Craig Stewart, Bishop of the Episcopal Diocese of Chicago.

The Invocation

RIGHT REVEREND GEORGE CRAIG STEWART: Let us pray. Almighty and everlasting God, whose mercy is over all Thy works, whose reign of law and of love reacheth throughout all the shining worlds of the universe and governeth all the movements of nations and of all living things, and determineth and moveth within all the purposes and eager plans of men, lift us, we beseech Thee, in this morning hour, above all the disquietudes of this world into Thy presence where we may be quiet and know that Thou art God.

Thou hast filled the whole earth with the provisions of Thy bounty. The valleys and hillsides and the mines and the deeps are stored with the evidences of Thy love. And we, Thy children, have not done the things that we ought to have done; we have sinned against Thee and not known nor followed Thy will, so we have had problems and trouble and seen our brothers here and there in want and in distress. Forgive us, we beseech Thee, O Lord, for that indifference which is stupidity and folly, for that skepticism which is blindness, for that selfishness which is sin, and fill our hearts and the hearts of all Thy people throughout the earth with such a sense of responsibility, with such clearness of vision, with such eagerness to do Thy will, that there may be righteousness and peace and joy established throughout all the earth.

Bless, we beseech Thee, our government. Make us good patriots. Hasten the coming of Thy kingdom. Make us good citizens of the Kingdom of Heaven. Bless these Thy servants gathered in this meeting, devoting themselves to the protection of human life, cultivating and nourishing and developing a sensitiveness to human values as the great values in life. They come from different homes and different cities. They have different problems and all their hopes and joys and discouragements are open unto Thee. Bless them in this meeting and in all their meetings, and as they go to and fro in this city bless all who are near and dear to them and have

them in Thy keeping, and bind us all who are made in Thine image and who bear the dignity of men, bind us all together more closely in devotion to the things of the spirit, to the things that endure, to the things that are eternal, so that having served Thee in our day and generation we may in our passing leave the name and the influence of those who have been aware of the high calling to which they are called, of the dignity of human life, and who have prepared this earth to be a fairer habitation for those who come after us.

To Thy name, the Father and the Son and the Holy Ghost, be all honor and glory, world without end, amen.

PRESIDENT BERGQUIST: The secretary having advised the chairman that a quorum of members entitled to vote is present in person or by proxy, the Chair will be glad to entertain a motion to dispense with the calling of the roll. Do I hear such a motion?

(A motion was regularly made and seconded to dispense with the roll call.)

PRESIDENT BERGQUIST: If there is no opposition, we will consider the motion approved.

We meet here today for the third time in alternate years. We meet here because we find Chicago a desirable city despite the fact that overworked news dispatches may lead some folks to think otherwise. We find here facilities which lend themselves in a very satisfactory way to the functioning of our Congress.

Not so long ago the citizens of Chicago decided to sweep the dirt off its doorstep and to present a properly focused picture of Chicago's greatness, cultural, artistic, commercial and industrial. When a recent municipal election brought in a new city administration, the news gained prominence all over the world. As a result of this election, Chicago today can hold her head high and greet her visitors without apology.

Our Mayor is in sympathy with what we are trying to do and is regretful of circumstances that prevent his presence here.

Anything I might say regarding what he has done or is planning to do for Chicago would be a repetition of a story that is already familiar to those of us in this city.

He has sent to us this morning a man who is no less prominent, a man who has served Cook County as an official for many years, and served it faithfully and well, a man who has taken a keen interest in every civic movement for the benefit of Cook County and the city of Chicago. This man is a good friend of mine, so that these remarks are based upon a personal knowledge and experience extending over many years.

Robert M. Sweitzer, Clerk of Cook County, is here to extend a greeting and welcome.

Address of Welcome

By **ROBERT M. SWEITZER**

Clerk of Cook County, Chicago, Ill.

It is indeed your loss that His Honor cannot be here this morning to extend to you that hearty welcome and that spirit of good will which I know is welling up in his soul at this moment.

I wish that the Mayor could be here in order that you might meet him face to face and hear the sincere tones of his voice and be apprised of his program of endeavor on behalf of this great metropolis.

The Mayor is sincerely in earnest, not only to revive the old spirit of Chicago, but to dedicate his work and the work of this city to the purposes which for many years were well known and are traditional as the "I Will" spirit of the great city of the Mid-west.

Chicago has been reborn, and in the determination and capacity of its present

administration will again hold high its head among the great moral and civic communities of the universe.

Chicago was traduced, as we all know, throughout the world. Chicago was hailed as the abiding place of the gunman, as the habitat of the undesirable from every other section. There was much said that was untrue. Many of these statements were most extravagant, but nevertheless they were believed in most sections of the world, whether in some communities through a spirit of envy or otherwise I do not know, but it was necessary that something be done, and Chicago has done the biggest thing it could do to bring about the redemption of its fair name.

The Mayor wants you to know that you are heartily welcome, that you have the freedom of the city, and everything that he or his administration can do for your comfort and pleasure while you are here will be done if you will just simply indicate what it is.

Century of Progress Exposition

The Mayor is anxious that you should see this great city, that you may note the great program of civic beauty which is being carried forward, that you may see the undeniable evidences that Chicago is sincere in her ambition to make this city the most beautiful city in the world. If you will see the development of this program, particularly along our great waterfront, and if you will note our parks and note the new civic buildings, these great structures which have arisen in Chicago and those now under construction, you will find the evidence that the heart of Chicago is still throbbing and its ambition has in no sense been subdued or changed. The Mayor, too, would like to have you see on our lakefront the evidences of preparation for "A Century of Progress," that great exposition to be given in Chicago in 1933, an exposition which will be unique, an exposition which will not simply be an industrial show, but which will mark the progress of all civilization for the last 100 years and be the highest point in educational return ever offered to visitors who go to a great exposition.

It is going to be worth while, and if you will see the evidences now of Chicago's determination to make this the most wonderful exhibition ever held in the world, I am sure you will be glad to return and hold your convention here again during the World's Fair year. That is what the Mayor has in his heart. He wants you to come back then. He wants you to come back as frequently as you can. You will find not only that this is a safe haven, but you will find here that spirit of hospitality and that spirit of welcome which will assure you that when you are in Chicago, you are as near to being at home as you can be anywhere, excepting in your own domicile. That is the spirit of Chicago. That is the spirit of His Honor, the Mayor. He wants you to know that you are safe here, not only in the streets but elsewhere.

During some recent years of unfortunate memory, I have known of instances where strangers whose destination was farther along and who had to make a railroad change in Chicago, have timidly asked policemen whether it was safe for them to step outside the depot to get a breath of fresh air. That was almost tragic in its influence on the welfare of Chicago, because many thousands of people detoured and didn't want to come into Chicago at all.

But that feeling has disappeared. Chicago is safe. Chicago is glorious. Chicago has a heart full of warmth and welcome, and in that spirit on behalf of His Honor the Mayor, I welcome you here today and hope your deliberations will not only be profitable and of great advantage in this great crusade of yours for the safety of your fellow men, but likewise that when you go home you will take with you that impression of Chicago which will make you anxious to return again to our midst and get further evidences that Chicago redeemed and regenerated is the Chicago of old, and the name "Chicago" for many years, as you know, was synonymous with "hospitality." Godspeed your deliberations and bring you back here again soon.

The President's Annual Address

By C. W. BERGQUIST
President, The National Safety Council

Once more we assemble in our Annual Safety Congress to renew our friendships, to rededicate ourselves to our task and to gain the knowledge and inspiration to guide our efforts during the coming year.

Inspiration we need more than ever this year. The trend of conditions during the past two years has saddened and disheartened us. Sometimes, perhaps, we wonder whether our efforts are so important after all. In the minds of many the tragedy of unemployment has overshadowed that of disabling injury and accidental death.

Such thoughts cloud our vision. We lose sight of the fact that accidents intensify the evils of the times. They often add a crushing load to those who are already harassed by financial distress, and the majority of the victims are not covered by the slim benefits of compensation. More prosperous times will return eventually, but those who are incapacitated by accident will not benefit from them.

From the employer's point of view accidents are as costly as ever, even though there is no great urge for production. Profits have dwindled in some businesses to the point where accident losses may easily wipe them out.

Other speakers will tell you during this great congress of specific methods of accident prevention, of ways and means of arousing and maintaining the interest of employees and of the public. I propose to discuss briefly the problem before us, to analyze the reasons for the annual toll of nearly 100,000 accidental deaths, and the part we can play in its reduction.

We are a nation of individualists, yet the industrial safety movement is one of the finest examples of cooperation we have ever known. But, unfortunately, we too often leave cooperation at the plant gate, and our individualism once more asserts itself.

In pioneer days individualism was not entirely objectionable; at least, it had less opportunity to display anti-social aspects. But as the frontiers of civilization pushed forward, safe outlets for restless energy became fewer. The population of our cities increased, bringing new problems of living together. Personality traits which were not dangerous in the great open spaces became potentially serious when the individual had command of a high powered mechanism in a crowded thoroughfare.

Many people have remarked about the change in the character of certain individuals when they take the wheel of an automobile. It would be more correct to say that driving is an indication of character. Power of any kind is likely to have an intoxicating effect on some natures.

Right here we see one of the underlying causes of the whole accident problem—power without responsibility. Theoretically the individual is responsible for his acts, but how does it work out in practice?

With few exceptions, the penalty for endangering life, or even causing injury or death, is not severe. I refer to the sentence imposed by public opinion as well as that imposed by the courts. The public is reluctant to see the reckless driver, who may be prominent socially, sent to jail with hardened criminals.

The youth of good family who runs afoul of the traffic police is frequently spared the disgrace of court proceedings through influential friends and thus the feeling grows that the only real crime is that of being caught and punished. Accidents tend to become a mere matter of claims and settlements, with the insurance company usually softening the blow.

In spite of all the ravings of the intelligentsia about "witch-burning puritans" the United States is a tolerant nation. In no other country is the person who menaces the safety of others regarded so lightly. This attitude helps to explain the difference between our fire losses and our accident rates and those of other countries. Occasionally public indignation is aroused to action, but such drives are of short duration.

Our gregarious method of living demands certain adjustments of conduct. The individual with an exaggerated ego finds it difficult to regulate his conduct for the convenience of others. This type of person is not necessarily a criminal, although criminals frequently display these traits in much greater degree.

Lack of consideration for others is evident in many minor acts. The man who spits on the floor in a street car, throws paper on the streets or discards lighted matches thoughtlessly, has certain defects of character which are comparable in a lesser degree to those of the reckless driver.

It is not difficult to find examples of thoughtlessness and discourtesy in traffic. Take any fairly busy highway between centers of population. Regardless of legal speed limits, we find that traffic usually adapts itself to between 40 and 45 miles an hour. While traffic is moving smoothly at this rate there is little danger. But there are always some who are not satisfied with the speed which the majority find satisfactory. They cut in and out of traffic often where the view ahead is obstructed by a hill or a curve, menacing others as well as endangering themselves.

No one is thrilled by the slogan "Courtesy Prevents Accidents." It is too much like one of the old copy book maxims. But like many another platitude, it contains a world of practical truth.

Traffic brings to mind another thought. In no other activity fraught with so many hazards do we find so little supervision. In industry you will not find a group of even twenty-five men at work without the supervision of somebody who is responsible to the management. On the highway every man is a law unto himself. On a stretch of road you can drive a hundred miles and pass thousands of motorists without seeing a motorcycle officer.

Let us now consider the familiar comparison between county highway traffic and railroad operation. We all know that the engineer is a picked man, and that his training and the traditions of his occupation demand that the safety of passengers must be his first consideration. Railroad history contains many instances of heroism and devotion to duty on the part of trainmen. But even after a rigorous selection of personnel the railroad management leaves as little as possible to the human element. The engineman runs on a strict schedule. His locomotive is thoroughly overhauled before it leaves the roundhouse and the section gangs have made the track safe. Signals warn the engineer of danger ahead, and even automatic control has been introduced on some lines.

Now compare this picture with that presented by the highway. Every detail which would be minutely supervised in the factory or on the railroad is left to the discretion of the individual. In most states there is no restriction on who may operate a motor vehicle. The motorist may have a mental age of ten or less, or he may have an exaggerated egotism which makes him a menace in spite of more than average intelligence. Few machines used in industry are potentially as dangerous as the automobile.

This, then, is the background of our 33,000 motor-vehicle deaths last year. Under such conditions could we expect a different result?

Our home accident problem, with some 30,000 fatalities a year, is another example of unsupervised activity and lack of responsibility. It is not too much to say that many of our better class homes contain hazardous conditions that would not be tolerated in a reasonably progressive factory.

We are proud of the progress made in industrial safety, yet even here our achievements have been spotty. The picture is spoiled by the experience of many backward plants, and even a few unprogressive industries.

Rates for compensation insurance have gone up in practically every state. It is true that benefits have been made more liberal but that is only part of the story. Insurance companies and state funds have been losing money on companies which were shirking their responsibilities in accident prevention. We are quite familiar with the argument that every employer has a definite responsibility to protect his employee;

it is becoming increasingly evident that he has no right to expect other employers to pay the price of his negligence.

Unless management feels its responsibility and in turn makes supervisors and workers assume their share, little can be expected. The state and the insurance carrier can exercise comparatively little supervision over the plant, and the improvement must come from within.

Our attitude toward law is paradoxical. We resent the law as interference with our personal prerogatives, and at the same time we have a child-like faith in legislation as a remedy for social evils. We pass more laws than most other countries but show less regard for them.

The average person regards the law as something that restrains him—something that other persons enacted to interfere with his rights. We lose sight of the fact that back of every law on the statute books was a condition that needed correction. The legislation may have been unsound and ill-advised but we may be sure that some unsatisfactory condition led to its adoption. With few exceptions, our system of laws provides a code of conduct which facilitates living together in our modern civilized state.

One of the lessons we have learned in the past 20 years is that the accident problem is too big to be solved by any panacea. In other words, accident prevention is a long course of tedious sanitarium treatment rather than a major operation. A victim of illness can steel himself for an operation that promises one chance in ten for recovery, but strict observance of sanitarium regulations for many months may require even more fortitude.

The safety movement is handicapped by a lack of the heroics. Some of our attempts to dramatize it have achieved temporary success, but many efforts have fallen flat. There is need for the emotional appeal in our safety efforts but we must avoid mawkish sentimentality.

A movement which involves countless uninspiring details and the correction of certain fundamental human weaknesses is difficult to put across. It is easy enough to arouse indignation against the accident toll but it is another matter to keep up the courage and enthusiasm of people in the safety movement. The really vital work in accident prevention will never be spectacular.

Those who do not understand the situation sometimes ask: "When are we going to get results for the time, effort and money expended?"

Progress in any great movement for the improvement of the human race is discouragingly slow. Crime has been a scourge of society from the beginning of time, and often we may feel that little progress has been made after centuries of experimenting with legal and sociological problems.

Yet the progress has been made. Piracy has been swept from the seas. The slave trade has been practically abolished. Life and property are more secure today, in spite of the automobile and "crime waves," than they were in the seventeenth century. There was plenty of law then and executions were frequent, yet banditry was a much greater menace.

Nowadays we travel across the continent with scarcely a thought of train robbers. Yet they were a real peril within the memory of many who are still living. Nor does the thought of possible danger mar the pleasure of a journey by rail or steamship as it often did less than a generation ago.

In spite of the vast amount of crime news comparatively few citizens have any direct experience with crime or criminals. There is no doubt but that the people of all civilized countries are living on a much higher plane, morally and mentally, than they were a century ago. It is this onward march of progress that inspires the hope that an increasingly educated and enlightened people will eventually overcome the plague of accidents.

The crime problem and the accident problem have something in common, differing chiefly in degree. The criminal may be actively anti-social in his inclinations or he

may choose crime as the line of least resistance in providing a living. The bandit who shoots his way out of a tight situation is perhaps an exaggeration of the motorist who steps on the gas and tears over the highway at excessive speed, giving no thought to the consequences. Why they act that way is a problem to which psychologists and psychiatrists are devoting considerable research.

What is the National Safety Council's part in the solution of these problems?

I am convinced that the Council's function is to stimulate the interest of others and supply them with the necessary information to carry out their parts. The Council has no legislative authority and wants none. Too many institutions have been unable to escape the pitfalls of temporal power. Had it been possible to make life safe by legislation alone it would have been done ages ago.

It is our duty and privilege to encourage and support sound legislation and just enforcement, yet we must remember the limitations of laws. They are necessary for the restraint of those who require coercion, but our strongest appeal is to the hearts and heads of men.

The engineering side of accident prevention is of basic importance. While a physical hazard exists our efforts to inspire caution are likely to be greeted with skepticism. Without engineering skill, employee training and propaganda would have been unavailing in removing many accident causes. Engineers working through the Council have made many valuable contributions to safety knowledge. Our Safe Practices Pamphlets are looked upon everywhere as authentic sources of information. The work of research committees has made available important data that are useful in the prevention of health and accident hazards.

But the Council is more than an institution for technical research. We like to think of it as the central station which generates the power required to drive the safety movement. And this power is to be found in the spiritual values of our work.

We know the causes of accidents and we know what will prevent them. But is the public at large willing to pay the price? The price of safety is a trained and disciplined population, comparable to that of a well managed industrial plant or railroad, and the denial of personal liberty where it interferes with the safety and convenience of the group.

This may not appeal to the average American. Yet every accidental death strengthens the sentiment for stricter regulation of individual conduct. We have seen how people submitted to restrictions in times of national emergency, and in my opinion our present death toll approaches a real emergency.

The other alternative is the slow process of developing the right attitudes in the individual, a voluntary compliance with common sense rules of conduct, and the development of a public opinion which will be more effective than the ponderous machinery of legislation in influencing human behavior.

Improved attitudes toward the protection of human life cannot be secured without an inspired leadership, and the leaders in moulding public thought are to be found within the membership of the National Safety Council and affiliated Territorial Councils. Many of them are already giving splendid service to their communities by arousing the interest and enlisting the active support of public officials and influential organizations.

Every industrial plant which carries on an active safety program within its own organization is a center of safety influence in the community. Many of the lessons learned at work will be carried to the home. A worker trained in safe practices will always be a good influence, and the safety work of one company is of inestimable value in spreading the gospel. And lastly, the participation of industrial executives in community safety activities will round out the program and enable us to make real progress toward our goal of Universal Safety.

We must secure a general acceptance of the principle of personal responsibility. We must provide the leadership to mould public thought and stimulate action. We must develop an active—not a passive—attitude toward safety.

BE IT RESOLVED, That the activities of the National Safety Council for the coming year be concentrated more especially in the following specific channels:

1. *Public Safety*—Continued work for strong drivers' license laws in every state; uniform traffic laws for all states and cities; standard traffic signs and signals; standard accident reporting systems; a broader consideration of safety in highway engineering; strict enforcement and observance of all traffic laws; fairness and courtesy on the highways; a more intensive effort to reach the individual driver; the teaching of highway safety in the schools and homes; the establishment of community safety councils in more American cities.

2. *Industrial Safety*—The safeguarding of all mechanical equipment and the constant use of such devices; the revision of hazardous manufacturing processes; a widening of our fields of engineering pursuits in industry; regular and complete safety inspections and research in all industries, followed by prompt application of approved remedial measures; more psychological studies of the mental aspects of accidents; extension of the safety contest plan; a wider recognition of the close relationship between industrial health and safety; and full co-operation with the National Safety Council and affiliated community safety councils in carrying on industrial safety.

3. *Home Safety*—Broadening our educational work, particularly with the schools, the National Federation of Women's Clubs, the National Association of Parents and Teachers and kindred groups; an earnest effort to reach the individual housewife with an educational program on home hazards.

4. *Propaganda*—In acknowledging a splendid co-operation during 1930 by the press, the radio and other distributive channels we urge continuous propaganda through these media during the coming year in an effort to arouse our citizens to their true sense of responsibility in a problem which must be shared by all.

Mr. Chairman, I move the adoption of the resolution as printed.

(The motion was regularly seconded.)

PRESIDENT BERGQUIST: If there are no contrary votes we will consider that motion approved.

Mr. Scott: Mr. President, I offer in behalf of the Resolutions Committee the following:

Appreciation of President Bergquist

BE IT RESOLVED, That the members of the National Safety Council hereby express their appreciation and gratitude for the inspiring leadership of Carl W. Bergquist who has served as President of the Council during this past year with an intelligent understanding of its many problems and with an unselfish willingness to give freely of his energy to enlarge the influence and to increase the effectiveness of the organized safety movement.

I move its adoption, Mr. Chairman.

(The motion was regularly seconded, put to a vote and carried.)

Mr. Scott: Mr. President, your Resolutions Committee presents the following resolution:

General Resolution

WHEREAS, The activities of the National Safety Council have been carried forward with vigor and enthusiasm during this past year of economic stress which has challenged the very existence of many established institutions, and

WHEREAS, Safety has proved to be a necessary and vital force in our social structure as a result of the unselfish, patriotic work of the individuals and organi-

zations shouldering the leadership responsibility for the advancement of this great humanitarian movement, therefore, be it

RESOLVED, That the members of the National Safety Council, here assembled at the Twentieth Annual Safety Congress do hereby express their thanks and deep appreciation to the Directors and the Executive Committeemen, the Vice-Presidents, the Chairmen, Officials and members of sections and committees who are in a large measure responsible for the encouraging results of this past year; and to the officers and committees of the Territorial Safety Councils who are doing splendid concentrated work in many communities and particularly to those who have cooperated with the Chicago Safety Council in support of the efforts of the National Safety Council to make this Congress a success.

I move the adoption of the resolutions as read, Mr. President.

(The motion was regularly seconded and carried.)

PRESIDENT BERGQUIST: I want to add to these resolutions my own expression of gratitude to those who have stood by so loyally both in the National and Territorial Councils during my term of office.

Mr. Scott: Mr. President and Members of the Council: This is the first of our Annual Meetings in many years not attended by Homer Niesz. We shall miss his presence, the friendly grasp of his hand, and his wise and inspiring counsel. His life was so purposeful and his influence for all things good so evident that it is difficult to comprehend his passing. His daily work cultivated and nurtured an ever present devotion to the needs of his fellow men and aroused a deeply sympathetic understanding of safety. His monument is an indelible memory of purposeful service in the many fields his life touched. The safety movement has been enriched by his leadership and character and his contribution was a fine expression of his practical idealism.

We of the National Safety Council and the cause we represent were very close to his heart. We can pay no greater tribute to him than to pledge ourselves to this unfinished task, and this we do. It is appropriate that you should give formal recognition to the loss we have sustained, and in an attempt to express our appreciation of his life and service your Resolutions Committee offers and moves the adoption of the following resolution:

Homer E. Niesz

WHEREAS, Our esteemed Past President, Homer Eldridge Niesz, died on August 8, 1931, and

WHEREAS, He gave long and devoted service to the cause of Safety and the National Safety Council as its Treasurer and Chairman of the Finance Committee in 1922, as its Vice-President and Treasurer in 1923 and 1924, as a member of its Executive Committee for 1924 to 1926, as Vice-President for Public Relations in 1926 and 1927, as its President in 1927 and 1928 and as a continuing member of its Executive Committee until his death, and

WHEREAS, During these years of generous service Mr. Niesz won the admiration and affection of his associates and others who were influenced by his leadership in safety.

BE IT RESOLVED, That the entire membership of the National Safety Council, its Officers and Executive Committee hereby express their deep sense of loss and their gratitude and appreciation for the contribution of Mr. Niesz to the Council, and

BE IT FURTHER RESOLVED, That these resolutions be spread upon the minutes of this meeting, and that a copy be sent to Mrs. Niesz.

I move you the adoption of that resolution.

(The motion was regularly seconded.)

PRESIDENT BERGQUIST: Shall we rise as an indication of our approval?

(The motion was passed by a rising vote.)

PRESIDENT BERGQUIST: Before I got this job as president of the National Safety Council, I didn't realize how much work it involved. I didn't realize that there would be among the pleasant things some disappointments. I should have known better, but I found out there were people who differed with me in some fundamental policies of the organization, and of course that is as it should be. So the past year has been a mixture of great happiness, a little disappointment, but I looked forward to this Congress as the high spot of my term of office. I looked forward to it with just a little bit of timidity, too, recognizing that I would have to be on the job every day and every night, and that perhaps something along the line might slip for which I would be held responsible. But there has always been interjected some pleasant things to do, some things more pleasant than the many other pleasant things that befall the man who holds this job, and I have one of them right now. It is a very pleasant thing I am going to do this minute.

You know, there is a young man in Chicago who is very much in the public eye. Perhaps no young man in the business world is watched more closely. In the beginning he was overshadowed by a very eminent father, and he may still be overshadowed by an eminent father more or less, but he has made friends on all sides by his proved ability and by his energetic willingness to tackle worthwhile things in business and civic life. He is president or vice chairman of seven utility companies or utility and investment companies. His aggressive leadership of the United Charities of Chicago and his more recent acceptance of the chairmanship of the joint Cook County Emergency Relief Fund symbolizes his firm belief that business and industry have definite social obligations and responsibilities which their leaders must discharge. Because he backs up this belief with action, he is asked to lend or lend a hand whenever there is some great public movement on foot for the benefit of his city. It is to be expected, therefore, that he is interested deeply in the safety movement. You heard his voice over your radio in the National Safety Council's Third Universal Safety Series. Today he has a message for you here. I am pleased indeed to welcome and to present to you this distinguished young man and Chairman of the newly-organized Advisory Committee of the National Safety Council, Samuel Insull Jr., of Chicago.

Human Conservation—A National Necessity

By **SAMUEL INSULL JR.**
President, Midland Utilities Company, Chicago

Who is responsible for safety? My answer is—an all-inclusive "everybody!" Living today is complicated because of the many inter-relations in our high pressured, "hurry-up" tempo of life. Visualize a steam railroad, a modern skyscraper, a transatlantic liner or an automobile. Think of the growing demands and uses of electricity, chemicals, compressed air and other tremendous forces, and you must admit there are complications in the modern safety problem. Think of the employers, the employees and all the multitude of persons and interests involved in providing the facilities of modern life.

Then ask yourself the question: which of these persons or groups must accept the responsibilities of leadership in this never-ending battle for human conservation? Although responsibility must be continuously pressed upon our governing bodies, federal, state and local—upon our trade associations, upon our insurance companies, our communities, our employers and upon every individual, I conceive the National Safety Council to be this natural and national leader, just as the Boy Scouts and the Young Men's Christian Association have assumed responsibility for boy training; as the National Tuberculosis Association has insured national public interest in the disease problem.

The general public still believes that accidents are the fortuitous, natural consequences of malign forces; that they are mainly acts of God, and therefore beyond human control. As we make progress with our studies, however, we learn that each accident has many causes and that these are closely interwoven with the physical conditions under which we live; with our subconscious reactions and our habits.

It follows naturally, that the acceleration of the safety movement depends upon a widespread understanding of the problem and upon individual and group participation in its solution. There must be definite and concentrated activities, continuously carried on throughout industry. There must be organized means of teaching the technique of safety to the lay public—to the children—to the women in the homes—and especially to the automobile drivers and pedestrians.

It is apparent that many accidents are still caused by imperfect physical conditions. There must be continuous study to free our factories, our mines, our railroads, our public buildings, our highways, and our homes from such conditions. It is my conviction that the records of accidents point the way to the need for changes in the designing of our buildings and their equipment and the application of safeguards. Every structure erected should be checked for possible accident hazards. There must be constant inspection. The causes of accidents must be brought to the attention of architects, engineers, and those professional bodies that create and establish construction standards. Safety should be a major consideration—as well as beauty and permanence.

These things can be accomplished only through the pressure of public opinion. To do this we must have more accurate data about more accidents. The facts must be impressed upon our educators and our leaders in business and public affairs, to convince them that absolute protection is an inherent right of man and that additional costs are warranted in upsetting current standards to secure accident immunity for our fellow men.

Those of you who know how slowly vital changes can be made, because of the immense investment in properties and the demand for stability in our lives, will realize the strength and vigilance necessary to alter such accepted conditions. Truly, "the mills of the Gods grind slowly." To change the established order requires persistence and patience. Someone has said that man yields to custom just as he bows to fate. It would be difficult to change the design of a pin, a screw, or a lathe. Likewise it is difficult to influence the public mind to accept new things. We first make our habits, you know—and then our habits make us.

Safety is distinctly a problem of public welfare. There must be leadership of the highest type—non-partisan and unselfish—to bring about these reforms. All real progress depends on such guidance. Some body of persons must shoulder the responsibility for fanning the flames of public consciousness and keeping the true picture before the American people continuously.

I am told that 80 per cent of all accidents are due to the personal acts of human beings. We agree, I think, that a defective mind is as dangerous as a defective machine. I ask, is it possible—after twenty years of experience—to teach people to work safely as well as rapidly and accurately? The permanent establishment of safety habits is our most difficult problem today.

We must get the lesson across—so that it sticks. Memories of tragedies in which our acquaintances suffered stand indelibly engrossed upon our minds. We cannot stamp these gruesome pictures out—no matter how hard we try. We must find some way of imprinting safety in the same lasting, dramatic way.

The instinct of self preservation is strong of course, but the spirit of adventure somehow is always coming to grips with it. This instinct for adventure is natural—and necessary. Just how far should we go to get the thrill out of sailing a boat, driving an automobile, playing any game, or perhaps working on top of a 50-story building? The danger line for one person might be an unfair restraint upon another. I know a lot of automobile drivers—who, should they ever take up aviation, could never in the world duplicate Lindbergh's recent trip to Japan. Richard Byrd, whom

you all enjoyed at last year's Congress, is planning another antarctic trip. He'll make it, too, because his adventurous nature is never permitted to step beyond the well defined limitations of his sense of physical values. The gates of adventure will always be open to our Lindberghs and our Byrds. We must be reasonable in defining limitations; otherwise we may spoil our chances of securing general assent for the establishment of rules of control.

I said a moment ago that 80 per cent of accident prevention work deals with the human mind. In the remaining 20 per cent we find such problems as proper physical protection, the safeguarding of our machinery, engineering revision, the physical aspects of highway safety, such as safe roads, standard signs and signals and the maintenance of safe motor vehicles.

The teaching of safety during the past twenty years has been largely a mass effort. Children have been taught safety in their school classes; public meetings have been held by the thousands; we have had nineteen other annual conventions very much like this one. But there is a growing opinion that there must be more individual instruction. Every known method must be used to impress the human mind with the story of accidents and bring it to the conviction that they can be eliminated if proper means are taken to that end. We must "individualize" in our training. This is the job that lies ahead during the next twenty years.

The skeptic says: "Where is your proof of achievement?" My interest is not entirely wrapped up in the thousands and thousands of individual cases of authentic reductions. The vital question is—has there been logic, force, and wisdom in our appeal? Are we reasonable in urging that these terrible injuries and fatalities be cut down? My answer is unquestionably "yes."

Pardoxical as it may seem, while relatively few people seem to have been seriously impressed with the need for safety, still there are unmistakable signs, especially in industry, that safety has been accepted as a rational policy and a definite aid to a humanitarian basis of living. "No accident" records are multiplying fast. Such accomplishments were not even dreamed of twenty years ago—or even ten years ago. The steam railroads have cut their accidents 70 per cent. Many other groups have done likewise.

Also I believe there is a keener appreciation of the need for safety in all parts of the world. During these twenty years there have been many international conferences. There has been steady growth in the development of our Annual Congresses, in hundreds of regional conventions, and in other expressions of public interest.

I am recommending to you that the National Safety Council maintain its high place in safety, and that it conserve this leadership by bringing about the sympathy and active cooperation of every worthy instrumentality.

We must have expansion of our membership and resources. The American Red Cross, prior to the World War, had a comparatively small popular membership, but its spectacular appeal to alleviate suffering brought us all into participation in this great work. We must picture the true facts of accidents just as graphically and as appealingly.

How shocked we were, just a few weeks ago, to read that 1500 lives had been lost in a terrible hurricane down in Central America. Yet in our country last year sixty-six times that many people lost their lives in accidents. In one case it is mass slaughter; in the other it is the individual case multiplied by exactly 99,000! Isn't our experience of 1930 every bit as dramatic, every bit as terrible as that wholesale sacrifice a few weeks ago?

I submit that it is far more horrible. And it is our task to arouse the public from its apparent lassitude. The far-reaching effects of accidents go beyond the basic fact that a human life has been taken or that a victim has been made a permanent cripple. It strikes right at the heart of our whole social structure. It undermines the strength, the courage and hopes of the survivors.

I know what I am talking about, gentlemen. As Chairman of the Chicago Unemployment Relief Committee, my eyes have been opened during recent weeks. I have

seen human misery at its lowest ebb. And it would surprise you to know the number of these deserving cases which can be traced right back to that tragic second when the bread-winner of the family became an accident victim. Surely the story of our national accident catastrophes should touch the heart and purse-strings of everyone who has a bit of human kindness in his system.

The safety movement needs the help of those today who are able to underwrite the financing of a program which will make public the humanitarian purposes and definite accomplishments of our work. I do not hesitate to predict that after safety is properly understood and appreciated, the necessary funds for the expansion of our organized work and for the development of research and study will be forthcoming. Also I would impress upon you that cooperation and support must come from our educators, our government officials, our community leaders, from our churches, our industrialists, and from all who share in influencing the lives and actions of the various groups within our national life.

PRESIDENT BERQUEST: It is pretty safe to say that the newly organized Advisory Committee of the National Safety Council is in good hands.

You will be interested in the names of some of those with whom Mr. Insull has surrounded himself in this new enterprise:

MR. STUYVESANT PEARODY, President, Consumers Company, Chicago.
MR. GERARD SWORE, President, General Electric Company, New York City.
MR. FRED W. SARGENT, President, Chicago & North Western Railroad Company, Chicago.

MR. SEWELL AVERY, President, U. S. Gypsum Company, Chicago.
MR. PAUL SHOUR, President, Southern Pacific Railroad Company, San Francisco.
MR. ALEX. DOW, President, Detroit Edison Company, Detroit.

MR. H. H. ROBERTSON, President, H. H. Robertson Company, Pittsburgh.
MR. F. J. LAMARAN, President, Fort Pitt Malleable Iron Company, Pittsburgh.
MR. EDWARD DANA, General Manager, Boston Elevated Railway Company, Boston.
DR. ROBERT M. HUTCHINS, President, University of Chicago, Chicago.
MR. HARRY B. EARMART, President, White Star Refining Company, The Meadows, Ana Arbor, Michigan.

MR. RICHARD K. MELLON, Pittsburgh.
MR. P. E. CROWLEY, President, New York Central Lines, New York City.
That is a pretty good committee.

The next order of business, will be the presentation of trophies to those who so successfully completed the no-accident contest period sponsored by the Metals, Paper and Pulp, Petroleum and Public Utilities Sections of the National Safety Council.

Award of No-Accident Contest Trophies

The first sectional no-accident contest was sponsored by the Paper and Pulp Section in 1925. This was of very short duration, but was productive of such excellent results, in both reducing lost time and stimulating interest in the accident prevention program of registered units, that a second contest was immediately sponsored for a longer period covering six months.

Today it will be my pleasure to award trophies to those mills completing the Sixth Annual Contest of the Paper and Pulp Section; the Fourth Contest of the Public Utilities as well as the Petroleum Section; and the Third Contest of the Metals Section.

In the no-accident contest period which closed June 30, 1931, a grand total of 765 units completed, or nearly twenty times as many as entered the first contest. Many phenomenal records have been established not only by those ranking first but also by many other contestants. I wish we had sufficient time this morning to discuss them all, particularly the paper mill where the last lost time accident occurred in March, 1926; the public utility with a rate of but one-fourth that of the industry in spite of the fact their man-hour exposure totalled nearly twenty-five million; the

large steel mill which worked over two and one-half million man-hours without a lost time accident; the many, many petroleum departments where man-hour exposure decided the winner because so many have not had a lost time accident in over six months.

But these facts and figures will not be buried for want of time. During the week each section will go into detail when awarding certificates to those in runner-up positions.

I believe, however, it is sufficient to say that the winners having achieved such enviable positions give mute evidence of the sincerity with which industry as a whole endeavors to conserve human life and limb.

Based upon verified reports and on behalf of the National Safety Council and its Executive Committee, the following listed contestants are to be presented with trophies.

In the Public Utilities Contest

Combination Gas and Electric Division.

- Group A—Penn Central Light and Power Co., Altoona, Pa.
- Group B—Lake Superior District Power Co., Ashland, Wis.

Electric Division.

- Group A—Duquesne Light Co., Pittsburgh, Pa.
- Group B—Fall River Electric Light Co., Fall River, Mass.

Gas Division.

- Group A—Hope Natural Gas Co., Pittsburgh, Pa.
- Group B—Reserve Gas Co., Pittsburgh, Pa.

In the Petroleum Section Contest

Manufacturing Department.

- Group A—Vacuum Oil Co., Paulsboro, N. J.
- Group B—Standard Oil Co. (Ind.), Casper, Wyoming.
- Group C—Vacuum Oil Co., Bayonne, N. J.

Marketing Department.

- Group A—Standard Oil Co. (Ind.), St. Louis, Mo.
- Group B—Standard Oil Co. (Ind.), Billings, Mont.

Producing Department.

- Group A—Standard Oil Co. of California, North District, Calif.
- Group B—Hope Construction & Refining Co., Pittsburgh, Pa.
- Group C—General Petroleum Corp., Kern, Calif.

Natural Gas Gasoline Department.

- Group A—Standard Oil Co. of California, Standard Gasoline Co., Calif.
- Group B—Midwest Refining Co., Casper, Wyoming.

Pipe Line Department.

- Group A—Standard Oil Co. of California, San Joaquin Valley Fields, California.
- Group B—General Petroleum Corp., Southern & Terminal Pipe Lines, Calif.

Marine Department.

- Union Oil Co. of California, Los Angeles, Calif.

In the Metals Section Contest

Steel Mills Division.

- Group A—Corrigan McKimney Steel Co., Cleveland, Ohio.
- Group B—Driver Harris Co., Harrison, N. J.

Rolling, Finishing and Fabricating Division.

- Group A—Central Tube Co., Ambridge, Pa.
- Group B—Republic Steel Corp., Union Drawn Steel Co., Beaver Falls Plant No. 1, Beaver Falls, Pa.

Iron Foundries Division.

- Group A—The Ohio Brass Co., Mansfield, Ohio.
- Group B—National Radiator Corp., Johnstown Union Plant, Johnstown, Pa.

Steel Foundries Division.

- Group A—Kensington Steel Co., Chicago, Ill.

Heavy Machine Shops Division.

- Group A—General Electric Co., Philadelphia Works, Philadelphia, Pa.
- Group B—Whiting Corporation, Harvey, Ill.

In the Paper and Pulp Section Contest

Pulp and Paper Mill Division.

- Group A—Kimberly-Clark Corporation, Falls Mill, Niagara Falls, N. Y.
- Group B—The Champion Coated Paper Co., Paper Mill No. 1, Hamilton, Ohio.
- Group C—Consolidated Water Power and Paper Co., Appleton Division, Appleton, Wis.
- Group D—International Paper Co., Riley Mill, Riley, Maine.

Paper and Board Re-Manufacturing Plants Division.

- Bemis Brothers Bag Co., East Pepperell, Mass.

PRESIDENT BERGQUIST: In the Paper and Pulp Section the officers look upon the gentleman at my left here as the daddy of the contest plan, for it was through his efforts that this first activity was sponsored. I have been informed that he has given the greater part of his life to the paper and pulp industry and its safety program. It, therefore, is quite fitting and appropriate that we should be honored by his presence today. He will award his trophy to one of the paper mills which in the opinion of a committee of judges has achieved the most outstanding safety record in the past contest. So it gives me very great pleasure indeed to introduce to you this pioneer in the paper and publishing business, Edward B. Fritz, Publisher of the Paper Industry Magazine, of Chicago. Mr. Fritz will now present the paper industry trophy.

Presentation of "The Paper Industry" Trophy

E. B. FRITZ (Publisher, "The Paper Industry," Chicago): Mr. Chairman and Members: This is the sixth contest. The first one was for thirty days only, the second one for six months and the remaining four on the latter basis. *The Paper Industry* has had the pleasure of presenting the emblem each time for the six years, and it has given us a lot of inspiration, because we have seen each year that the number of accidents has been lessened, and that is the result we have all worked for.

In 1931 there were 125 mills in the contest, one more than in 1930, working about 1,400,000 more man-hours and about 3,600 more employees, with a record of 787 lost time accidents against 966 lost time accidents in 1930. In 1931 there were a little over 17,000 days lost, while in 1930 there were 22,500 days lost.

The ratio of accidents to the number of employees has lessened each year so that in 1927 there was one accident to every 23 men, and in 1931, one to every 52 men.

It was interesting to note that in 1927 and 1929 there were only six mills with perfect records. In 1930 there were eleven and in 1931 there were 15.

The mill voted the major prize has had 482 employees working for 651,603 hours with no lost-time accidents, which we believe is a remarkable record. This is the Champion Coated Paper Company of Hamilton, Ohio, and I take pleasure in presenting its representative with the major trophy at this time. Will you please present this trophy to your company with the compliments of the National Safety Council and *The Paper Industry*?

KENNETH FAIST (Champion Coated Paper Company, Hamilton, Ohio): On behalf of the management and the boys of No. 1 Mill, I want to thank you. I also wish to add that this mill, as you said, employs 482 workers and up to now has worked 1,000,279 man-hours and is still going strong.

PRESIDENT BERGQUIST: I now have another pleasant duty to perform, and that is to present to the Louisville Safety Council a bronze plaque which was so well earned in the Fifth Inter-Council Plant Contest. This plaque was earned because of this outstanding record in the reduction of the accident frequency and severity rate, and I am hopeful that Mr. O'Brien, who said he would come and represent the Council as its president, is here to receive the award. Mr. O'Brien. Congratulations to you, sir, and your associates in Louisville.

E. J. O'BRIEN, JR. (President, Louisville Safety Council): On behalf of the Louisville Safety Council, I wish to thank the National Safety Council, and at the same time call your attention to the record that, we think, is rather wonderful. In 1928 our severity rate was 1.14. For the first six months of 1931 it dropped to .13, with practically the same number of employees listed in the contest as during 1928. I thank you.

PRESIDENT BERGQUIST: I now want to introduce to you a man who has come from the east to talk to us on a subject we know little about. This man is very modest. He comes here to represent a speaker who appears on our program, but who through illness was unable to come. I am sorry that I cannot give you more facts about our next speaker. I know enough about him, though, to know that he is one of the outstanding leaders in water transportation, that he has devoted twenty-five years to this work, that he has the safety conscience Mr. Insull has emphasized, and that much of the progress made in this work in the shipping industry can be laid to the knowledge and untiring work of this gentleman. Mr. A. J. Baker, secretary of the American Shipping Board Steamship Association, New York City, will present the paper prepared for this meeting by Mr. H. B. Walker, of the American Steamship Owners Association.

Safety In the Merchant Marine

By H. B. WALKER

President, American Steamship Owners' Association, New York City

The value of accident prevention in any line of human activity is beyond question. From a humanitarian point of view its worth has never been doubted, but to gain a permanent place in business its economic value had to be demonstrated. Safety in transportation involves three main phases—first, the proper construction and maintenance of the equipment used; second, the operation of the equipment by trained and experienced employees; third, the protection of the employees against personal injury. With respect to the construction, equipment, and operation of ships, shipowners have not only shown an active interest but have been quick to adopt anything which tends to make more safe life and property at sea.

Water transportation is one of the oldest forms of communication. For centuries various types of vessels have been built for use in navigating rivers and oceans. New lands and new peoples have been found by its means, and the same hazards which faced the Phoenicians and Egyptians in their seafaring ventures face navigators today. Progress in ship construction and improvement in aids to navigation have, however, tended to minimize the dangers, and the safety of water transportation has been further enhanced by the use of life-saving equipment, wireless apparatus, fire detecting and extinguishing systems, etc.

Rapid strides have been made in recent years, for it was not until 1854 that

the British Merchant Shipping Act required water-tight compartments in ships. In 1866 the loss of the passenger ship "London" led to a meeting of the Council of the Institution of Naval Architects to consider the general question of safety of life at sea. The last conference was held in London in 1929, at which representatives of all of the leading maritime nations were in attendance. The requirements of the Convention then approved are more stringent than anything ever before proposed for international adoption, and bring the construction of ships to a high degree of safety. Ships built according to its provisions will be more safe because of the higher standards of subdivision, the reduction to a minimum of openings in vital parts of the ship, and the insuring that water-tight doors and side scuttles can be quickly closed in times of emergency. The regulations with regard to life-saving appliances have been modernized and additional buoyant apparatus provided; the use of radiotelegraphy has been extended, and the navigation laws have been modified where considered necessary so that accidents may be reduced to a minimum. The Convention is now before the Congress of the United States, and will probably be ratified at its next session. Ships being built in the United States today are equalling and in some respects exceeding its requirements.

Our Government takes an active interest in the question of safety of ships. Inspection of hulls, boilers, and machinery is regularly carried out by the Steamboat Inspection Service of the Department of Commerce. The first Federal legislation having for its purpose the safeguarding of lives and property at sea was enacted in July, 1838. Owners of steamboats were required to make a new enrollment and take out a new license without which they could transport neither passengers nor goods. Inspectors were at that time appointed by the United States District Judges, whose duty was to ascertain whether the vessel was in all respects seaworthy. Regulations governing the operation of ships were also prescribed.

The present administration and operation of the Steamboat Inspection Service are based upon the Act of Congress of February 28, 1871, which law, among other things, provides for the inspection, testing, and stamping of material used in the construction of marine boilers. This provision has proved of high value and importance in the prevention of explosions and consequent loss of life. Life-saving equipment, fire-fighting apparatus, and similar devices are also examined to determine whether they are suitable and sufficient as required by law. These inspections are made during construction and periodically thereafter not less than once a year.

The Steamboat Inspection Service also has charge of the licensing of officers, who must have had actual experience on board ship. The applicants for license are submitted to rigid written and oral examinations, which cover, for deck officers, among other things, first-aid, visual acuity, and color sense. The officials of the Steamboat Inspection Service also make sure of the ability of able seamen and life-boat men, and issue certificates to them. It is this branch of the Government that has power to revoke the license of an officer for violations of law.

Not only does the Steamboat Inspection Service perform administrative functions such as the inspection of hulls and boilers, the certification of vessels, and the licensing of men, and quasi-judicial functions such as the investigation of the conduct of licensed officers, but it has legislative functions to perform in formulating rules and regulations which, when approved by the Secretary of Commerce, have the force of statute law.

The Steamboat Inspection Service is doing an excellent work and through its efforts the danger of accidents is considerably lessened, and the owners and operators of vessels show not only a willingness but a desire to cooperate in the elimination, as far as possible, of every element of danger. How safe transportation

by water has become is evidenced by the fact that for the past ten years an average in excess of 4,100,000 passengers have been carried for every life that was lost.

The United States Navy contributes to safety of life at sea by providing aids to navigation along the coast. These are in the form of radio compass stations from which navigators can obtain their exact position at any time. No charge is assessed for this service, either to our own ships or to those of foreign nations. The Hydrographic Office of the Navy Department has also been an important factor in the promotion of safety. It was established under the Navy in 1830, and issues charts, light lists, sailing directions, and navigational books. With the changing conditions, earthquakes, erosion, new discoveries, and new construction, the charts, light lists, and sailing directions must be continually revised. Daily and weekly notices are distributed containing all new information, and when urgent, messages are broadcast by radio.

The Lighthouse Service maintains the buoys in our channels, as well as our light-houses, lightships, and radiobeacons, which are of inestimable aid. These stations, by night and frequently by day, broadcast their friendly signals of guidance and of warning, using light or sound or radio. Our first light station, at the entrance to Boston Harbor, was placed in commission 214 years ago, and there have since been added more than 19,000 aids of various kinds. No maritime nation in the world has its channels so well marked or enjoys so many aids to navigation. This service, as well as the Hydrographic Office and the Steamboat Inspection Service, is in charge of experienced and highly efficient men. Studies are constantly being made with the view to improvements in the service.

Excellent work is done by the United States Coast Guard, which was organized by Alexander Hamilton in 1790 for the purpose of preventing the smuggling of tea, spices, and other commodities. It has since 1914 carried on the International Ice Patrol which is supported by all of the leading maritime nations. This particular service was developed as a result of the loss of the "Titanic." The Coast Guard stands ready night and day to aid vessels in distress, and its many heroic rescues are well known.

Another branch of the Government concerned in the proper construction and operation of ships is the Bureau of Navigation. It is responsible in general for the enforcement of the laws and regulations applying to seamen and to the merchant marine, including the recently enacted Load Line Law. Certain special lines of work falling within these general categories are entrusted to the Public Health Service, the Steamboat Inspection Service, and the Customs officials of the Treasury Department, in view of the special facilities possessed by these agencies and to avoid duplication of effort. In general, the duties of this Bureau include the registry, enrollment, and licensing of American vessels, the admeasurement of vessels, the assessment and collection of tonnage taxes, and the entry and clearance of ships.

In the shipping industry the value of accident prevention to the personnel, both aboard ship and ashore, is being more generally realized. Shipping executives are taking a keener interest not only from the humanitarian standpoint but because safe practices pay. On the Great Lakes safety education has been carried on through ship safety committees for a number of years with excellent results. Each committee, which is composed of six men, holds a meeting once a month upon the call of the master of the vessel, at which the master and chief engineer are present in an advisory capacity. They consider various questions of safety, discuss accidents, give instructions to new men, etc. As a result of the work of these committees, accidents have been very materially reduced.

In Seattle safety education is conducted by the Waterfront Employers' Association, on which both employer and employee have representation. This association, by means of careful employment selection, has greatly reduced the high labor

turn-over in the stevedoring industry which has resulted in more steady employment for the men, with increased earnings. In San Francisco there is also a co-operative movement which has been in existence since 1927. A safety engineer, who devotes his entire time to the work, is in charge and has done excellent work. Similar work is carried on in other ports, and several companies have highly developed safety departments in their own organization. On the Atlantic Coast much has been accomplished through the activities of the Marine Section of this Council, in which many of the leading American shipowners and operators hold membership. One company is reported to have saved \$70,000 in one year in the cost of accidents occurring among longshoremen and other employees through an organized safety movement costing less than \$500.

Our own association has a safety committee which has formulated recommendations, now generally observed, for the prevention of accidents based upon the practices of those of our members who have been carrying on accident prevention work. Steps are now being taken toward the formulation of a safe practice pamphlet which will be suitable for all of our ports. There has been splendid cooperation on the part of the safety committees in various compensation districts, as well as on the part of the United States Employees' Compensation Commission, through its safety engineer. Distribution of pamphlets, posters, and other material by the Marine Section of this organization has been invaluable, and executives, who are always sympathetic to an injured employee, are now actively taking steps to prevent the occurrence of accidents, for they realize that safety pays.

PRESIDENT BERGQUIST: Thank you, Mr. Baker, for the able presentation of that paper on water transportation and the activities undertaken to prevent accidents therein.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL.



Annual Banquet

Wednesday Evening Session
October 14, 1931

C. W. BERGQUIST, Presiding
President, National Safety Council, Inc.

OTHO M. GRAVES, Toastmaster
President, National Crushed Stone Company, Easton, Pa.

The Banquet session was called to order by Arthur H. Young, secretary, Industrial Relations Counselors, Inc., New York City.

CHAIRMAN YOUNG: I am bidden by the Executive Committee to inform you of their action at this afternoon's meeting where the National Safety Council officers for the ensuing year were elected.

This year the committee desired to pay an especially signal honor to the chief who was to lead us throughout this year, a man who as our leader last year, in spite of being faced throughout his whole term by the most adverse economic conditions ever met in the progress of the National Safety Council, consolidated all of the gains of the past twenty years, added new aims, and attained new objectives for our organization without loss of any item of quality of service to our members. He has succeeded in these difficult times in bringing the whole organization, membership, officers, executive committeemen, members of the staff, into close, cohesive cooperation and harmony.

Therefore, the members of the Executive Committee have conferred upon this man an honor only twice previously conferred upon our president. It is a great honor and your privilege to meet Carl W. Bergquist, reelected president of the National Safety Council.

PRESIDENT BERGQUIST: I thank you most heartily for that cordial response to Mr. Young's announcement. There are other men on the Executive Committee and in other positions in the National Safety Council who should share this honor with me. I shall read the names of the Executive Committee members who were elected by your Board today.

Vice President for Finance—J. I. Banash.
Vice President for Industrial Safety—Arthur M. Tode.
Vice President for Public Safety—Edward Dana.
Vice President for Business Administration—G. T. Hellmuth.
Vice President for Territorial Council—John E. Long.
Vice President for Membership—Howard B. Fonda.
Vice President for Engineering—J. E. Culliney.
Vice President for Education—Albert W. Whitney.

Vice President for Health—Dr. C.-E. A. Winslow.

Treasurer—Will Cooper.

Managing Director—W. H. Cameron.

I would like at this time to make special mention of one who is very well known to us Chicagoans, and who I know will become well known to the rest of you people in time, a man who is always ready to stand behind any civic movement for the betterment of his native city and his state and his country, if need be. I want especially to introduce him to you because he has recently become an integral part of the National Safety Council as the chairman of the newly organized Advisory Committee, Samuel Insull Jr.

There is one other man, ladies and gentlemen, who has done more for the safety movement in Chicago than any other man has done. Everyone in Chicago who is in touch with the safety movement, in any capacity, knows who this man is. For the benefit of those of you from out of town who may not know him, I want to present to you C. L. Rice, President of the Chicago Safety Council.

To lead the National Safety Council for a second year is indeed a unique privilege. Most of us who are elected to such offices relinquish our duties with a feeling that we have fallen far short of what we had hoped to accomplish. For this reason, I feel exceptionally fortunate in having the opportunity to gain from a year's experience, and I appreciate this evidence of your confidence more deeply than I can express that appreciation in mere words.

The year just past has brought many perplexing problems. We have wondered whether the work of the years could possibly survive the economic condition which now confronts us. I feel that we can face the future of the safety movement with confidence. The attendance at this Congress, the largest held in this great hotel this year, is convincing proof that the nation has faith in the safety movement.

Industry realizes that the abandonment of accident prevention until more prosperous times come would be little short of disastrous. The results of safety are cumulative. It cannot be discontinued without losing much valuable momentum that has been gained over the past twenty years. We are living in a changing world. We have witnessed many scientific miracles thus far in this century, and scientists tell us that the greatest wonders are still to come. Some of the discoveries of the past have presented hazards which we had to overcome before these discoveries became useful servants of man, and the future will bring new problems and tax our ability to a greater extent than heretofore if we are to harness all of the forces and bring them safely to our service.

I have no fear that the safety movement will become bankrupt spiritually. The pioneers of the movement have left us an heritage that should inspire us to our best efforts, and we must proceed in a spirit of willingness to do the things which they left undone, but which they so admirably started.

The safety movement is not confronted by any organized opposition, and therein lies one of our difficulties. Safety is accepted passively. It meets with apathy and indifference on the part of some people, but not hatred or persecution. It becomes our duty, therefore, to inspire the public, and we must carry on with a zeal guided by a thorough understanding of the problem. Lukewarmness and discouragement in our own ranks is the greatest handicap that we face in attaining our objective, universal safety. The prolonging of human life and happiness is the goal which inspires us to do our best. The coming year will present new opportunity for us to serve humanity. Your officers ask for your continued loyalty and generous help, knowing that you will give it gladly and wholeheartedly, as you have in the past.

We have on the program tonight a matter of unusual interest and importance having to do with the outstanding record of one of our great railroad systems in the safety movement. The year 1930 ended a decade of progress in efficient rail transportation that stands as a monument to the wisdom of the management of these great railroads, one of America's greatest assets.

One of the outstanding features of that decade of railroad operation has been the almost universally established safety movement in every road that operates in this country. Safety in railroad employment has been one of the particular features in our part in life conservation, and the Railroad Employees' National Safety Contest has been credited with being one of the most effective agencies utilized by the individual railroads in their accident prevention programs.

The files of the Interstate Commerce Commission furnish evidence that passenger travel on our railroads has become safer with the passing years and many roads have established phenomenal records since the year 1917 when the Interstate Commerce Commission first published passenger accident statistics. These records have been carefully analyzed in order to determine which railroad or railroad system has operated the greatest number of passenger miles without a passenger being killed in a train accident. The result of this study is the basis of our Special Safety Award, a feature of our program tonight, and I request W. H. Cameron, our managing director, to please read the commemorative citation authorized by the National Safety Council.

W. H. CAMERON: "National Safety Council Certificate of Special Commendation, awarded the New York Central Lines: The New York Central Railroad Company, seven consecutive years' clear record; The Michigan Central Railroad, nine consecutive years' clear record; The Boston & Albany Railroad, fourteen consecutive years' clear record; The Pittsburgh and Lake Erie Railroad Company, fourteen consecutive years' clear record, in recognition of their outstanding achievements in the field of safe rail transportation, these four units of the System having recorded a combined total of 26,947,687,000 passenger miles during the seven consecutive years, 1924 to 1930, without a passenger killed in a train accident, the greatest number that stands credited to any railroad, according to the official records of the Interstate Commerce Commission as of January 1, 1931."

PRESIDENT BERGQUIST: Before presenting this evidence of superiority in accident prevention to the great railroad which merits it, I want to remark that R. D. Starbuck of the New York Central Lines is our guest of honor as the official representative of this railroad system. It is indeed a great pleasure to have him with us as our guest on this occasion. With this Certificate of Special Commendation goes our congratulations and best wishes for further achievement in the field of railroad safety. I have the honor to present to you R. D. Starbuck, vice-president of The New York Central Lines.

R. D. STARBUCK: On behalf of The New York Central Lines, I wish to express sincere appreciation of the honor that has been conferred upon us. There is real satisfaction in the realization that, with other railroads, we are succeeding in making rail transportation increasingly safe in this country each year. That we of the New York Central should achieve a record in our passenger safety department worthy of special award by the National Safety Council, is indeed most gratifying and should prove an added inspiration for continued effort in providing the utmost possible safety to the public.

This record has not been attained by any group of individuals, nor by any special class of employees. Whatever credit is due properly should go to all classes of our employees who have loyally and earnestly endeavored to put into practice the fundamental policy of our system, safe and dependable transportation service.

To you, President Bergquist, to your Executive Committee, and to the National Council as a whole, we of the New York Central extend all good wishes for continued success in the worthy cause of universal safety. I thank you very much.

PRESIDENT BERGQUIST: Now then I am about to vanish from the program, which will be continued under the direction of a very distinguished and able gentleman.

He is by education and training an engineer. He is also an author. He was a professor in two different universities. He was engaged in transportation activities somewhat early in his career. But through the final stages of success, he finally landed at

the rock bottom of railroads by becoming president of the General Crushed Stone Company.

It gives me very great pleasure to introduce to our members and guests tonight, Otho M. Graves, your toastmaster, who will conduct the remainder of the program.

Remarks by the Banquet Toastmaster

TOASTMASTER GRAVES: I want you to know that I am most deeply appreciative of the honor which you have conferred upon me, and I think also upon the industry with which I am connected, in asking me to be the toastmaster of so distinguished a gathering.

So large a gathering as this is stimulating and inspiring to us all and must be encouraging to your officers. Regardless of the difference in our various occupations, we are gathered here tonight motivated by similar impulses, imbued with common ideals, and sharing the common purpose of endeavoring to make this country a safer and, therefore, a happier place in which to live. By attendance at the Congress and at this banquet tonight, we refresh enthusiasm, quicken spirits, and dedicate ourselves anew to the humanitarian work in which we are engaged. This is a surprisingly large audience and when we consider the difficult and trying times in which we live, it becomes all the more evident that you place your faith and confidence in the work of this Council and in the work of your officers.

In the last few years it has become increasingly evident that of all the material with which man has to work, there is none so vitally important nor so fascinating as the human.

A relatively new thought is manifestly permeating industrial activity, a keener perception of the interdependence of employer and employee, a relationship which now approaches economic equality. Industry is demanding a new type of executive who not only thoroughly understands the processes of manufacture, but who sees and sympathetically shares the personal problems of his men, one who while governing and directing, creates in those associated with him enthusiastic cooperation; a leader and not a boss, one whose qualities of integrity, judicial fairness, and human kindness awaken the loyalty and hold the confidence of his men.

I am firmly convinced, as I know you are also, that the employee, if he believes that the interest of his employer in his welfare and in his contentment of mind is prompted by ordinary human kindness and sympathy, will admire and respect his leader all the more.

On some previous occasions, and also I trust I will repeat it again in the future, I have called to the attention of those who have labor under their control, that I wish we might all carry in our minds and hearts those lines of Pope which, though written nearly two centuries ago, seem prophetic in their application.

"Teach me to feel another's woe,

To hide the faults I see;

That mercy I to others show,

That mercy show to me."

May God speed the day when that spirit shall guide our thought and govern our conduct.

This morning I had a very delightful conversation with a gentleman whom I met for the first time. He told me, under pressure from me, a good deal about himself which was quite fascinating. I can't repeat it all to you. You will have the pleasure of listening to him in a few moments for yourself and judge for yourself as to the interest I had this morning in what he was saying.

He has had degrees from the University of Glasgow and the University of London. He is a minister in the Presbyterian Church of the United States. I think it is called the National Presbyterian Church. He is a poet, a lecturer, and a preacher. But the thing that interested me most was a bit of personal history which I am quite sure he didn't think that I would share with you, but I am going to do it.

He told me when he was a young minister in the Scotch Presbyterian Church, he met a young American girl in Scotland and fell in love with her, and they didn't see each other for nine years, when he came to America and became a minister of the National Presbyterian Church. Whether his being in love had anything to do with this slight change in denomination remains unrelated, but at any rate, after a lapse of nine years, they met again and were married; and he tells me they are still married.

I am thinking the romance there made the poet of him; and I am also thinking the appeal necessary to win her after nine years of inactivity made him the lecturer that he is; and I am also thinking, because of the tender way in which he spoke of her, that the only way he knew to thank God for her was to become a preacher.

It is with confidence and pleasure that I present to you one whom many of you already know, Dr. Robert MacGowan of Pittsburgh.

The Moral Aspects of Accident Prevention

By ROBERT MACGOWAN, D.D.

Minister, Bellefield Presbyterian Church, Pittsburgh, Pa.

When I came to this country and found out some of the things that were happening here, I just loved it, and one of the things that drew me to it was this National Safety Council. It wasn't very old at the time I came to this country first, but don't you see what it meant to me? It meant this: that it was placing the emphasis where it properly belongs forever in this country. The first thing that matters in America is not land and landlords, and it isn't big business and big dollars. The first thing that matters is man and woman and boy and girl, human beings like ourselves, brought together here tonight. If that is not true today, then we have ourselves to blame, because it is written into the Constitution of the United States of America.

I found that in this country every man is a worker, or should be. In England a gentleman is a man who doesn't work or who doesn't need to work, as you know; but in this country, as you also know, we call that fellow a tramp, don't we? Every man until the end of his time wants to be exercising his faculties in some way or other. Every man is interested in his job because it is part of himself, it is his own personality. In it he is expressing himself.

When men are not at work, you can see it written on their countenances, you can see it in their clothes, you can see it in themselves. They lack initiative, self-expression, the thing that every man should have by the Grace of God. A good job—I hope it will soon come back again for every man and woman who wants to work in this big country of ours. Don't you know that work is the future basis of the brotherhood of mankind? Maybe Russia is telling us. It can't all be lies that they are living over yonder. A lot of it is, and time is going to show us just what the lie is, but there is one truth, that men must be workers together for the common good, and with the common good in their heart and in their pocket if they are to be brothers unto the ends of the earth.

Well, now what about jobs? Safety means jobs, this, that, and the other kind. In order that a job may be done right, there are certain simple provisions, certain considerations that we must keep in mind. The first thing is this: a job must be done skillfully. An unskilled man is a menace in any job, whether it is driving a nail or driving an engine. An unskilled man will spoil any job and will spoil it for the other fellow, too. It should be done on schedule. Regularity and punctuality are a part of the life of a mill just as much as they are a part of the life of a school. It is the rush work that causes the accidents, the piling up of the work until the end of the week or some other time. It should be kept up to the minute.

Regularity and punctuality sometimes save a lot of disaster. And then, work should be done safely, and here is the third important item in the whole business. An un-

skilled man means loss of material for you, as the employer, and for the fellows engaged in the work.

A piece of pottery thrown down can never be replaced. It is lost, it is done, it is money lost. Lost time is the same thing, and if there be no safety, it is lost life, lost skill, lost labor, lost manhood, lost enthusiasm, lost inspiration, and loss of everything that makes the wheels go round.

You know, I am a safety man from away back. I spend the summer with my father down in our summer home. The old gentleman has a funny habit. When he burns a match, he never throws it away. He worked in the dye works in the old country. He has been ten years retired but he is still continuing to do it. He puts the matches back into the old box and he sees that every match is out before it goes in there. You see he was a safety man before men thought about safety. He practiced it and lived it.

The National Safety Council is just endeavoring to organize the sentiment that is in every good man's heart and always has been, for the preservation of the safety and of the life of our fellow men and women, and they are doing it to the queen's taste.

You know, this country went through its Revolution. Russia is going through its Revolution and having a pretty easy time of it in comparison to what we had. They are simply taking the lessons that civilization elsewhere has gone through hell to learn, and she is taking them easily and applying them in her own country for her own time, and there is plenty of work to do in building the things we have already built. But away back in the middle of the last century, there came the Industrial Revolution. Before that time, well, there wasn't very much need of safety. Men took a little time.

In 1835 the Patent Office had been established in Washington, D. C. In twenty years, they had 60,000 patents registered for machinery. Since that time, millions have been entered there, and are being entered still. Steinmetz and Edison and the rest of them—they were the forerunners of it all. Here were these great monsters, then, ready to devour us; voracious, hungry, eating up human life at an incredible rate. In Pittsburgh in 1900, 600 men died in one year in the mills, killed at their work. That has been largely eliminated. Why? Because the Safety Council has been busy and the mills now are safer places to live in, and cities, we hope, will sometime become safer places to live in, too.

Now, what caused it all? It was just a new vision dawning on the minds of great industrial leaders. Men said to themselves, "We have recognized now that after all is said and done, the important matter is not the mill; it is the man. It is not the work; it is the worker. It is not the produce; it is the producer." We must have the right kind of men thinking the right way and living the right kind of life within our mills, and if we do, things will go well with us.

Now, how is it that men are related to safety in their work? I am related to machinery. I am a clergyman, but I have a car and I have got to monkey around with that car occasionally. It is spitting now and I will have to look after it and my bank is busted and I don't know what I am going to do. But still, I am a part of the machinery age. Then three things are our concern. First, the construction of that thing, whatever it may be, a glass, a cigar, a motor car, an automobile, anything at all. If there is imperfect workmanship there, I may be driving my new car along the highway someday and because of these imperfections, I may get my neck broken, and somebody else with me.

Then the care of the car. That is myself, my job. Do I drive in to have it looked over, oiled and greased, and the little things done? No, I just postpone it, thinking, Oh well, there is plenty of time, and then, Bang! There is a crash.

Or, it may be in the control of the car. That is myself again. I am behind the wheel. What am I going to do? How am I going to drive? When a man goes thirty miles an hour, he is going. When he is going forty miles an hour, he is going somewhere. When he is going seventy-five miles an hour, he is going to hell.

The point is this: there is nothing wrong with the machine. It is the man behind

the wheel. Let's say it again altogether: in politics, in religion, in business, in the home, I don't care what the thing may be, it is what you said, Mr. Toastmaster, it is the human. It is the creation of life that is our business at this minute. What we want is manhood and womanhood—the man behind the wheel.

You remember the story in the Old Testament about Jehu. The folks looked up the road and saw a big cloud of dust rising and they said, "There he comes! See his horses. See him galloping."

And a stranger said, "Who is it?" And they answered, "That is Jehu, the son of Hanani. He driveth furiously."

There was nothing wrong with his horses; they were perfectly decent horses. There was nothing wrong with his chariot; it was well made like any chariot in those times. He was a king, but it was a furious man who held the reins, and that is the trouble in this country at this present minute.

Here are the enemies of the cause. Can I state them to you very simply? The enemies of our cause are found in the very nature of the thing itself. Let me congratulate you folks in Chicago on your Planetarium. That is an education. The lights go out and you see the panorama of the skies floating about you, then the lecturer talks to you about the order and uniformity of nature, the order and the uniformity of law everywhere.

Well, that is just what we are up against when we go out to a mill or anywhere else. I drop a hammer and it falls on my toe and I have a sore toe. So I have to watch the processes of law, universal in the world. We are in a world that is sometimes in our favor and sometimes very much against us, a world of frustration and limitation, where men have to struggle to get the things that are worth while, where if they are to achieve, they must make sacrifices. Nature so proclaims it, and when you go to work in a mill, there are the laws that have to be observed. If you don't observe them there will come the crash.

You know, I learned to be a philosopher when I was a little fellow. Little children are very imitative and they want to do what you do. The plumber had been at our home, and I had seen him put the poker in the fire and then put it up to his cheek to see if it was hot enough. I thought I could do the same thing, so I shoved the poker into the fire and it came out red hot, and I proceeded to see if it was hot enough. I didn't do it again. No, I don't have a scar, but I learned respect for nature's laws. The worst atheist in the world doesn't say, "I don't believe in God," but rather "I don't believe in nature's laws and I can abuse them as I want to."

I don't care what else you believe in, I don't care what else you respect, but first respect the universe and the laws that are there for you in the control of your conduct, and everything else will come right with you.

Then there are the hazards of occupation. Go into the big mills yonder. I see in there weight, I see speed, I see power. These steel plates look like flapjacks being turned over by these mighty arms. It is a marvelous thing, but just think of the danger, the power of it.

This sense of power, you know, is in the universe around you. Let me tell you something: if you get it into your mind, you will not go into the mill and put your dinner-pail down and begin grumbling. You will go in as though you were going into church, with a genuine respect for the universe of power. What have you in a mill? What is it? Listen to me. It is the concentrated power of God's universe in one little corner of the globe. There it is—and you are going to play with it and trifle with it? No, you don't. You won't do it for very long. Respect the power that is there.

Then there is a last thing that is an enemy of our cause, and that is the human nature itself, the temperament of man. What do we call it? Is it recklessness? I don't like the word. Why not call it *wreckfulness* and spell it with a "w"?

Oh no, I say as a Scotchman, it is not in my blood to be like that. Don't you remember what Bobby Burns said: "Patient, cautious self-control is wisdom's root." Now read it this way: Patient, cautious self-control is *safety's* root. How is that?

It couldn't be better. You need the right kind of a man for a safety worker or a safety citizen, or a safety anything else.

It is this wreckfulness that makes the woman run for a gun, you know, when they have a wee quarrel. Better the divorce court any time than that. We run for a pistol when we get angry at one another; we want to shoot somebody. It is like the Irishman—do you remember him?—who was scared to death during the night when it was all dark, and he saw an apparition at the foot of his bed and he drew his pistol and shot. The next morning he found a hole in his shirt, and somebody said, "Well, what did you do about it, Pat?"

"Oh," he said, "I just thanked God I wasn't in the shirt when it happened."

Then there is something more. This is a little bit of what we call thoughtfulness. I don't know whether to call a man crazy when he drives the way some people do, or just plain dumb—helplessly dumb. Is that right? They sail along through the side streets with their hats tilted on the side of their heads and maybe they are driving with one hand at that, and when you get them alone they are boasting all the time about the speed they made.

How often we are called in to see accidents and we hear how it happened, and it is this: I didn't think. I didn't think it could happen.

And what of the selfishness of men, the men who go around, who simply and deliberately don't care what happens? They have got to get on their way. They are the hogs. You know the swine don't obey traffic lights. The traffic light is put up for intelligent people. Don't be the selfish man.

These are the enemies of our cause and are largely within ourselves, but there are also one or two friends of the cause we have to emphasize. The first is the instinct of self-preservation. It goes way back to the beginning of time, when men first learned the difference between good and evil. The things that hurt their body, they learned to avoid and they called them evil. The things that helped them and made them strong, they called good.

Morality had a physical basis, largely, to begin with, but there are some men in our own time who haven't sense enough to come out of the rain. They go back again and do the things that are killing them and destroying them and wounding their bodies, and their souls as well.

This instinct of self-preservation is something that we have to develop for our own time, to develop and encourage in the lives of boys and girls. It is a business for all of us who are in contact with life and teaching young life how to guard itself from danger.

The second friend is the instinct of adaptation; that is to say, you can very easily become accustomed to a new environment. There is an instinct of response in your nature. Science tells us that all life is reduced to response today: the response of that flower, for example, to the sun; the response of a man's mind to the teacher; the response of a little child to a mother, the response of a sweetheart to his beloved. And so the environment around us is waiting for the right response.

And there is the automobile sense, the speed sense, the electric sense. There is a transmutation of these functions within our own nature. Man is applying himself in new ways and is learning new lessons, and all the while and in the process of it, adjusting himself into the new world into which he was born, a world of expert machinery, delicate and sensitive, that he has to guard himself against.

Here we are gathered together, interested in one another and in a common cause. We love to be together. We are human beings like one another physically and in our needs and in our work is the basis upon which all community service has to be built as the generations pass by.

These are the things that we must cultivate in human experience, if the safety business is to make the progress that it must.

So I just want to say this in closing, and give you the three things I would advise: First, practice the simple, plain, ordinary, everyday virtues. If you want a code of

ethics for your safety movement, I would point you back to the Sermon on the Mount. Be a little generous to one another, a little merciful, a little patient, a little kind.

The second thing is this: *practice the pause*. The poet has to do it in his lines else he will end in trouble, and true poetry is just the music of the pause. The orator has to do it. If he does not pause, he will swamp his hearers with oratory.

So, I say practice the pause. Practice it when you are out in traffic. Shall we call it the "patience pause?" When you come to the left hand turn at the street corner, or you see somebody backing around and you want to get through, two seconds will save a busted wheel and a broken neck. Take a little time, wait a minute, don't be in such a big hurry.

And then the last thing is brotherhood. Practice the principles of brotherhood. Do you feel it that way? Do you feel it is being spread abroad into our big world? The safety business has got to be taken up by all countries in a big way.

Our basic principles are brotherhood. Spell brotherhood, and in the accomplishment of that end, we shall reach the broader, the deeper, the more elevated conception of the thing that we call safety—safety for mankind.

R. L. Stevenson, when he was dying, was down in the South Sea Isles. The native chiefs loved him, and they said, "Let's do something for him before he dies." So they built him a road, a road from the mountain where he lived down to the water he loved so well, and after the road was built they went to present it to him. It is a beautiful thing even yet. And they said, "Master, this is for you, built in your honor, and we have called it, 'The Road of the Loving Heart.'"

That is why I am in the Safety Council, why I am in its work, and why I am here tonight. I want to be one of the builders of the Road of the Loving Heart, through our country's life and out yonder into the larger life of mankind everywhere.

TOASTMASTER GRAVES: I am sure, Dr. MacGowan, that if all of this audience could speak to you as I only for the moment am privileged to do, they would join with me in expressing to you our deepest appreciation for one of the most delightful safety talks that any of us have ever heard.

I have known Mr. Bergquist only a short time, but I am quite able to realize in that small space of time why he has been elected for a second term. I enjoyed, as I know you did, the scholarly analysis in his address to us this evening. I realize that behind him is an unusually competent, capable, well informed, energetic executive committee, and back of that, a board of directors, all of whom are giving unstintingly of their time and thought and energy.

I know that not only this Council, but American industry is indebted to these men who helped this Council. I am also aware of something further than that, and that is that their work could not be done except for the voluntary support of all of the industries which you present tonight so ably represent: a thousand men on countless committees, serving independently of one another, and yet correlating their work, exchanging ideas of one industry with another, all through the magnificent clearing house of the Safety Council.

Somewhat or other the simile occurs that the National Safety Council is like a lantern, lighting the feet of the road to which Dr. MacGowan has just referred.

Now then, if this Safety Council is a lantern lighting the pathway as it stretches before us, it has a light within it, and don't you agree with me that that light is Will Cameron?

It is a difficult task to introduce the second and last of our speakers. He tells me he is a Pennsylvania Irish Quaker. In my sojourn in Pennsylvania, I thought there were only Quakers and Dutch there.

All of us who know Jimmy Gheen know that from time to time we lose him. He has organized Chambers of Commerce and after they are running well, they lose him. He has been manager of the order department of the Bethlehem Steel Company, and when they had all the orders they could handle, they lost him. He has talked all over the United States to service clubs, Kiwanis, Rotary, Lions, Four-Square, and all the

others. They all lost him. He is just a little too big (and I mean this sincerely) for any one job. He has that genius, I think, of realizing what so few of us do, that humor drives home reason quicker than anything else. And so without more ado, I present to you Jimmy Gheen, our inspirational humorist of America.

How's Your Spizzerintum?

By JAMES E. GHEEN
New York City

I don't think any one in the room envies me the position I now occupy, following that wonderful address we all listened to so intently that was given by Dr. MacGowan.

I remember speaking one time in Jackson, Michigan, where there were three speakers on the regular program and I was sandwiched in between the other two, and the gentlemen preceding me had made a very remarkable address. When I rose to speak, I said I felt like the oyster in the oyster stew that met the other oyster and said, "Hello, how are you?"

"I am all right, but, by the way, where are we?"

"We are at a church supper."

"Then," said the first oyster, "what the dickens are both of us doing here?"

It would seem to me better to have dismissed you after that wonderful address of Dr. MacGowan's.

But, when the third speaker was introduced, he arose and said, "I have no compunction about being referred to as an oyster, but he didn't tell all the story. A small boy at the church supper was called upon to eat the two oysters. His mother had given him one, and presuming that he had eaten it, she said, 'Son, don't you want the other oyster now?' And he replied, 'Huh huh, (puckering up his face) I don't want this one!'"

Football having been mentioned here this evening, I sort of feel that I am interference. I remember that story told by a football man who saw a game of football in the southern part of the United States played by colored boys. It was a fast game, played between two clubs that called themselves the I-Will-Arise Club and the Come-Late-and-Leave-Early Club. (The latter club was composed of members of boards of directors. I imagine.) The little quarter back of the I-Will-Arise Club was so proud of his club and so pompous that he never used numbers less than a hundred thousand. When he called his signals, he would call them something like this: "Three hundred forty-two trillion." And then the ball was passed and away they would go, but they didn't go very far because they met some stiff opposition from the Come-Late-and-Leave-Early Club.

One day a great inspiration struck him and he thought that was the psychological moment to put in the reserve full back, so he looked over to the bench where the reserves were sitting and called one of the finest specimens of manhood he ever saw,—a great big black man, six foot, six-inches tall, weighing 225 pounds, and built like a panther.

The quarter back called, "Four hundred sixty-two trillion."

But the big full back said, "Never mind them big numbers. Just give me the ball." They did and he started around the end. He had supple hips, and every time a would-be tackler would come to him, he would knock him to one side. And when he got out in front of the improvised grandstand where the colored girls were, he threw back his head and said, "Interference, follow me!"

So I feel something like that interference, but I come here, glad to see you laugh, and to know why you do laugh.

I was in Denver, Colorado in 1924 and a man came up to me and said, "Jimmy, did

you ever hear this one? To him who feels, life is a tragedy. To him who thinks, life is a comedy."

That is the reason you laugh, because you men in this national safety movement don't just feel badly about what has happened; you haven't just *felt* about it, but you have *thought* about it also, and therefore, you can smile at least, and perhaps laugh.

Now, at home, my wife says that I am a wit. Some of her friends agree that she is half right, so I don't know, sometimes, just how foolish I am. Probably no after-dinner speaker does. Now when I go out to speak on occasions like this, my wife admonishes me not to be a fool and not to talk too long, and whoever started this meeting left a watch right here, so I will make what I call a timely address by referring to the watch occasionally. You can look at yours if you want to. I don't mind a bit, but don't put it up to your ear and shake it; that is embarrassing.

I have had embarrassing moments on platforms, as other speakers have. I heard recently of a publication offering a dollar prize to the person suggesting the most embarrassing moment he had ever experienced, and a man wrote in and said, "Send the dollar to me. The other night I went home and found my wife sitting on another man's lap, and she was embarrassed, too, so you had better send two dollars."

The answer came back, "I am sending three dollars. I imagine the other fellow was embarrassed also."

I am not feeling exactly embarrassed tonight. I love the way the New York delegation sang over there. Every once in awhile the rest of you sang. I couldn't help singing. Mr. Starbuck and I sat there and harmonized beautifully. I am a good singer. All my family are good singers. We had to be good singers—we had no luck on the bathroom door.

That is the reason, when I come to a party like this, I like to sing and I like to laugh and I like to see other people laugh, and I am so glad that the ladies are here tonight. Women's minds are cleaner than men's, but they ought to be. They change them oftener.

I was so glad to hear Dr. MacGowan talk about this wreckfulness and this hurry and this blurry, where with all the speed that we have these days we keep thinking we must hurry and we go at a rapid pace, and sometimes even in speaking we try to talk as fast as Floyd Gibbons. There is no reason for it. Someone has said that if President Hoover knows what is in the Wickersham Report, Floyd Gibbons must have read it to him.

I was down in Albany, the state capital of New York, one time, and I was in the office of Mark Grave, former Tax Commissioner and now Director of Budgets. One of these excited individuals ran in and said, "Mark, where can I get hold of Miss Osgood?"

"Well, I don't know," Mark said, "she is awfully ticklish."

I was in a restaurant in New York City one day and another one of these excited individuals came in and sat down beside me and rapped on the counter. The waitress said, "What can I do for you?"

He said, "I want some turtle soup and I want it in a hurry."

And the waitress said, "All right, but I can't get it for you in a hurry. You know how these turtles are."

I was brought up to safety when I was in the Bethlehem Steel Company making some steel and some speeches. Now I am making all speeches and no steel, but I learned a lot about safety. I have watched the movement with a great deal of interest and I know this matter of speed, this matter of hurry that has come upon us, we have to eliminate in some way.

I don't know, for instance, whether most people are careless or not. I hope they are, in order that I can say what I have to say in this connection. The majority are careless, I hope, because I never believed so much in majorities. I remember the time, for instance, of the Great Flood when only one man had sense enough to come

in out of the wet. That is what I am trying to get over to you, that it is not the majority that is always right, after all.

Here is Mr. Starbuck here with his wonderful railroad, and I think back in railroad circles and transportation circles, when Nancy Hanks went a mile in a couple of minutes; then we had the Empire State Express; then we had all these automobiles and flying machines and motor boats. Now they tell me they are perfecting some device down in New York City where you can put a man in a tube, press a button, and he will arrive in San Francisco two hours before he left. That is going some.

If you want to keep up that pace, don't go down into Ohio. I went into a certain store there and no one came to wait on me. I knocked impatiently on the counter and still no one came. I knocked louder and a voice in the rear of the store said, "What do you want?"

I said, "I want to get waited on."

And he said, "Would you mind comin' back sometime when I am standin' up?"

But, shall we continue to hurry? I don't know, and I stand up here, embarrassed for fear I will make some slip, or some error in grammar. I think of the two negatives which make a positive. A little girl heard that at school and she went home and tried to explain it to her mother; but mother couldn't understand it, and finally she said, "I ain't got no time; that is positive."

We all make mistakes and I think many of them can be attributed to this hurry and blurry. I think of the Frenchman who was called upon to make an after-dinner speech. Everything had been hurry and blurry and he knew there wasn't time to make a speech, so when he was called upon, he said, "Ladies and Gentlemen: I do not want to cockroach upon your time."

A gentleman sitting beside him pulled his sleeve and said, "I beg your pardon, old chap, but you have used the wrong word. You said 'cockroach'; you should say 'encroach'."

You know how apologetic the French are, so he said, "I beg ze pardon. I have made ze great mistake. I say cockroach; I should say hencroach. I use ze wrong gender—that is all."

Down in Bethlehem they have the Pennsylvania Dutch. They are very wonderful people but they do get mixed up in their language. I remember a fellow who wanted to go to Allentown, six miles away, so he said to the station agent, "Vot time does the next train back from Allentown come out?"

The agent said: "You mean, what time does it arrive or leave?"

And he said, "Yes."

I think sometimes we hurry too fast. A man came into my office and he said, "Mr. Gueen, I have a machine here. You buy this machine and it will cut your work right in half." I bought two. Who wouldn't?

I am interested in this safety movement. All my life I have been interested in the National Safety Council and I know what you have accomplished. I know that it is because you followed certain laws and you followed certain rules. Dr. MacGowan told you that you couldn't break the laws. You can break the rules, but not the laws. They will break you, as he told you.

Take for instance the suspender business. Now, what would the suspender business amount to if it wasn't for the law of gravitation? So we have to have laws and we have to have rules, and I believe that your success in the Council, as I have watched it from the outside, has come about because you have followed certain laws. If you continue to follow them you will enjoy even greater success than that you have enjoyed in the past.

I believe that the National Safety Council can do anything it wants to do, provided, first, that it knows exactly what it wants to do; second, that it wants it hard enough; third, that it confidently expects to be able to do it; fourth, that it per-

sistently determines to do it; and fifth, that it is willing to make the sacrifice necessary for its accomplishment.

Now, they are good rules but bitter medicine. A lot of organizations that I have met in my time didn't know why they were organized, didn't know what they were trying to do, and didn't have courage to do the things that they should have attempted to do. The National Safety Council, in days gone by and in days to come, will attempt to do things because it is a strong organization of many members. It will attempt to do those things that not one of you as an individual would dare to attempt to do. That is the reason you have an organization. That is what the organization is worth. That is the reason it continues to do things.

And so I would say to you who have never served on the board of directors or the executive committee, it is not an easy task. I have never been there myself, and yet I know it is difficult for them to outline a definite, comprehensive program that is satisfactory to all. It is not an easy thing for any organization to know exactly what it wants to do, and these organizations and these individuals who go through life and achieve a measure of success without having a well defined plan, why, sometimes I don't even feel like calling it success. It seems to me that they have been simply lucky, and you know business people used to use luck as one of the laws. They had two laws for success in business in the old days: the laws of pluck and luck. You had to have luck to find somebody to pluck.

Know exactly what you want to do. Somebody said something in my introduction about somebody being inebriated. I didn't know what was coming. But I was thinking of the inebriated man who knew what he wanted. He went to one of these telephones where you drop a nickel in the slot. He called his number and the girl said, "Drop a nickel, please."

He said, "Listen, girlie, I know what I want. I want conversation with a friend, not financial advice from a stranger."

There, you see, he knew what he wanted. That is important, and I say it is very difficult for an organization of this kind to achieve the success that you can, and that you have in the past, if you don't know exactly what you want to do.

A man called up a lumber yard and said, "Send me twelve 2x10's right away."

The fellow said, "How long do you want them?"

"Well," he said, "I want them a long while. I am going to put them under the porch."

Bless his heart, he knew what he wanted, but he couldn't tell about it.

And you want it hard enough. I can say truthfully and sincerely that I have met no group of men more interested in their work than are the safety men that I have met. You have been somehow imbued with a spirit of absolute sincerity. It wasn't just a job for you. It was more than a job. It was this work of humanity. It was a sincere, positive thing for you, something you wanted with all your heart and strength and might to accomplish, because you believed in it. That is wanting it hard enough, and I say that any man who goes into this safety work, or any corporation or industry that goes into this safety work, not having that same idea of it, is stupid.

And speaking of stupid people, Lew Fields used to tell the story of a man he knew. After talking to him at great length, Fields said, "You know less about more things than any man I ever met." There are people like that. You have probably met them. I am sure, however, that they don't belong to this organization.

Strange as it may seem, the most stupid person I ever met was a girl. I talked to her at great length and I couldn't get a sensible reply to any of my questions. Finally, I said, "Girl, you are the most stupid person I ever met in my life. Is there anybody in your family as stupid as you are?"

She said, "Yes, my uncle."

And I said, "Well, how stupid is he?"

And she said, "He is all bent over like this." (*Stooping over.*)

Now what could you do with a person like that?

Up in Troy, New York, only recently some man was awakened early in the morning by a knock on his back door. Half awake, he arose and reached in the closet for his bathrobe and got ahold of his wife's kimono. He went down to the back door and there was the iceman, and the iceman threw his arms about his neck and kissed him. The fellow went back upstairs trying to figure it out, and he finally decided that the iceman's wife must have a kimono exactly the same color as his wife's.

Now, you are not going to be that stupid. When this great National Safety Council puts something in their program that they have considered for weeks and months and years, perhaps, you are not going to be so stupid that you are not going to want with all your might and strength, to do it.

Over in Massachusetts—I guess that is far enough away—two fellows fished all day without much success, but as they started home at nightfall, they thought they might throw out their lines once more. They did, and both got a strike. They fiddled with the strike, but the fish got away, and all excited, one man said to the other, "Mark that spot so we can fish here tomorrow."

Then they went back to the dock and put the boat away, and one fellow said, "Did you mark the spot where we had that strike today?"

The other fellow said, "Sure I marked it. I put a chalk mark on the boat."

And the other fellow said, "Why, you big fool, maybe we won't have the same boat tomorrow."

So much for stupidity.

Then you come to this third rule of confidently expecting. I don't believe in an organization putting something into their program of work if they don't have faith enough and courage enough to believe they are going to be able to do it. Confidence in yourselves—surely you must have it.

In all the organizations with which I have been acquainted, there are those who say, "It can't be done." I know Will Cameron has heard them say it. I remember that down in New York, in an architect's office, is a sign which says: "They said it couldn't be done, but we poor fools didn't know about it, so we went ahead and did it." Maybe that is what you have done in the National Safety Council—you didn't know it couldn't be done—so you just went ahead and did it.

If there is any man among you who, when this organization proposes to do something, you perchance feels it can't be done, then you slip down into the research laboratory of some industry to which you can gain access, and talk to those men. I prophesy they will tell you that in a research laboratory they never dare say it can't be done, until the last time they are willing to try it.

That is the reason you have succeeded. That is the reason you will continue to succeed. I am sure. It is the same old optimism we have talked about for years and years, the faith we must have in ourselves.

Mention having been made of the fact that I used to work for the Bethlehem Steel Company, I will tell you that while there I was one of the proud possessors of the much loved four-column pins which Mr. Schwab gave to department heads and executives, a very beautiful pin. We formed a club or organization and met once a year, at Christmas time, when Mr. Schwab gave us a dinner.

One dinner stands out—that of December, 1914. At this dinner, however, Mr. Schwab was just as optimistic as usual, and as a tribute to him, I want to say he is the greatest optimist in America on America. I remember that in his private office at Bethlehem, the walls were all hung with personally autographed photographs of men of America and Europe and Asia whom he knew. One of these always caught my attention, a picture of Thomas Edison. On it he had written, "From Tom to Charley, the greatest optimist of them all."

And this night, Mr. Schwab was, as his usual self, urging us all to be optimists

even though days were dark, and every time he introduced somebody, he worked in the word, optimist. There sat along-side of me an Irishman who finally said to me: "What is an optimist?"

I said, "Well, Mr. Schwab means that business is going to be better; that we are going to have more orders; we are going to have more work; we are going to make more money; we are going to get larger bonuses; and we are going to have more for the wife and kiddies." Then a great big smile broke over Pat's face and he said: "What a darn fool I was. I have been sitting here thinking an optimist was an eye doctor."

That is the way some people go through life. They belong to an organization and don't know what it is. They don't even know what an optimist is.

I know that you men are, at least I hope you are, big men, and those companies which employ you are and have been rich enough to send you here tonight. A man came into my office the other day and transacted some business with me. He is an old friend and I always talk to him like I would my relatives, and I said to him, "Look how that coat hangs on you, look how your trousers bag, look at your collar. It's too big—and so is your hat. Why do you wear clothes like that?"

"I'll tell you, Jimmy," he said, "I'm a much bigger man down home."

Well, you have got to be big men wherever you are. You are a big man now. I am sure.

We must hurry on to the next rule of persistently determining to do the thing you set out to do. Why, there is not a man here who couldn't get up and give an illustration of perseverance. You know in your own company, in your own plant, there have been many times even in this great safety work that you had to persevere.

Visualize with me, if you will, two Irishmen holding a Scotchman up on the road. The idea was highway robbery. Can you imagine that? Well, they fought with the Scotchman for more than two hours and finally they overpowered him and took away from him all the money he had, five cents. And as the two Irishmen sat there and nursed their wounds, Pat, with a torn ear, a black eye, a broken nose, a gashed cheek, and a dislocated hand, said, "Mike, it's a darned good thing he didn't have ten cents or he would have killed the both of us."

Now, that is the best story I know about perseverance. How different from the incident that occurred the other evening when I went to the moving pictures with Mrs. Gheen. I put a bill in the window, took two tickets and started for the door, and Mrs. Gheen said, "Wasn't that a five-dollar bill you put in there?" Luckily, I went back and the four dollars were still there. I took them with much thanks and I said to the sweet young thing behind the window, "Do many people make that mistake and leave their change?"

"Yes," she said, "quite a few."

"What do you do in a case like that?"

"I knock on the window with a sponge."

That is just the opposite. That is not the kind of effort that has made the National Safety Council what it is. That is not the kind of effort that will make it grow and make it carry out this big program that you are thinking about. It is perseverance that will bring it about, there is no question about it.

Then we come to that last rule of being willing to make the sacrifices. I venture to say there is not another man here who hasn't had to make a great sacrifice. I know the officers and staff of this organization have had to make sacrifice after sacrifice in order to carry out their policies.

Emerson said, "Nothing great is ever accomplished without enthusiasm." I can almost truthfully say, Nothing great is ever accomplished without sacrifice.

Some men say they have been working hard in the safety movement. That makes me think of another sick friend. This fellow went down to the doctor, the doctor examined him and said, "What you need is more exercise. What do you do for a

living?" He said, "I am a piano mover." And the doctor said, "Hereafter, move them two at a time."

Now, in that great welcoming message which your President has written, he emphasized the fact that right now there must be no depression in safety. Safety has made an impression that has nothing whatsoever to do with a depression. Sacrifice is necessary, there is no question about it.

In Pittsburgh day before yesterday I listened to Mr. Grant, the general sales manager of the General Motors Corporation. Preceding him, two men had given wonderful sales demonstrations and laid down six rules, all of which you know, on how to make a sale. Mr. Grant said, "There is one more. The gentleman who spoke before me told you how he started out in the selling business by selling books. So did I, and once in awhile I became discouraged and I sat in the hotel and loafed, but after I did it several times, I checked up and discovered that the days I loafed, I didn't sell any books."

Now, I don't mean that you loaf on the safety job. You don't very much, and so far as this organization is concerned, it seems to me that it is those people who are not too lazy—I don't mind using the word—who make it possible for this organization to accomplish more. The laziest man I ever met smoked a clay pipe. I said to him: "Why do you smoke a clay pipe?"

He said, "Why? Well, I'll tell you. Because, if I drop it, I don't have to pick it up."

Now, there you are. Some of you may feel that way about safety, or you may feel that way about some particular plank in your program of work, that if you drop it, you don't have to pick it up.

When I lived in Albany, New York, I attended a great military review of the famous Tenth Regiment Infantry of New York State. It was a wonderful spectacle but I was more interested in watching the drum major at the head of the band, the fellow with the big hat and baton who pompously marched down the street. As he came to the corner, he would twirl his baton, turn and march on, and the band would swing around right after him.

Fool that I am, I laughed aloud, and sitting along side of me was a man who was wearing all sorts of decorations, and he was very much offended at my laughter, and he said, "What are you laughing at?"

And I said, "Wouldn't the drum major look foolish if the band didn't follow him?"

Well, when I got back to my office the thing stayed with me, and later on I heard and saw a band coming up Pearl Street on the way to the State Capitol. The shortest way to the capitol, up State Street, was a six per cent grade or hill, and when they came to State Street the drum major twirled his baton, turned, pointed up State Street, and marched up. But the band came up, saw the hill, and turned and went down Parade Street.

After a while, he missed the sound of the drumbeats, the drumbeats of constructive criticism, the drumbeats of advice, the drumbeats of praise, the drumbeats of admiration, all these drumbeats that we humans who become drum majors like to hear. He knew there was something wrong and he didn't want to turn around. So he did the next worse thing for a drum major to do, he dropped his baton and when he saw the band wasn't following him, sneaked away. I have seen drum majors in organizations take their plans and programs and ambitions and put them in an inside pocket or the drawer of a desk, and slink away because the band wouldn't follow.

Never let that happen in the National Safety Council. Follow the drum major.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Advanced Safety Engineering

Under Auspices of the American Society of Safety Engineers-Engineering Section, National Safety Council, and in cooperation with the Engineering Division, Chicago Safety Council.

Friday Morning Session

October 16, 1931

DR. M. G. LLOYD, Chairman

U. S. Bureau of Standards, Washington, D. C.

The Advanced Safety Engineering Session convened with W. Dean Keefer, Secretary, ASSE-Engineering Section, presiding. Mr. Keefer called the meeting to order and introduced the chairman, Dr. M. G. Lloyd, of the U. S. Bureau of Standards, Washington, D. C., who had just been elected General Chairman of the American Society of Safety Engineers—Engineering Section of the National Safety Council, for the coming year.

CHAIRMAN LLOYD: Mr. Keefer, members of the National Safety Council and of the Chicago Safety Council. The first subject on our program is "Building Safety into the Machine." One of the first problems safety engineers had to contend with was guarding machinery, and this is still one of our big problems. In the early days machines usually had to be guarded after they were placed on the job. We all realized it was better, when it could be done, to build safety into the machine when the machine itself was manufactured.

We have as a speaker on this subject a man who has had a great deal to do with the design and manufacture of machinery in his own plant. I take pleasure in introducing Mr. P. S. Lang, Department of Machine Safety and Coordination, of the Western Electric Company.

Safety Features Applied to Miscellaneous Machine Equipment

By P. S. LANG

Chief of Machine Safety Department, Western Electric Company, Inc.,
Hawthorne Works, Chicago

In the early history of the design of machine equipment, provision for the health and safety of the operator was generally subordinated to the requirement for efficiency. Protection of the operator is now recognized, however, as a design objective at least equal in importance to efficiency of the mechanism; and much improvement in safety conditions is being effected on the older existing machine equipment by the later application of guards and safety devices in the light of our present standards.

The use of guards and other safety appliances must be considered from two viewpoints, first, that of equipment now in use, the safety features of which are not up to our present standard, and second, that of proposed equipment, the design of which is to include all desirable safety features. The addition of protective devices to a machine not originally designed for them is not conducive to a compact and symmetrical appearance. Care should be exercised in the addition of such features that they do not unnecessarily inconvenience the machine operator and decrease production.

From the standpoint of economy, it is necessary when considering the addition of safety appliances, to compare their cost with the value of the machine. It is frequently found that the cost of adding the necessary safety devices to the old machine would not be justified as it could be replaced by a new one having the desired features, at a cost not exceeding that of safeguarding the old one.

(Mr. Lang exhibited 25 slides, photographs of which may be borrowed from the Council's headquarters office.)

Figure 1 showed a screw machine in which the numerous gears, belts, and pulleys are hazards to the operator because of their location and complete exposure. The application of a direct connected motor drive to this machine was slightly more costly than effectively guarding the belt driven unit would have been. However, the more convenient operation, elimination of several belt drives, increased illumination, and better vision in the vicinity of the machine, more than compensated for the increased expenditure.

Figure 2 showed equally effective results in a large shop with similar machines.

A simple but effective guard for a wire rewinding machine was shown in both the opened and closed positions in Figure 3. This guard, hinged at the rear, consists of a casting in the open front of which is mounted an idler roller covered by a pane of shatter-proof glass. The open position shows the lower guard removed to present a view of the spool holding device. The purpose of this guard is to prevent small pieces of wire from being thrown off the rapidly revolving spool with the possibility of injuring the operator or other persons in the vicinity of the machine.

It is common to find machines that cannot be guarded to eliminate the hazards, because of the nature of the work to which they are adapted. In such cases, it is necessary to devise a safety mechanism other than a guard to meet the specific requirements. Safety appliances of this nature were installed on the rubber mixing machines shown in Figure 4. The mechanism consists of two cross bars fixed at both ends in supporting brackets which are pivoted in the upper part of housings mounted on top of each side frame. One of the housings contains a rotary switch, which is actuated by a pin in one of the cross bar supporting brackets. A slight movement of the pivoted frame operates the switch, reversing the driving motor current and making it act as a dynamic brake, stopping the machine. The machine is stopped when empty, in a $7\frac{1}{2}$ " travel measured on the periphery of the faster mixing roll which is 18" in diameter. The cross bars, which are accessible on both sides of the machine, are located so that the operator could move them with his head or body if both of his hands were caught between the rolls.

Another example of the application of this type of safety device is that of the two-hand control on the kick press which was shown in Figure 5. This machine cannot be operated until both pawls, one on each side of the ratchet, have been released. When properly used, injury to the operator's hands is impossible as both hands are occupied in releasing the pawls. However, with devices of this character, strict supervision is necessary to insure that they are not intentionally rendered inoperative.

The two-hand control feature has also been applied to a paper shear shown in Figure 6. In this case, two levers, one on either side of the machine, must be operated simultaneously to start the shear. If either hand is removed from either lever, the machine will stop.

Figure 7 showed the application of safeguards to a table saw used for cutting rods, tubes and sheets of fiber, asbestos, rubber, lead and copper. These safety devices

prevent the operator's hands from making contact with the rotating saw and protect him from chips which fly about during the cutting cycle. The guard which covers the saw is adjustable to any thickness of work within the limits of the machine. Two forgings, one on each side of the saw and fastened to the guide, protect the operator's fingers and hold the material in position while it is being cut.

A machine, every moving part of which is guarded, was shown in Figure 8. This machine is used for removing the sheath from defective lead covered telephone cable. One safety feature used here is an interlocking cam on the electric control switch lever which prevents the opening of the door over the rolls until the current for the driving motor is shut off. The cam provides a two-way interlock so that while the door is open, the switch lever cannot be moved from the "off" position, and the machine cannot be started until the door is closed, thus precluding the possibility of injury.

Figure 9 showed safety attachments as installed on a jolt squeezer for the foundry which requires the operator to use both hands in the final squeezing, thereby eliminating the possibility of injuring the fingers.

Figure 10 showed a rotary milling machine fixture used in machining the legs of telephone switch hooks. The hooks are inserted in the fixture by hand through apertures just large enough to receive them and, after the machining operation, they are automatically ejected. This fixture encloses the cutter as well as the actuating mechanism, and also eliminates the hazard of flying chips.

Figure 11 showed a table trim saw which has a motor equipped with a spring set solenoid brake and a hand wheel in place of the customary lever on the starting switch. The solenoid is connected in parallel with the motor circuit and is energized while the motor is running, thereby holding the brake open. Switching off the motor current de-energizes the solenoid, sets the brake, stopping the machine. The brake eliminates the acute hazard presented to an operator wishing to use a saw that, unknown to him, had been used by another operator a few minutes earlier and is still in motion. The brake is especially useful in the protection afforded a night operator should a complete power failure occur and force him to grope about in the darkness. Solenoid brakes have also been applied to shapers, jointers and lathes as well as to saws. In addition to the safety feature, the time saved in stopping a machine by solenoid brake equipment results in increased production.

Figure 12 showed the adaptation of guards to a gang veneer saw. In this machine the saws are adjustably positioned on a long mandrel. It has been necessary, therefore, to design guards that will follow the saws across the machine for the various adjustments required.

Figure 13 showed an automatic feed rip saw which has been equipped with a knot deflector and a group of kick back fingers. A number of these saws have been in operation for a period of years without causing an accident.

Figure 14 showed safeguards that have been applied to standard swing saws. In addition to belt and saw guards, a substantial stop chain has been incorporated to prevent the saw from swinging beyond a safe limit. Another feature is a device which prevents rebound by automatically locking the saw frame when it has swung back to its idle position. The operator presses a grip located at the rear of the carriage handle, thereby releasing the frame when he desires to make the next cut.

A thoroughly guarded belt sander was shown in Figure 15. The motor is enclosed in a sheet metal housing, while the various chains, sanding belt, and other moving parts are covered by sheet metal guards. All of these guards are hinged or have covers which may be removed readily for inspection or repair. The hinged door of the chain guard is provided with an oiling fixture which affords a convenient and safe means of lubricating the chain. The guard over the sanding belt opens into an exhaust pipe which carries away the dust.

Safety devices as adapted to a production wood turning lathe were shown in Figure 16. A sheet metal guard hinged at one end on a bracket fixed to the rear side of the

headstock is lowered until it strikes a stop. In this position, it covers the lathe chuck and prevents chips or broken parts from being thrown beyond the confines of the machine. A floating section consisting of semi-circular pieces of sheet metal, hinged at the rear on each side of the mechanism and yoked by a flat piece on the top, permits the guard to be used for any variety or size of work within the range of the machine. To make the appliance more flexible, four pieces, adjustable vertically by loosening a wing nut in each, are attached to each side of the floating section to accommodate the various tool setups required. The guard has a handle at the front by means of which it may be raised or lowered. A counterweight attached to a lever projecting from the rear of the device balances it so that very little effort is required to raise or lower it. An arm, attached to one end of the shaft upon which the guard is hinged, follows the movement of the appliance and is arranged to actuate a limit switch at the rear of the machine. Upon raising the device, this switch opens the trip coil circuit of a magnetic switch thereby breaking the motor circuit and stopping the machine. The machine cannot be started until the attachment has again been lowered. The motor is protected from dust by a sheet metal housing. A hood located beneath the bed of the lathe is exhausted by a suction pipe which takes away the dust and shavings as rapidly as they are produced.

Figure 17 showed the progress made in the incorporation of protective devices in the design of a machine. It showed an old and a new style wood jointer. The older machine had been in use for approximately fifteen years while the new one had just recently been installed.

A design exhibiting simplicity and neat appearance was presented in Figure 18. This machine, consisting of a motor to which a chuck holding a standard drill was attached, is used for boring holes. A casting which serves the purpose of motor end bell and chuck guard is split at the outer end to permit the clamping of a drill guard.

Figure 19 showed a flute grinder for taps built into a dust-proof housing. An exhaust hood and a spark shield are incorporated in this design to protect the operator both from a health and an accident standpoint.

In the manufacture of tinsel wire, the heads of the machines shown in Figure 20 revolve at the rate of 10,500 R.P.M., making it necessary to enclose them in substantial guards to protect the operators from injury through contact with the rapidly rotating mechanism.

Figures 21 and 22 showed machinery used in the manufacture of fuses. These machines were designed for single purpose work and are well safeguarded.

Figure 23 showed a machine made for twisting tinsel conductors. The flier revolves at 2,000 R.P.M. and is totally enclosed in substantial guards which are so interlocked that opening the doors breaks the motor circuit and sets a brake to stop the machine.

Figure 24 showed a wire drawing machine which reduces wire to the finer sizes and on which all moving parts are totally enclosed. This machine is a multiple unit machine so designed that there is no opening from the drawing compartment of one unit to that of the other. There are two doors to each drawing compartment geared together and pivoted so that they may be swung out of the way to permit easy die strapping. The doors also prevent the compound used within the machine from being splashed on the floor.

Figure 25 showed built-in guards on special machinery for drawing heavy wire. On this type of machine the wire being drawn is completely enclosed. The take-up spool is also enclosed to prevent the possibility of the wire whipping, if it should break.

The use of guards or other safety appliances should not be necessary to eliminate hazards which may be directly attributed to faulty design in a machine, as, for example, the application of a device to catch and hold the flywheel of a machine should its supporting shaft fail. A safety mechanism of this nature would be necessitated only by neglect on the part of the designer properly to consider the various factors affecting the life of the material used in the shaft. Of these factors,

the one commonly given the least consideration is that of fatigue failure, incorrectly known among many shop men as failure by crystallization. Fatigue cracks have their origin at points of localized stress and gradually spread across the part until failure occurs.

We have found it to be more economical to consider safety problems from all angles before making any changes, and past experience has proven that proper safeguarding will speed up rather than retard machine operations. Safety supervisors play an important part, as it has been found from accident history over a period of years that properly safeguarded machinery contributed only a small percentage of the accidents experienced in the average manufacturing establishment.

Supervisors with an intimate knowledge of the work at hand who can teach the operator to do his work properly, and see that he continues to do so, will do more toward eliminating industrial accidents than could be accomplished in any other way.

J. F. McCABE (Duquesne Light Company): I would like you to explain that low-voltage release a little better; I believe you referred to it as a solenoid brake.

Mr. LANG: We had a lot of trouble with saws, shapers, jointers, etc. coasting. Even after the power is shut off, such machines continue to revolve anywhere from ten to thirty-five minutes. The brake was designed and installed to overcome that hazard. It is similar to the single plate clutch in an automobile. When the motor is energized, the 6-pound solenoid is energized with the same impulse and pulls on a fulcrum which compresses a spring inside a housing; this is counter-balanced with another spring on the other side of the clutch plate. When the current is cut off, the solenoid is de-energized and the two faces of the clutch come together; the resulting friction stops the machine, sometimes in two and one-half seconds. Some of our brakes have operated for four years without repair or upkeep cost. On rubber mills we stop 200 horsepower motors, at 100 r.p.m. in less than one-third a revolution of the rotor.

CHAIRMAN LLOYD: I want to thank you very much, Mr. Lang, for your address and for these very valuable illustrations.

We will now pass to the next item on the program. The question of education has always been and probably always will be a very important factor in accident prevention. The Education Division of the National Safety Council has been doing excellent work in introducing safety ideas into our elementary schools and high schools. In the cities where that work has been going on for several years there is definite evidence of a reduction in accidents. Introducing safety into our higher institutions of learning has not progressed so far. Some of our engineering colleges have definitely made a start. One of the leaders in this movement is with us this morning, and I consider it a great privilege for us to listen to Professor John W. Hallock, head of the Department of Industrial Engineering, the University of Pittsburgh.

Safety Engineering and the Student

By JOHN W. HALLOCK

Professor and Head, Department of Industrial Engineering, University of Pittsburgh, Pittsburgh, Pa.

The engineering profession has unquestionably gone through a most astounding evolution. Starting with very simple technical equipment, the engineer has given to our modern civilization a long list of inventions. Doubtless these have facilitated further development—and the end is not yet in sight. The individual farmer of half a century ago worked from dawn to dark with relatively low individual productivity. Today, with the aid of electricity, the gas engine, improved farm machinery and other engineering improvements, the individual may produce with much less effort a vastly larger amount of economic good. Similarly in all walks of life the influence of the engineer is strongly felt. The creation and efficient operation of

great industries and of great systems of transportation and communication have been most astounding phases of the evolution of the profession.

The advance of engineering has brought to the engineer not only high praise for his achievements; it has imposed upon him a responsibility for the right use of the new things. In the days when highway traffic was entirely horse-drawn, the life and limb of pedestrians and drivers on the highway were relatively secure. The engineer developed the automobile and the motor truck. In answer to public demand, he developed adequate highways to carry the ever-increasing stream of traffic. But it is not enough to devise roads of proper width, grade and surface to take care of the probable intensity over a given artery for a number of years. Curves and grade crossings must be so safeguarded as to finish the job and give us not only a *good* highway but a *safe* highway. The flow of traffic must be so regulated as to produce the most efficient and safest use of the highway.

In the field of industry, it is largely the engineer who, building on the work of the physicist and the chemist, has made possible the enormous enterprises which are the just pride of this country. Hundreds and even thousands of employees are the rule now rather than the exception. Dealing with masses, the engineer has been prone to forget the individual, his safety, and his proper place in society. Yet here, too, a very definite responsibility attaches to the engineer.

The engineer who would disclaim the responsibility I have pointed out might almost as logically give a hand grenade into the hands of a small child and then claim it is the child's own fault if he suddenly departs this life. We engineers have been too busy making hand grenades and not busy enough instructing the users of our product.

Admitting the responsibility of the engineer, where shall we begin to apply remedial measures? Statistics show our accidents as a rule under three heads—the home, the highway, and the industry. Of these three, the engineer is concerned in a much more definite way with the last two, the highway and the industry. Touching the highway, he is concerned in two ways, in proper design and in adequate means of regulating and controlling the use of the highway. Considering the enormity and comparative newness of the problem, I am sure you will all agree that great strides have been made in this connection. The actual solution of the problems involved is up to a relatively small number of men. It is true, of course, that the individual driver on the highway must be educated to the right way of doing things. The *engineering* responsibility (and after all, that is basic) must of necessity remain in the hands of a relatively small number of highly-trained technicians.

In the field of industry, the problem is different. We have for the most part *congregated* individuals. We have definite working organizations with clearly-defined duties and responsibilities. On the other hand we have a far greater range and diversity of types of hazards. On the whole, the problem seems more concentrated, more susceptible to attack and solution. It is therefore within this field of application of engineering principles to safety that I shall confine my remarks. Incidentally, it is in the field of industrial safety engineering that we have initiated our course at the University of Pittsburgh.

Before presenting to you some observations on our objectives in undertaking safety engineering instruction as a regular part of our curriculum, let me say that there have been two rather divergent views as to the methods that the engineering colleges should employ. The first is that the colleges should offer a full four-year course leading to a bachelor's degree in Safety Engineering. The other extreme view is that the principles of safety will be fully realized if we include the design and use of mechanical safeguards in existing design courses, with possibly a few lectures on the management of a safety organization. We feel that at the University of Pittsburgh we have met both of these viewpoints.

In the first place, all our design courses, in all branches of engineering, emphasize strongly the safety of the individual with respect to the piece of equipment being

designed. Every faculty member offering design courses is in sufficiently intimate contact with manufacturing or operating industries to fully appreciate the importance of design as effecting safety in manufacture and in use. On the other hand, the student has an opportunity to study this phase of engineering practice during his regular assignments to cooperative work. What I have said in regard to design courses holds true also in shop and laboratory work.

We have not felt that there is as yet sufficient demand for individuals known as "safety engineers" to warrant a four-year program in this specialized field. We have felt that safety, being a function of management, properly belongs in a program where courses in management predominate. We have had such a four-year course since September, 1920, known as "Industrial Engineering." It is in this department that our safety engineering instruction is offered and it is in this department that our students have the opportunity to specialize in the field of safety. In addition to a required two-credit course and two three-credit courses in management, in which safety features strongly, the student has an opportunity to elect as many as six credits of additional work in this or in other specialized fields. We expect a great many of our industrial engineering students to pursue advanced courses in safety engineering work as soon as industry proves to us that it can use men thus trained.

There is another field of instruction in safety engineering which I should like to bring up—namely, graduate or extension courses. Such courses should go far toward raising the standards and securing a uniformity of practice, a lack of which has heretofore weakened our cause. Just how far our colleges should be asked to undertake such courses is problematical. There are those who feel that such instruction is sub-collegiate in character. Others feel that the problems of each industry are peculiar enough to that particular industry that no college instructor can apply general principles to the specific problems involved. The correct course to follow, it seems to me, is quite evident. If it is *safety engineering* that is to be taught, then our engineering colleges should be in line to help. If it is a mere dabbling in generalities and a few statistics with regard to safety that are desired, then I am inclined to agree that the work is sub-collegiate. Accepting the technical or professional aspects of safety instruction as essential, we at the University of Pittsburgh offered in September, 1930, a course in Industrial Safety Engineering as an evening course in our Downtown Division. Having had the pleasure of conducting the course personally I shall give a brief description of our experience and shall be glad to answer such questions as you may have regarding our experience.

In the first place, it was necessary to build up a course content. To this end we enlisted the assistance of a score of the country's leading authorities on the subject. Among these were leading executives in industry. Without a single exception, our general plan was endorsed and many very valuable suggestions were received. Offers of assistance were numerous and I am frank to admit that without much of this assistance the giving of the course would have been impossible.

A tentative outline of the course was submitted to all of the men who had been called upon for preliminary advice. Following receipt of much constructive criticism a final outline was adopted and published. At the risk of boring many of you who have helped in the building up of the course, I shall list the thirty-two topics taken up during the year. They are:—

1. Purposes of Safety Work in Industry.
2. Origin and Growth of Safety Movement.
3. Agencies and Organizations in Safety Work.
4. Industrial Hazards.
5. Management's Responsibility in Employee Safety.
6. The Safety Engineer.
7. The Safety Committee.
8. The Foreman as a Safety Man.

9. Safety Education for the Worker.
10. Study of Individual Accidents.
11. Accident Reports in the Industry.
12. Accident Records—Individual Cases, Causes, Costs, etc.
13. Study of Accidents not Resulting in Human Injury.
14. Accident Classification.
15. Employee Safety Record.
16. Checking Results Obtained.
17. First Aid and Hospitalization.
18. Safety and Production—Machinery.
19. Safety and Production—The Human Factor.
20. Design as Effecting Safety.
21. Safety Codes—Origin and Authority.
22. Safety Codes—Adapting to Specific Needs.
23. Safety Codes—Putting them over to the Worker.
24. Safeguarding the Working Place.
25. Standardization as Effecting Safety.
26. Employee Incentives.
27. Inspection.
28. Materials Handling.
29. Workmen's Compensation—Origin and Effects.
30. Workmen's Compensation—Rate Making.
31. Related Activities—Employee Betterment.
32. Methods and Results in Typical Industries.

The class met in the Downtown Division of the University in the Chamber of Commerce Building. Sessions were held each Wednesday evening from 7:50 to 9:35. The central location and the arrangement of hours most convenient for the majority permitted many men from a considerable distance to attend the class.

The first half of each period was devoted to a lecture and the last half to discussion. In retrospect, the lectures were of little importance except as paving the way for the discussion. It was understood by the members of the class that discussion was to be strictly limited to the subject of the evening, that no destructive criticism would be tolerated and that the time of the class was not to be taken in singing the praises of one's company. If specific examples were quoted, they were required to be entirely impersonal and to the point. Needless to say, there was much diversity of opinion on the subjects treated. I am certain that there was never a lack of readiness to discuss. In the early sessions of the class it was necessary to throw out leading questions to start the discussion of the topic of the evening. Toward the end of the year there was need for a sergeant-at-arms. The sessions were lively and interesting but I do not recall a single instance of sharp debate or of any display of feeling. To me this was a pleasant surprise for I know of but few subjects so filled with genuine emotional appeal as safety.

Considerable interest attaches to the number and type of students enrolled in the course. There were 77 students representing 35 different companies. In general, the requirements for admission to the course were identical with those for admission to the Schools of Engineering and Mines. As the course carried college credit, and as many members of the class were candidates for the bachelor's degree, this was essential. However, many were admitted as special non-degree students who did not possess the necessary preparation for entrance to the University. Many men, engaged as safety engineers and in some cases as safety directors were found to lack the necessary preparation. Obviously it would have been unfair to exclude them. In short, the occupation of the applicant and his apparent motive in undertaking the course were taken into account as well as his scholastic background. I feel sure that the records of the class will bear me out in saying that, to a man, these

special students justified their admission to the class. Many applicants were denied admission. Many were advised to secure additional preparation before enrolling.

At the close of the college year, there were a number of applications for advanced work. Unfortunately, this cannot be offered for at least another year. However, the class voluntarily undertook to form a permanent organization—the Council of Safety Engineers, University of Pittsburgh Chapter. According to the preamble of its constitution, the purpose of the organization is to cooperate with the University of Pittsburgh in safety engineering education by interesting new students and in rendering any other assistance possible.

Looking ahead, it is our plan to repeat the course from year to year as long as there is sufficient demand. If advanced work is desired by a sufficient number of those capable of pursuing it, it is probable that such courses, to be taught by specialists in each field, will be added. If the demand in industrial centers in Western Pennsylvania seems to warrant it, extension courses may be arranged. In short, our experience this year has led us to believe that there is still much that our colleges and Universities can do to aid the cause of safety engineering. It is our sincere hope that we may be of assistance to other colleges and to industry in the building up of courses similar to our own.

In conclusion, may I enumerate a few needs which I feel are still to be met before safety engineering education can be fully effective. In the first place, we need, *for the student*, a better summarization and unification of the principles involved. We need fewer details of how certain situations have been met and hazards eliminated, and more of the basic facts. This is true both as regards text and lecture material for formal instruction and also as regards topics discussed in many safety meetings and company rallies which I have attended.

In the second place, we need more *technical* content in our safety engineering instruction. American industry is today so highly mechanized and its processes are so technically involved that the highest success can come only to the man who fully understands the technique of his own particular industry. In making this suggestion, I am fully aware that many highly successful safety men are not engineers in the sense that they have completed formal courses of instruction. Undoubtedly they have acquired a sufficient mastery of the technique of their industry to be able to show excellent results. My feeling is that were they engineers, and still in possession of the other important qualifications of the safety man, there is no limit to the success which they might attain.

In the third place, if courses in safety engineering such as I have described are likely to be offered throughout the country, it is my belief that such courses may be made much more effective if co-ordinated with, and supplemented by, other instruction. There will always be students enrolling who need to round out their previous education to fit themselves better for their tasks. For example, during our year's work, it was possible for me to direct students into work in machine design, electricity, psychology, personnel management, industrial management, production planning and control, etc. In many cases, the student himself knew exactly the kind of course he needed to take. In other cases, I was able to suggest certain courses after consultation with the student.

This leads me to my fourth suggestion—that of vocational guidance. It is undoubtedly true that many men are in safety work by force of circumstances rather than by direct selection. I do not mean to disparage this way of entering a given field. A man must possess many of the necessary qualifications or he would not be in the position. On the other hand, a little well-directed guidance may help the safety man to a position of greater usefulness. Where possible, I believe the instructor in safety engineering should consider guidance of the individual as much a part of his job as the formal class work.

Finally, there must be considerable co-ordination if several simultaneous courses throughout the country are to be most effectively given. It is my firm belief that

such co-ordination should at least have its origin in the National Safety Council. As I have stated in the beginning of this paper, the engineer is largely responsible for modern industry and for the creation of many of the hazards in industry today. If he admits and assumes this responsibility, the engineering colleges should assist in the building up of remedial measures.

Discussion

W. H. BAKER (J. E. Baker Company): Are text books being used by the University of Pittsburgh?

G. L. JENSEN (Engineering College, University of Michigan, Ann Arbor, Mich.): We approach the problem not from the standpoint of training a professional safety engineer, but from the standpoint of interesting the general engineer in the importance and the need for some information relative to safety. The course is not limited to the industrial division but is open to all engineers as an elective course. It is used, incidentally, as a follow-up and simultaneously as an introduction to a general course in personnel administration, in an attempt to interest the average slide-rule-trained engineer in the human problem.

N. E. GREEN (Louisville Car Wheel and Railway Supply Company, Louisville, Ky.): We think so much of it that our secretary has been giving a series of lectures in the University of Louisville, Speed Scientific School every year. We have become very much interested in safety in our own plant through the National Safety Council in the past sixteen years.

J. W. MCNAUL (University of Wisconsin, Madison, Wis.): I agree with Mr. Jensen that safety should be introduced to all engineering students, for no engineer can tell when he gets out of school into just what line of work he will enter and when he will need this knowledge.

WILLS MACLACHLAN (Electrical Engineer, Toronto, Ont., Can.): What is the answer to the claim that colleges already have over-crowded curricula?

A. W. WHITNEY (National Bureau of Casualty and Surety Underwriters, New York City): Interest in this subject goes back a good many years, perhaps as far back as 1918, when several conferences were held in New York. One of the leaders was Dean Kimball of Cornell, and a little handbook was formulated and published by the Council. The thing didn't go ahead very fast, but I am delighted that it has taken root so well at the University of Pittsburgh, University of Michigan, and other equally important institutions.

I know something about Professor Hallock's work because I was present at one of his lectures last year. I don't think he will allow me to tell you how he got into the work. He wasn't primarily interested, but the Dean of the University of Pittsburgh rather pushed him in. Professor Hallock submitted a little reluctantly at first, but has become thoroughly interested in it.

That is typical of almost all of us who have become interested in safety education. Safety itself is not a particularly attractive subject to most people who haven't thought about it. Many feel it is a stupid, negative sort of thing.

In engineering, and this holds true of life in general, there is strictly no safety problem as such. I mean the problem in engineering is the right organization of your work, and if you get your work organized rightly then you get a whole lot of things: you get efficiency and you get profits and you get safety and you get health and you get good morale, and you get all kinds of good relationships. The problem in engineering is to get into that center of things and get your right organization and get to doing things in the right way.

There are a lot of approaches to the problem. You can approach it from the standpoint of pure engineering efficiency, or you can approach it from the standpoint of profits, or you can approach it from the standpoint of morale. In a certain sense it doesn't make very much difference provided you can get into the proper organization of industry.

CHAIRMAN LLOYD: I will ask Professor Hallock to close the discussion and answer the questions which have been raised.

PROFESSOR HALLOCK: The safety course is being given on the campus as an elective to students with junior and senior standing in either the school of engineering or the school of mines. This ties up very intimately with Mr. MacLachlan's question on the crowded curriculum, to which I will make reference later.

This year so many students elected the course that we immediately found it necessary to sectionalize, and instead of teaching two hours on the campus in this subject, I am teaching six.

I hope eventually that at least the principles covered in the course that I now teach will be presented in all branches of engineering.

I started out under the impression that there were only one or two books available, and I have filled two sections of a sectional bookcase. To name five outstanding books, however, there are Mr. Louis A. DeBlois' book on "Industrial Safety Organization," a book by Mr. Boyd Fisher on "The Mental Causes of Accidents," which, by the way, supplements very nicely the work that has been so ably covered in the psychology lectures as a part of this Congress. A third book is by Mr. Williams of the National Safety Council and is called "A Manual of Industrial Safety." A fourth is by Fred G. Lange, "Handbook of Industrial Safety." This particular handbook is replete with excellent examples of the way certain situations have been met in industry. Then we have a very recent book just published this year by McGraw-Hill Company and written by H. W. Heinrich; his book is on "Industrial Safety, a Scientific Approach."

To my way of thinking, excellent though these five books are, they have not yet come down to the working principles underlying the educational approach, and I am only hoping that the interest now being engendered among educators in this subject will result in a codification, as it were, of the principles.

There are several ways to look at teaching. First, there is that class of instruction which we offer to supplement the regular engineering training. That work is and should be of a graduate nature. Second, there is the extension course, such as the downtown division course which I just described, into which it is possible to bring men without technical training and yet which may fill a very important gap in the educational program. Lastly, there is the undergraduate program, and I have no fight at all with anyone who says that safety should be included in every course in every department of engineering. In my own department, I feel it connects up with all the courses in industrial management, in production planning and control, in time and motion studies, and so forth.

Mr. MacLachlan asked a question which has been a sore point with me for a number of years, and that is the crowded curriculum in the average college program. I am convinced that we are teaching too much detail and not enough basic, fundamental principles. That applies not only to safety but it applies in all fields of electrical, mechanical and civil engineering. Were we to confine ourselves more to essentials and less to courses that certain instructors feel are a nice rounding out of the program, then I am confident that the product of the engineering schools would be of a better caliber and one that would be more quickly and more readily adapted into industry.

CHAIRMAN LLOYD: The title of our next address relates to efficiency engineering. I believe the efficiency engineer has been very welcome in some plants, and in others has been forgotten as quickly as possible after he passed through.

I am not accusing the next speaker of being an efficiency engineer. He is on the editorial staff of "Factory and Industrial Management" and of course efficiency engineering is only one small part of his work.

The topic of this address is "Accident Prevention Through Time Study Methods." It will be presented to you by A. H. Mogensen, vice-president of the Society of Industrial Engineers.

Accident Prevention Through Time Study Methods

By A. H. MOGENSEN

National Vice-President, Society of Industrial Engineers, Chicago, Ill.

The minute we speak of accident prevention in connection with time and motion study there is in the minds of most people a paradox. It has come to be generally believed that time and motion study work is in direct opposition to the work you are doing. This belief is largely due to the fact that so much time study work has not followed the true principles which underlie this program. You all know what trouble you run into when you equip a punch press with the wrong type of guard. You must be extremely careful not to slow down the production of the operator. If that operator is on an incentive plan, it naturally is to his best interest to remove or render inoperative that safeguard to increase production. I think that is why this battle between these two ideas exists. A little later, when I discuss the relation of time and motion study to safety, I hope to show you how the two are absolutely compatible and not conflicting.

Before I speak of time and motion study, I want to tell you what it is. It has come to be too generally believed that piece rate systems or incentive systems are slapped on in a hurry simply to increase speed and to increase profits.

The real definition of time and motion study, as I see it, is that it is a searching, scientific analysis of methods and equipment used in doing a piece of work; the development in minute detail of the best manner of doing it, and then the determination of the time required. It is not coming in with a stop watch, making a quick reading, getting out and setting a rate, as so many people believe. You notice that time is the last thing mentioned there—a searching, scientific analysis of methods and equipment used in doing a piece of work; the development in minute detail of the right way of doing the job. Isn't that safety? What is safety? The safe way of doing anything is the right way, and the right way is the safe way. Accidents are caused because somebody has done something the wrong way. All your accidents due to slips, falls and stumbles—why? Because somebody has left something on the floor, or somebody has left the floor in a slippery condition, or somebody is doing something the wrong way. Therefore, if we can find out, first, what is the right way and, secondly, if we can teach all operators how to do their jobs the right way, well, possibly some of you men would be out of your jobs. At any rate, it would give us an entirely different conception on this relation between safety and time and motion study.

I am going to try to tell you in half an hour what often takes four hours to cover completely and what is going to cover a full week's course next week at the Massachusetts Institute of Technology.

Motion study is not a speeding-up process. It seeks to find the one best way of doing a job, and the funny thing is that the best way is usually the easiest and the safest way.

"The one best way" is a term the credit for which goes to Frank B. Gilbreth, the pioneer who developed this whole science of motion study. Following Fred Taylor's development in the field of time study, Frank Gilbreth formulated a complete science for finding the right way to do every job.

The whole thing can be summed up very easily in this one principle: Any job, no matter what it is, is made up of three parts: make-ready, that is, set up or prepare; do, the actual performance of the operation; and put-away.

Suppose I were to tell you that tomorrow instead of taking quite a time to shave you must do it in three minutes. If you go about the job without thinking about it, you will probably do the usual things in the usual way, and when you come to the actual shaving you will probably hurry, take two or three fast strokes and cut yourself, and then say there is nothing gained in shaving in so short a time because it takes you fifteen minutes to stop the blood with a styptic pencil.

On the other hand, suppose you were to take just exactly as long for the actual shaving operation as is your custom. Then try to save time on the other parts of the job. For example in handling your soap tube, you take off the cap and put it down somewhere, or possibly lose it down the drain. Then you get your brush, put some cream on it, then put the cream down somewhere and start lathering. Just think, what is the left hand doing? Nothing! You could be one-handed and still do the job. When you are all through, you hunt for the tube, and then start looking for the cap to put it on. Much of that time can be entirely eliminated with a little practice.

The whole principle behind motion study is the formation of habit, the right habit. You can't start tomorrow and do this right because it will seem awkward. It will be some time before you can employ all the industrial principles of motion study. Try it this way. Pick up your brush in one hand, your tube in the other, and unscrew the cap a couple of turns with this hand, the thumb and finger. Just hold the cap back and apply the cream to your brush, and while lathering assemble the cap to the tube and put it away. That illustrates the principle, although it takes a little practice to accomplish it.

What have you done? You have taken the make-ready and put-away and combined them while you were performing a do operation, and all that time is saved. That is the principle, and there is nothing more to it.

Wherever there is an assembly job or hand operation, we try to have the operator use both hands. Very often you can at once double your production, but not by speeding up the do. It often comes from combining the make-ready and put-away into one operation. That is where you can save time.

You say, "That is all right for a lot of the simple jobs which examples you have discussed, but we have a big plant. We are making turbines and we have boring mills that take four or five days for one job." I'll tell you where to start. You don't need a stop watch on this operator; you can take an alarm clock. What does he do? He looks at his drawing twenty minutes, signals the crane and waits for the crane thirty minutes. He goes to the tool room and gets his tools. What is the machine doing all that time? Standing idle! Why doesn't that man get his clamping bolts, assemble them with the fixtures, and all the things he has to work with, then look at the drawing while waiting for the crane? Do you think he does it? Go home and watch him! Take a motion picture of him at work and study the make-ready, do, and put-away, and look for your waste in the make-ready and put-away.

A movie was taken of certain operations in an eastern plant. When it was shown to one of the production men, he exclaimed, "My God, how long have we been doing the job that way?" The foreman said, "Seventeen years." I can't tell you what he replied to that, but he had never noticed it before although he had walked right by that job every day.

Take the question of skill. The skill of a worker is not speed. Too many people who see a man working rapidly say, "There is a skillful worker." Not at all. Skill is made up of consistency, rhythm, ambidexterity, precision, and speed. Speed is in there but it is only one factor. And then there is the coordinated use of both hands. All these factors, and many more we don't know about yet make up skill.

In motion study we capitalize on habit tendency.

Some people say when you make an operation regular and easy, "It is monotonous; it is deadly." We haven't time to go into that here. Most of us are very much mis-

taken in believing that the majority of workers performing operations that have been studied with these principles in mind are undergoing some sort of a deadly drudge, something they hate. It is not nearly as bad as we think it is.

In all hand motions we have five different orders. The first order is the use of the fingers; second, the use of the fingers and the wrist; third, the fingers, the wrist and the forearm; fourth, the fingers, wrist, forearm and the upper arm; fifth, a motion that requires the actual bending of the body or a change in position.

We should try to use the lowest class of motion possible. Frank Gilbreth, when he trained the world's speed typewriting artist, did so by teaching that girl to use her fingers and just one slight motion of the wrist instead of using her forearm and upper arm. Wherever possible, we should try to reduce motion. Henry Ford has said the same thing. He has a simple rule. "If I go through the plant and see any man step from his job or bend down, there is something wrong."

I will show you in some of my films how we try to bring the work to the worker and reduce his working area so he can make use of the lower orders of motion.

Then, as far as possible, we want to make use of drop deliveries. Go into the plant and see how much of an operation is putting something away after it is finished, putting it into a tote box, or putting it over here on a conveyor, putting something away when so many times we can just design the layout so the moment an operation is finished it can be pulled toward the operator or pushed away, or tossed a little bit to one side to a drop delivery. The minute we release something we have the drop delivery. I will show you that in the film.

The use of the human hand is the thing we must watch all the time, how much of our work is being done with one hand only. Fully half the productive workers in assembly work or on hand operations could be replaced today with one-armed men and women, who could do the job just as well. If you don't believe it, go out and see how much of the time things are assembled by using one hand as a holding fixture, a vice, or a clamp, when so often some simple fixture or holding device or clamp could be designed so the operator could use both hands instead of one.

Prepositioned tools. As far as possible, we should try to have the tools prepositioned in a definite place. Take the desk of the president of the largest bank in Chicago. He uses a fountain pen. A man carried his pen in his pocket in the old days. How many of you know in which pocket you carry your pen? Next week, go around and ask some friend if he has a match. He will start going through all his pockets. Take this fountain pen, we fumble around in our pockets for it. When we have finally found it, what do we do? We take it apart, and how many unscrew the pen with two or three turns. Any fountain pen can be opened in one turn of the wrist and assembled again in one turn. Try it on your own. It is good exercise. You assemble the fountain pen and you get it down to the table. All that is make-ready. What are you going to do? Sign your name. That is do. Then there is the put-away.

Somebody didn't know he was applying a principle on the reduction of motion when he said, "We will put a fixture out here, a holding device for the fountain pen." Now of course our holders are so cluttered up with elephants that we can't find them, but the idea is good.

What does a man want to do? He wants to write his name. If he keeps his desk in order and doesn't have it piled up with things, he can reach over without looking, take the pen, sign his name, and put it back. The make-ready and put-away have been cut down by applying this principle of prepositioned tools. While I have no evidence that an accident has ever occurred through the use of sharp edged instruments, how many times do you see a girl in an assembly operation, or some other operation where she has four or five spatulas, files, sharp instruments, or scissors, reach down to find some particular tool in a pile of tools, use it, and drop it again. Prepositioning those tools not only saves a tremendous amount of effort but I believe would make the job safer.

As far as possible, all motion should be symmetrical and opposite. It is much easier. Try to do something like this (describing a circle with both hands at the same time, and in the same direction). Now try the symmetrical and opposite motion. Why, you can even write your name that way.

The managers of a large automobile plant said, "Oh, we can't apply any of these principles here. Our work is entirely different. Motion study can't be done. By the time we would make one of those studies four new models would be down the line, and it wouldn't be any good."

(Mr. Mogenssen then exhibited several motion pictures illustrating the principles which he has discussed. The first showed the old method of assembling an automobile license bracket. He explained this film had been studied for a long time by supervisors and workers who gradually improved the operation. He then exhibited a movie of the improved job. The company later used this second film in training new workers.)

I haven't time to tell you all that has been learned from studies like this. We have had a whole series of articles in "Industrial Management" explaining what is done in General Electric and in other plants, giving prints and going into full detail. Compare the two films! Does operator number two work any harder than operator number one? Is he more tired at the end of the day? Is there any chance of that wrench slipping, taking off the skin on a pair of knuckles that might later result in infection and cause lost time? I could show you pictures all through the afternoon and there would be a lot of questions on them.

Take the plant where the license bracket is made. Supposing several experts come into the department and start talking about job number one. The foreman is wondering whether he is going to be fired. How many times do we take a man into the plant and don't even say "hello" to the foreman. Only twice in the last year have I been in plants where I was introduced to the foreman. I feel like I was going into somebody's house with my hat on and spitting in the corner. The experts stand there, then go out, and later somebody comes down with a nicely developed motion set-up, and the foreman has to take it and like it. What is going to happen? Something is sure to go wrong. The foreman will not find it particularly worth his while to see that the thing works out well. He thinks it is a criticism of his old method. We all resent anything that is new, and we resist criticism. But if you let him in at the start he will help and come back for more.

The same way with your tool and machine designers. Several plants have already tied this in with tool and machine design. You can't just make an operation safe after somebody has designed that equipment with no idea at all of safety in mind. You cannot design that equipment for safety by adding a lot of gadgets and things that come down and knock an operator out of the way to keep her from getting hurt. I saw a set of safety guards on a punch press that made me think the girl would be better off in a harness. They had her hooked up with a harness so that if anything happened it would pull her out of the way. Some of those things are worse on the operator than the accident itself.

Another thing they did at Cadillac: They decided such a simple thing as a vice was wasting time. Every time you use the old vice you run it up and back it off by hand. They redesigned the vice so that foot operated air pressure brought the vice in and out, and one of the vice companies is building the vice designed by the boys at Cadillac.

Then there is the question of material saving. I could tell you a lot of instances where not labor was saved but material. A study was made just recently where they saved \$3800 in labor, but they saved \$9000 in material.

Then there is the question of training. The value of the film in the formation of habits and in teaching is not at all generally appreciated.

The last part of July a concern got a million and one-half dollar order, and that is something these days. The order had to be completed the first of October. It

meant turning out in one day 1500 units where the greatest number they had ever before produced was 1000 a week. They brought in a number of new girls and put them to work with eighteen skilled operators. They fiddled along for a week. The skilled operators were only doing fifty per cent production, and at the end of the week the new operators weren't anywhere at all. One evening they told the best girl to report to the laboratory the next morning.

When this girl went home she told her husband, "They want me to work in the micro-motion study laboratory. They say that guy in there is a—you know what they say, a so-and-so—and I don't want to go there tomorrow. I am going to quit." Her husband said, "Go down there first anyway. Maybe he isn't as bad as they say he is."

At the end of the week, after she had helped to improve the job she said, "You know, Mr. Smith this is marvelous. I didn't know it was going to be like this." The job was finally photographed in movie, and the film was used to train 400 new girls.

I saw the last of the order come through the other day. The order was finished on time. I think we can have a release on that in time to have the story and pictures in our next issue.

This method of improving processes and instructing new workers certainly helps to prevent accidents. Safe habits of work are formed, fatigue is decreased, and much physical labor is eliminated.

PROFESSOR JOHN W. HALLOCK (University of Pittsburgh): Many of the men here may be interested in a book by Lowry, Maynard, and Stigermeyer called "Time and Motion Study." It is published by the McGraw-Hill Company. We use the standard text and supplement the text with much of the data Mr. Mogensen has presented.

A. M. STEEVER (Great Lakes Forge Company, Chicago): At what speed are these pictures taken?

MR. MOGENSEN: At the rate of 960 pictures a minute. Some of the larger and more expensive cameras are equipped to run at constant speed at 1000 frames per minute.

C. L. HUNGERFORD (Firestone Tire & Rubber Company, Akron, Ohio): Do you recommend that all development work be done in a laboratory? Are you able to set up a job in the laboratory as you have it in the factory?

MR. MOGENSEN: I called it the laboratory because it is a term often used. It is really a class room. They have a class room at Cadillac, at the General Electric in Fort Wayne, and at Schenectady, and other plants. The original Gilbreth micro-motion study work was largely done in the laboratory because it required big arc lights and a professional camera with a whole truck load of equipment and an operator. With the new super-speed panchromatic cameras, many operations can be photographed without any special light at all. The small 16-millimeter camera has reduced the cost, and it takes very little experience to handle it.

In teaching the principles of motion economy to foremen, superintendents, leading operators, and time study men, nearly all use the class room and the motion picture projectors. Tool designers are all brought into the class room. Simple things are shown. Pictures are projected and new experiments worked out. Outside of the training in this class room, as I suggested, a lot of work is often done in the plant. If you once get the people in the plant thinking and working along these lines you don't need a laboratory. The whole plant becomes a laboratory and every single one of your workers in the plant is contributing ideas that are acceptable when this sort of spirit is set up. You can't hire a couple of experts, a couple of methods men, put them in the laboratory and expect them to do the thinking for the organization.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Foremen's Forum

Friday Afternoon Session
October 16, 1931

T. H. McKENNEY, Chairman

Supervisor of Labor and Safety, Illinois Steel Company, South Chicago, Ill.

The meeting of the Foremen's Forum was called to order by T. H. McKenney, Illinois Steel Company, presiding as chairman.

CHAIRMAN McKENNEY: This meeting is principally for foremen, you men who have accepted the responsibility for interpreting the policies of your companies to the workers. At this time I am going to introduce our first speaker, Mr. R. A. Toogood, who is the safety man for the American Seating Company at Grand Rapids.

A Foreman's Safety Experience

By REUBEN TOOGOOD

Foreman, American Seating Company, Grand Rapids, Mich.

There is no person in industry who has such close contact with the job of accident prevention as the foreman. Older foremen, like myself, remember when there was no safety work. We remember when an injury to a man employed in a plant was no more the business of the employer than if the same man had been injured at home or on the street. We remember when a machine man used to apply for a job and to prove that he was an experienced man would show how many fingers were missing.

Then we saw the safety movement in its beginning. The first evidence of such a movement was the appearance in the plant of "safety first" signs and some safety posters. These signs and posters were the occasion of much comment in the plant. You people who have been attending safety meetings have doubtless heard a good deal about the "hard boiled foreman" of the old days. Having been a foreman in those days I can tell you something about the hard boiled workmen we had then. One of my first jobs as foreman was to put a stop to drunkenness on the job. I remember when workmen who had been disciplined used to wait down by the railroad tracks to waylay the foreman on the way home. When you know those things you can well believe that if a foreman was not hard boiled he did not remain a foreman for long. You can imagine the sort of comment occasioned by the first safety posters. Foreman and men felt that the safety first idea (as it was called then) was a lot of hot air and that if the company would put the money in the pay envelope it would do a lot more good.

Following the appearance of safety posters and safety-first signs, came the first aid departments which were not very much like the modern first aid departments we

see today. I remember that the man in charge of the stockroom was called the first aid man and that he removed slivers from the body, foreign bodies from the eyes and treated almost any minor or major injury. Little attention was paid in this first aid room to cleanliness in a surgical sense. It happened that I worked in a department near the stockroom and I remember well that for many years I carried a jack-knife with one blade reserved for the removal of slivers. The first aid man used to come into my department when he had an unusually difficult sliver to dig out and borrow the jack-knife to do the job. It is probably not much of an exaggeration to say that more infections came out of some of these primitive first aid departments than ever went in.

I do not know what the people in the front office thought about safety. Foremen in those days did not spend much time in the front office. But top management did not say much to the foremen and men about the new idea of accident prevention, probably because they felt that they would not get much help from the shop. The idea of safety, as a major problem of production, had not taken hold and the only way management knew of presenting the idea to the people in the shop was through posters.

The next step, as I remember it, was the formation of safety committees. These safety committees were instructed to make periodical inspections of the plant. Their reports consisted almost entirely of recommendations for guards. Not much was done in the way of preventing the accidents which were generally charged to carelessness. About this same the State and insurance company inspectors used to go through the plant and the superintendent used to come around and tell the foremen to get their machine guards in place because the inspector was coming through. Guards were dug up from wherever they had been buried and hastily attached to machines so that the inspector would find a well guarded plant.

From conditions like this the foreman who has been on the job for many years has seen the safety movement grow to where safety is considered an important part of the job of every man who supervises production, and a workman is judged by the safety with which he works as well as by the amount and quality of production he turns out. We have seen every step in this change. We have seen and tried many new fangled ideas, some of which worked and some of which were soon discontinued. We are in a position to know what worked and what did not work. We know better than anyone else what has caused hundreds of accidents. A large part of this knowledge has never been written into the reports because it would reflect upon our supervision or upon some of our men and the average foreman will fight as hard to protect the interest of his men as he will his own. It is a wise accident investigator who can go into a department after an accident has occurred and get the whole truth about the accident. But the foreman knows.

The foreman can, if he is properly enlisted in the safety movement, prevent most of the accidents which occur in industry. To do this he has only to be guided by past experience and not make or permit to be made the same mistake twice, for every foreman who has been a foreman long has had about every kind of accident that it is possible to have. Managements which are trying to cut out accidents can do so to the best advantage if they get the ideas of the foremen and place the responsibility for accidents upon the foremen.

We may well say that if the safety experiences of the foremen in this room could be remembered and classified and related, this would furnish material for the most important book on industrial safety that has ever been written. It is not too much to believe that if this experience could form the foundation of our safety program we would reduce accidents as much from our present basis as they have been reduced in all the history of the safety movement.

In the few minutes at my disposal I wish to tell you of some accident cases and the lessons I have learned from them. In doing so I do not hope to cover the whole field of accident prevention, but rather to suggest to you the possibilities in getting safety lessons from the experience of foremen. My aim is to point out to foremen

that the best safety information at their disposal, is an analysis of their own accident records, and to point out to safety engineers, superintendents and other management representatives that they will get to the bottom of the accident situation only when they approach it through the foreman.

The cases which I am going to relate are real cases and the names of men I give you are the real names of the men involved. Some of these cases I have investigated myself; others are taken from the records of the American Seating Company where I am a foreman and chairman of the Foreman's Safety Committee.

The first point is that once a hazard has been recognized and a safeguard devised, it should be applied to every similar situation. There is no point to guarding the place where an accident has occurred if other places just like it are left unguarded.

Peter Viug, a college boy, was working on a light punch press. He had been borrowed from another department and did not understand the press but the point of operation was fully guarded and the job was considered safe enough for anyone to run.

He was turning the flywheel by hand and did what an experienced operator would probably not have done. He put his finger through a hole in the flywheel. As the press went over center it pulled his hand with it and his finger was sheared off against the frame of the press.

A number of lessons might be learned from this accident. The hazards of the job had not been carefully enough studied by the foreman and the boy had not been warned against every possible danger. More important than this was the fact that a simple disc guard of sheet metal could be placed on this wheel covering the holes and making it impossible for anyone to get his fingers through them. Such guards were known to us and we had them on a large number of machines, some of them in the same department. The fault, then, was ours for not following up a lesson that had been learned years before and applying it to every similar situation. Think back, if you please, and see if you have ever been guilty of the same fault. Have you perhaps had an accident which could not have happened if you had applied to the situation a lesson in guarding or in operation which you had learned from previous experience. Then think forward and try to picture where an accident is going to happen which you already know how to prevent. There is little excuse for the supervisor who has an accident after he has once learned how to prevent it.

From case two we learned that most serious accidents occur as the result of repeated chance taking and through a practice or condition which has existed for some time. The first time a man violates a rule, he is so conscious of it that he guards against injury. Having gotten away with it once he and others try again until at last it becomes common practice, often winked at by the foreman, and each time it is done, a little less care is taken.

The night crew in the foundry has to haul trailer loads of castings to the cleaning room with an electric truck. About a year ago an overhead bin was constructed and a steel ladder built just in the edge of an aisle. In passing this ladder, castings would catch, so it became the practice for one of the men to slip a board between the ladder and the load just as it was passing. For a year this went on without mishap and then one night the man did not get his hand out of the way quite soon enough and a finger was crushed. At once the ladder was ordered moved and that particular accident will not happen again. But the men had known and the foreman had known for a year that this was going on. The real reason for the accident, then, was failure to remove the accident cause which was known to everyone concerned.

For people who are trying to prevent accidents the lesson here is clear. If serious accidents are the result of repeated chance taking, there is always warning before they occur and a thorough investigation of minor accidents and unsafe practices will prevent the serious accidents by removing the causes.

Our safety committee, working on this theory, makes it a matter of daily business to investigate every minor accident and near accident. These investigations reveal

many conditions and practices which are unsafe and which may very well cause serious accidents.

My third point is that anybody doing a good job of accident investigating has got to get reports on accidents and near accidents. We have found that there is no one source of information as good as the first aid department. Men who receive minor injuries are usually in a mood to tell the nurse what they know about the cause. Investigation of these reports is very important. Sometimes we find that the man is overwrought or that he has a grievance of some sort that causes him to overstate the hazard. Even so, it is better to follow up the complaint and give his foreman a chance to straighten him out and try to change his attitude. More often than not, however, these reports lead to the discovery of real accident hazards.

For this purpose the nurse keeps a book into which she writes all the cases which come to her attention which she thinks might be of interest to the safety committee. The chairman of the safety committee then checks up this book every day and makes an investigation wherever it seems necessary. Let me read a few of these brief notes which we got from the nurse's book and which called our attention to matters that were not reported from any other source.

"Stanley Malinowski reported with a deep cut in his eyebrow. He said he leaned over to pick up something from the floor and when he raised up, struck his head against a piece of iron sticking out on his machine." Our investigation disclosed that the piece of iron was a gate guard for a drive pulley and that the guard had been left swinging open. Incidentally, it disclosed that the guard was not nearly as effective as it should be and the committee recommended a new guard which was made.

Paul Landowski reported with scratches and bruises on his left side. He said he fell on a slippery floor in his department. The safety committee brought this to the attention of the foreman who took steps to correct the condition.

"Pete Zegunis reported with a sprained back which he said he got while lifting a keg of screws." Investigation disclosed that because it was inconvenient to get help, this man was lifting loads which should have been handled by two men. The foreman instructed him always to ask for help whenever he found a load which was too heavy for one man to lift safely.

"Maryon Moore reported with a deep cut in the palm of his left hand from an electric drill." He told the nurse that he had not been instructed in the use of the drill and that he was afraid of it. Investigation disclosed that while he had been instructed, he had not been instructed recently nor on this particular type of work and that he certainly did not understand how to operate it.

None of these cases was a lost-time accident but you can see that they were all caused by conditions which might very easily cause serious injury. The safety committee, or accident investigator, dealing only with lost-time accidents, misses out on a number of very important clues as to where the hazards exist. We get about eight times as many of these cases as we do lost-time accidents, so the following-up of these reports is a much more important part of our safety activities than the investigation of lost-time accidents.

My fourth point is that in doing a good job of accident prevention, the foreman cannot afford to overlook the opportunity of getting suggestions from his men.

Harry Eno, a mine (and he could prove it by his missing fingers) had no use for safety, as he understood it. He would not use the guards which were furnished for his machine. I he scoffed at others who did.

It happened once that the foreman and mechanics were having a good deal of trouble devising a guard for another saw in the department. Eno was called upon for suggestions, with the result that he not only sketched a guard which could be used on that saw, but he also suggested guards which could be used on other saws in the department. His suggestions were followed out with the following results: first, the guards which he developed were far superior to those we had used previous-

ly; and second, Harry Eno was converted to the use of saw guards and came to be one of the most careful workmen in the department.

Foremen attempting to apply this lesson must remember that it is in two chapters. It is true that it helps to get suggestions from the men, but it is a thousand times more true that suggestions once received must be given thought and sincere attention and the man giving them must be recognized if not rewarded. Unless this second chapter of the lesson is remembered, suggestions will do more harm than good.

We discovered the fifth point in making plant inspections. It is this, that we get better results if we work quietly with the foreman concerned than if we make a public report of conditions. It used to be the practice to make a monthly inspection report at our monthly foremen's meeting. These reports were tiresome and the foremen whose departments were reported resented it. There were cases where the committee went through the department and said nothing to the foreman, but made a report about the department at the monthly meeting.

Before I was a safety committee-man I even asked the committee if they found anything wrong in my department and had them tell me "No," only to have them make a report at the next meeting of some condition which they thought was unsafe. My own reaction to this sort of thing was to get stubborn and postpone the improvement as long as possible. Surely this was not a healthy condition and I determined, when I became chairman of the safety committee, that I would never make a public report of any condition which could be corrected at once by taking it up with the foreman concerned.

Now we make our inspections and investigations, but when we find something wrong we do not report it to anyone but the foreman concerned. The result is that we have his fullest cooperation in correcting unsafe conditions. Of course, if a foreman is obstinate and refuses to cooperate, we have to bring pressure to bear in the best way possible. But in doing so we make it clear that we would rather get results without resorting to authority and after one such occasion the foreman is more willing to cooperate.

My sixth point is that a foreman's best bet in preventing accidents is in proper teaching. If an employee is new in the plant, or new to the department or to the job, he must be taught carefully before he can safely be left to run a job.

Dale Shephardson, operator on an endless bed tripple drum sander, was borrowed by the foreman of another department to run a similar machine. But while the machine was similar, the stock was considerably different, and because of this he permitted his hand to feed into the machine before he had it entirely set up.

Here was a man who pleaded guilty to carelessness because, as he said, he should have known better. But the real significance of the accident lies in the fact that the foreman, knowing he was an experienced operator did not give him any instruction or warning, did not in fact even find out his name. He was too busy to bother instructing a man who probably knew more about the machine than he did.

Here is the most common failing particularly of young foremen but often also of older ones. They feel that they will look silly giving instructions to a man who is older than they and who is a skilled mechanic. Let such a foreman remember that if the management did not want him to instruct these men he would never have been put on the job. Let him also remember that every job is different and that it is up to him to analyze each job and find in advance the danger spots so he can caution the workman. Let him remember finally that workmen expect to be led and instructed and that they depend upon him to do these things. Not to do them, weakens any foreman in the eyes of his men.

Probably there is not a foreman present who has not at some time turned a new man over to an older man to instruct. Have any of you ever had the startling experience of discovering, after several new men had come in and been instructed in this way, that the instructions being given are not at all what they were when you first gave them. There is no substitute for good instruction direct from the foreman, and the foreman who has not time to instruct his men is probably overworked by

running down a lot of mistakes, which would never have occurred if he had taken time to do a good teaching job in the first place.

The seventh and last point is that no amount of safety effort can be effective without supervision and discipline.

This same reluctance of some foremen to assert themselves in teaching is also true in regard to supervision and discipline. A number of serious accidents in one department will serve to illustrate what I mean.

Oliver Butler, a millwright, was doing a repair job on an electric crane way. He was drilling with his arm wrapped around a post where there was not sufficient clearance for his arm to be if the crane were operating. Someone started the crane and it sheared his arm between the post and the crane. Fortunately there was enough clearance so the arm did not have to be amputated, but the man was laid up for several weeks and his arm will never be entirely right.

In this man's kit on the floor beside the ladder was a padlock which had been issued him, with instructions to lock the starting switch whenever he was working on a machine, so that nobody could start it.

It is easy to diagnose such an accident as being caused by carelessness. Before we dismiss it entirely, however, let us consider some other cases that happened in the same department about the same time.

George Sissons, millwright, moving a molding machine in the foundry caught his hand in the machine causing a severe contused wound. The same man a few weeks later let an electric drill get away from him, striking him on the side of the head, causing a concussion.

Frank Laurel, millwright, dropped a heavy iron bar on his toe, and a few weeks later a fellow millwright dropped a brick on his head from a height of twelve feet.

Earl Kauffman, millwright, was helping to move a heavy machine through a doorway. The machine was being pulled on rollers by an electric truck. Kauffman, was an experienced mechanic, supposed to know better, but he was walking behind the machine with his hands resting over the corners. As the machine passed through the door his finger was caught and had to be amputated.

Each of these accidents, and they all occurred in less than six months, might well be called carelessness and dismissed as the fault of the men themselves, for they knew better and they were not expected to take chances. This was the opinion of the foreman and others concerned and nothing was being done to improve conditions. The foreman in this case was a young man who had recently been promoted from the department. Most of the men had as much experience as he. Many of them had been in the department longer. Because he was a careful workman himself, it did not occur to him that all the rest were not. He hesitated about closely supervising men who were probably as good mechanics as he was.

As a result of these several serious accidents he was made to see that somebody must exert some supervision over his department. He got the idea that every accident to one of his men was, first of all, his fault and that through supervision and instruction and discipline he was going to stop them. That was in December, 1926, and from that day to this there has not been one lost-time accident in his department. Safety was made a part of every job and accidents were just prohibited. Prior to that the safety man and the safety committees had put up safety posters and made speeches and given prizes, but accidents did not actually stop until the foreman made it his business to stop them.

So we could go on for the rest of the afternoon talking about accidents and near accidents, cases that form the material from which all safety lessons are learned. And, while we could multiply beyond number the cases, we could not learn many new lessons, for while every accident is different they all grow from a few causes and can be prevented by the faithful application of a few principles which most of us know.

As a foreman and safety committeeman, I have served through a period when the safety movement was unknown, have seen it in its beginnings and seen it grow

to be a necessary part of good management. Out of years of experience and from hundreds of cases we have learned seven lessons, one for each day of the week, if you wish.

1. When a safeguard or a safe practice is found to overcome a hazard it should be applied to all situations where the same hazard exists so that the same mistake will not be made twice.

2. Most serious accidents are the result of repeated chance taking, of unsafe practices which are known by the people who ought to stop them.

3. Any person doing accident prevention work should get reports of all accidents and near accidents and investigate every one with the sole purpose of seeing that it is not repeated.

4. In making inspections the best results are secured if recommendations are made directly and quietly to the person concerned.

5. Foremen can get much valuable information from their men and in addition can enlist their men in the cause of safety by accepting their suggestions and giving them proper credit.

6. Teaching is the most important job of any foreman.

7. No matter how expert or how intelligent or how careful a crew of men may be the foreman cannot hope to maintain a safety record without constantly supervising them.

Our experience, year by year, has been that when we have forgotten these truths our accident experience has been bad, but when we have remembered and practiced them it followed as surely as night follows day that accidents decreased. I offer them to you for your consideration.

CHAIRMAN MCKENNEY: This paper is now open for discussion.

ARTHUR MURRAY (Container Corporation of America, Chicago, Ill.): What does your management do to check the quality as well as the quantity of this foreman teaching.

MR. TOOGOOD: The best answer is that we have been able, through this investigation of accidents and cutting them down, to reduce our compensation insurance rates quite a bit.

MR. MURRAY: I would like to know whether the management is reviewing the ability of your foremen to teach. Does each foreman set up his own standards in each department, or is his teaching ability periodically analyzed.

MR. TOOGOOD: If a foreman is having an unusual number of accidents I think they talk to him in some way. I don't know whether it is the superintendent. I know the division superintendents do check up with the foremen.

MR. MURRAY: One way to approach accident problems and approved in most plants is by checking up on past experience. Another way is to analyze a condition before the injury is produced. What does your management do to see that your foremen are analyzing these jobs before an injury actually happens? It is much cheaper to prevent the injury than to go to the accident report and then develop a safeguard or safe practice.

MR. TOOGOOD: I don't come in very close contact with the management or superintendent and I am unable to answer that question.

E. D. KOPPELMYER (Illinois Manufacturers Mutual Casualty Association, Chicago, Ill.): What methods are used by the foremen to get this safety message out to the men on the job?

MR. TOOGOOD: These men are all instructed by the foreman when they come on the job, and he checks up with them two or three times to see whether they are following his instructions.

K. S. HUGHES (Hudson Coal Company, Scranton, Pa.): How many men does a foreman have under his supervision?

Mr. TOOGOOD: I think most of our departments have 30 or 40 men. One department runs around 60 or 70, but they are mostly all small departments.

K. E. YANDELL (Standard Oil of New Jersey, Elizabeth, N. J.): What is the best method of trying to convince a foreman that he is responsible for minimizing the accidents in his department? Disciplinary action doesn't seem to be the best method.

Mr. TOOGOOD: In one case I cited it worked fine, but most of them can be reached better through personal talks along educational lines. Once in a while you just have to bring pressure.

J. MORGAN BUSWELL (San Joaquin Light & Power Co., Fresno, Calif.): A foreman doesn't like to have a faulty condition in his department reported publicly or throughout the organization. He wishes to protect his organization or defend it in case of accident, and often it is difficult to get the real answer to an accident cause. The idea of burying the fault, not putting it on the record and not reporting it to the Central Accident Committee, or through the organization, becomes a difficult one from the standpoint of experience. Often you have a number of different departments, the experience in one of which will lead to the elimination of like accidents in another department. In addition you have a turnover in your accident committees, probably, and a foreman who permits a condition to exist until a safety committee comes around and finds it may later allow the same faulty condition to occur again. And if that, too, is hidden, then as time goes along there is no incentive for that foreman to keep his accident hazards down.

Doesn't the speaker think that some record should be kept of the faults that have been made by the safety committees, even though they are not published throughout the organization, or made public as the speaker said, so that we will have a consecutive record, a chronological record of the faults that have been found in the various departments?

Mr. TOOGOOD: We make a note of them on our inspection trips, but we do not report them. They are given to the secretary of the foremen's club and are placed on file. We don't report them at the foremen's meeting.

CHAIRMAN MCKENNEY: The next topic will be presented by Jack Dempster of the Canada Cement Company.

"John—Take This Man!"

The Foreman's Responsibility in Placing the New Man

By JACK DEMPSTER

Canada Cement Company Limited, Plant No. 8, Port Colborne, Ontario, Canada.

You wanted another man, and you have him. More than likely his vital history has been taken in the employment office, and a few salient facts were given you, but he has been turned over to you. Now, what?

In the old days he was told he had certain duties to perform, a pick and shovel given him, or he was placed at the machine he was hired for and told to "Go to it." It is a far jump from then until now—somebody started an agitation that "Foremen are responsible for the personal injuries of their men", and if that is true, one large burden has been laid upon our shoulders. Evidently we have to take it, so we'll just look in the mirror and try and find what we have to do and how we are equipped to do it.

We are here to talk about "Safety", not the qualifications of the man for the job, therefore, his past experience notwithstanding, we must assume always that he must be taught the safety policy; in other words, we have a new pupil in our safety education class. If we are to make a success of him, he must be convinced of our sincerity and we must gain his confidence. This is not going to be a talk on the foreman's qualifications, either; we have heard all about that subject from our own personal bosses, with fire and brimstone—but about the foreman's responsibilities from the safety engineer's point of view.

"John, take this man!" It starts there, but don't we all feel like demurring when somebody says "Our responsibility"? I believe we are using a word here that is sometimes misunderstood. None of you will agree if I say that we are to *blame* for an accident caused to one of our men, but if I say that we are *in charge* of our men, and their actions while they are on the job, it will sound better. To illustrate—I have a plant in mind, that operates with some of the most powerful machinery known, which has not one foreman on the job from 5:30 p. m. to 7:00 a. m. and yet this is a 24-hour plant. In that organization the foremen are held accountable for all accidents to their men—because they have charge of them.

In this hardboiled age of competition, I wonder if we all realize just how the average new man feels? Nearly always he is a stranger to the job, the men, the officials, and the local procedure. After all, we are only over-grown children, and can you remember how you suffered when you went to a different school?

Here is where the real safety foreman steps in. It is in his power, to a very great extent, not only to remove the apprehension and timidity from the new man, but to start him off on the right foot regarding our accident-prevention policies. The foreman has, then, a number of *duties* regarding this man, and you will agree that if they are conscientiously performed, we have done our best to create a friend, an efficient employee and a "safe" worker out of a "green" hand.

Our Duties. We must "Gain his Confidence; Teach him; Impress him, and Supervise him." And I think those four points cover all (what we are pleased to term) the "responsibilities" of the foreman toward the new man.

Gain His Confidence. When you contemplate the purchase of a car, you find out all you can regarding its capabilities; you try out its parts, learn about its engine and endeavor to obtain enough knowledge of the car to warrant dependence upon it. You want to be sure that when an emergency arises, the car will rise to the work expected of it, and after you have been driving your car for a while you are so familiar with it that, as we have heard often, you hesitate to trade it in for a newer car because you know the old one so well.

You take a new man under your jurisdiction, and thereby render yourself responsible for the work he performs. As far as you are concerned, in the beginning, you have an unknown factor. Probably not at once, but certainly as soon as possible, you can make it a point to have a talk with him. Forget the plant and his duties for a few minutes and get into his domestic life. You know that a friend is a better asset for you and your plant than one who is merely working for wages. It will be no hardship on your part, and may even not appear to be of great importance to you, but if you can get him to tell you of his wife and children, if he is married; of his dependents if he has any, and of his home life, his ambitions—get him to even tell you about the operations he has had—can he play ball, is he a musician? If he is of the non-English speaking races, get him to tell you a little of his own country and its customs. Can you realize for a moment just what all this means to the new man? You know perfectly well that you want a man that will be working just as hard and efficiently when you are away from him as when he knows you are watching him. The real foreman of today isn't riding about on a high horse, and if you are one of those who will be greeted with "Mornin', Mister Tom,"

"Good morning, Dick," or "How goes it, Harry?" by the men under you—well, there isn't very much the matter with you.

In the early days of organized accident prevention work, one of the hardest obstacles to be overcome was the suspicion of the rank and file. So many men thought that the "Company" had an ulterior motive and wished to avoid accidents purely for economic reasons. As the work presented so many varied problems, and so much ground work had to be done, it was quite a while before a whole organization was "sold." By gaining the open-minded confidence of your new man, you can present safety policies to him in a manner that he will never forget. Don't make the mistake of thinking, also, that because a man talks English imperfectly that you have to talk broken English too. See that he understands you, but remember that he looks up to you; you have a position to maintain and he will try to learn from you—providing of course that you don't kill the whole thing by an assumption of superiority. Every man, new man or old employee, has a certain amount of pride—if you wound that you will do incalculable harm. The new man wishes to emulate you and those above him; if his aspirations are guided into the right direction you will be achieving your object.

Teaching Him. "John, take this man!" No matter how experienced a man may be, he doesn't know it all. Your methods may be vastly different from those in practice at other plants, to achieve a similar object. As a foreman you are, and must be, a teacher. If you have gained the new man's confidence he will learn from you, and straightway you must embark upon your policy of safety education. When you went to a strange school, the teacher did not take your word as to the extent of your knowledge. He placed you under observation until he found out what you did know. You start in with your new man at the beginning—and of course you understand I am not talking about running a lathe or pouring a casting.

We are fond of saying: "Teach him to be safe and he will be a good workman," so go at it the right way. Never mind that "sob stuff" with the new man. It used to be the procedure to point out, in pathetic terms, a picture of the heart-broken widow and fatherless children—bereft because Daddy stepped on a nail and didn't get first aid treatment. For a long while we filled the head of our new man with visions of cripples selling lead pencils and a procession of wheel chairs from here to back again, because the victims tried to put a belt on a revolving pulley or climbed up a rickety ladder, and so on. The fallacy of this system became apparent and was shown one day when one of the Safety Committee members on our plant came into the office and said: "Here! Something's all wrong with this safety stuff. I am so full of pictures of the hospital that I cannot walk along the sidewalk in confidence, for fear I might trip over a match, and I dare not climb or run a machine in case I may be made to occupy a stretcher."

Industry soon discovered the same fact, and you can readily see your plan. It is bad business from an economic viewpoint, isn't it, when a personal injury is caused! You can show him that it constitutes a distinct loss to the country, the community and himself, when his earning powers are stopped through accident. Never mind talking about the billion or more dollars that accidents cost America—he can't comprehend a billion, neither can you; but he sure can grasp the fact that his wages will be two dollars and sixty-six cents, instead of four dollars a day if he gets hurt. Let him see that it is bad business to suffer unnecessary pain; that he is imposing a penalty upon others when his wife has to suffer because of him, and that it is not laid down in the laws of employment that a child must go hungry, because a man gets hurt. Teach the new man that all personal injuries can be avoided. That is a strong statement, but you foremen know it is true, even though some of you won't admit it. There are two words used to describe a state or condition, that I believe have done more for accident-prevention than anything else.

They are "Safety-Mindedness." That's what you want to teach the new man. Machinery must run and belts will come off and break; the blast furnace will develop weak spots, and nails will always be left protruding by somebody, but that inward consciousness of a self-preservation policy will *compel* a man to give first consideration to his life and limbs. When you can make him realize that it is unnecessary to have an accident, that it is poor business; that the company regards it as inefficiency on somebody's part and that he, himself will suffer when there isn't the slightest reason why he should do so, then you are maintaining your own position and you have a better worker—he knows that you are a friend and that you are solicitous for his welfare.

For goodness' sake, be sure that your new man thoroughly understands the motive for your safety warnings and teachings, and "sell" him thoroughly on the idea. Don't let him alone, undecided, but make a safe worker out of him even in spite of himself.

Impress Him. You are going to fail in your prime duty—you will have no success with your new man—if you fail to thoroughly impress him at the beginning. Think what an opportunity you have to add to this world's happiness—for God knows we need it. You have a machinist, an oiler, a laborer or a kiln attendant given to you, or perhaps he is just another man for the "Yard gang" to dig those ditches I mentioned, but you must let him know that you are sincere. For a time he will be puzzled with the mystery of it all. "Why should a foreman care whether I get hurt or not unless he gets something out of it?" But as he sees the light of earnestness in your eyes, detects the solicitude in your voice, he will come to realize that you are only a human being, even as he; that you have, too, somebody who shares your joys and sorrows. He will know that you, too, are not forgetful of the parents who brought you into the world, and because of your impressiveness he will feel that no chance is worth the jeopardizing of his privilege of losing his rough fingers in the curly head which rests upon his knee. See that he knows, like you do, that if there are such things as love, wife, children and happiness, it requires all his faculties to enjoy them, and nothing is worth while if it will tend to injure those faculties. See to it that your new man detects no hypocrisy in you—if he thinks you are not in earnest and you fail to impress him—then you have responsibility indeed!

Will you impress your new man, you foremen? You have assumed a burden all right, and from your lips may come the words that may affect him greatly. As we have grown in knowledge, our machinery made more intricate, our methods more scientific, so has man at his finger tips command of more power than our fathers dreamed of. Can you guide those finger tips and, doing so, cause your new man to follow you with confidence? Mr. Foreman, if you can't impress your new man with the full value of that which you have to sell, if he cannot detect sincerity in you from the very beginning, you will never sell to him at all. In the accident-prevention phrase of manufacture, there is a new conception as between master and man. The foreman no longer looks upon his men as mere portions of flesh and blood who are subservient to him. The real foreman will look beneath the accidental conditions of birth, education, environment or nationality, and will catch a glimpse of a brother worker. In all things he will impress the new man by doing as he teaches, and will assume no "Holier than thou" attitude.

Supervising Him. I have said that the foreman must gain the confidence of the new man; that he must teach him and that he must impress him; but these three things must be followed up—you must supervise him. Now, in that last qualification the true safety foreman comes to light. Suppose a member of your family were ill—you call in a doctor. The first thing he does is to find out the source of the trouble; he asks questions and he gains the confidence of the patient. He then lays down a set of rules, tells the patient or nurse what must be done and impresses them with the fact that, not only does he, the doctor, know exactly how to handle

this particular case but that the patient is going to recover. We know and have been taught that a great deal of a patient's chance for recovery depends upon the cooperation of the patient himself—therefore he must be impressed by the physician. But supposing, after all this, the doctor said "Good-bye", pocketed his fee and then never came near the sick patient again—would you feel that he had completed his job? If the patient was seriously ill, wouldn't you say that the physician should have paid other visits, that he should have noted the condition of the patient from time to time, to supervise his recovery? Of course you would, and no matter how much the foreman thinks he has "sold" the new worker, he must check up on him now and again—just a word or two of encouragement or caution.

I think that accident prevention work has had a remarkable effect in fostering and nourishing happy relations between employer and employee. There must be a supervisor, between the office and the rank and file, but the stern martinet has quickly disappeared, and when you hear around you, in every industry, the rankers calling their foremen by their Christian names, you cannot but feel that a happy state of relations exists. In the majority of plants it has not been found practicable for the whole organization to stop work and attend safety meetings very often. Nearly always we find a committee, composed of foremen, who can relay instructions to their men individually. We know that oftentimes a half a dozen words, given in what may not be precise grammar, by a foreman to his men, may carry more weight than half an hour's talk by the general manager.

Our duties are very clearly set forth here. As a go-between we must carry our men along and, not only see that the demands of production are satisfied, but that Tony Angelo or John Smith does not endanger his ability to produce, and that he understands that his first thought must be of safety, both for himself and his fellow workers. Supervise him? Yes, but supervise him intelligently. Let him know that not only is he part of the job, but that the company—the Big Boss—is relying on him. This work has made us all part of a big fraternal organization. If a safety competition is in force and a safety record existing that we are all proud of, don't forget that a slip on the part of the humblest worker can wreck the achievement just as surely as one by the manager.

I heard a story once of a foreman who bossed a gang of Italian laborers. They were all new men and were engaged for pick-and-shovel work. Now this foreman took the gang outside a building and into a large yard, and pointing down to the ground, said "Dig here." They dug down three or four feet and then he stopped them and said "Stop; dig over there." They dug down again for a while and, without any apparent reason he stopped them again and told them to dig in another place. This was repeated five or six times, and at last one of the gang, who were muttering to themselves, said: "Watta da hell; maybe you crazy. Dig-a here—stop; dig-a there—stop. All-a time dig like hell and stop. W'at's-a da mat?" Then the foreman did what he should have done in the beginning. He explained to Tony that the office had mislaid the drawings of a long-buried pipe line that ran through the yard somewhere, and that they just had to find that pipe. Well, after that, the job seemed intelligible, they knew what they were doing and why they were doing it. They went to work again with a will and soon the pipe line was found.

Now, how do we stack up on those four qualifications—which we have called "responsibilities"? When we get a new man do we always take him in hand, or do we just put him to work? In a few hours' time you and I will be on our way home. This white collar and these good clothes will be taken off and, clad in our working clothes, we will be on the job again. What are we going to do tomorrow—Monday—you and I? Are we just going to take up the reins where we left off, or has our visit to this Safety Congress done us some good? We will be in a position of authority soon—when we get our new man will we simply mark his check number in our time-book, or will we "Gain his Confidence; Teach him; Im-

press him, and Supervise him", in such a way that "responsibility" only means a "Labor of Love", and thus do another bit for humanity's sake in this world, when we answer the request

"John, Take this man!"

J. MORGAN BUSWELL (San Joaquin Light & Power Co., Fresno, Calif.): First, let's consider several accidents that occurred during the first hour of the day. In one case the man was worrying over his previous two weeks' pay, and two or three I. O. U.'s he left behind at three o'clock in the morning in a poker game. In another case a man had received some infection that had been making inroads on his health for a period of three weeks. Another man had come back from one of his bi-monthly or tri-monthly over night booze parties. He wasn't a regular drinker but once in three or four months he went on a real one. In another case a man had a sick kiddie at home, and that day the wife was to take the kiddie to the hospital perhaps for an operation.

Does the speaker think it is within the foreman's province to get so close to the workmen under him, that he should have been able to have seen those conditions at eight o'clock in the morning before the man was set at a task that involved some hazard.

MR. DREMPSTER: No foreman is divine. No foreman could possibly be expected to see the attitude of a man that early in the morning. If the right spirit of camaraderie can be fostered between the foreman and his men, they would go to the foreman and tell him they were in trouble.

In case of I. O. U.'s or economic problems, disease, or domestic troubles, we all meet them. I firmly believe that if a man goes to the foreman and tells him his troubles he should use his power as a foreman and deal with the situation from a safety viewpoint for the protection of the man himself.

MR. BUSWELL: It is our belief that the foreman can and should be so close to his men, that he can see the signs at eight o'clock in the morning. It is therefore a rule in our organization that the foreman never set a man to a task particularly involving dangers or hazards at any time unless he knows for a certainty that the man is at that time perfectly capable of performing that task with safety.

CHAIRMAN MCKENNEY: We will proceed to the next topic, "The Conference Method of Imparting Safety," in two sections. Mr. E. F. Blank, of the Jones and Laughlin Steel Corporation, will be the first speaker.

Recent Developments in the Conference Method of Imparting Safety

By EARL F. BLANK

Safety Director, Jones and Laughlin Steel Corporation, Pittsburgh, Pa.

When some twenty years ago a few employers began to think seriously about accident prevention work, they thought mostly in terms of physical and mechanical guards. When new plants were built thought was given to proper layout, safe machinery and equipment. However, it was found, after some plants were practically 100 per cent physically safe, that we still had accidents and it was necessary to institute an educational campaign to prevent the type of accident that was being caused by the human element. This campaign of education consisted, first, of the organization of safety committees and the posting of safety bulletins and various kinds of safety meetings, pointing out to the employees the various hazards and how to eliminate them.

The next step was rules and regulations, safety news letters, safety magazines and literature of other kinds, safety contests, and accident investigations, all designed to focus attention on accident prevention and to make the employees more careful

workers. In the first twenty years of accident prevention work in industry, these methods resulted in reductions in accident rates varying from about 10 to 50 per cent.

Our company by 1928 had been able to reduce its frequency and severity rates about 60 per cent, but in 1929 we had an increase in accident severity. This, I believe, was true all over the country, from National Safety Council figures that were compiled which showed that accident severity rates were higher in 1929 than in 1928 for the 1092 establishments reporting. Increase in these rates was probably due to increased activity, increased employment with green men, and a greater drive for production.

An analysis of our accident causes led us to believe that our employees were not taking seriously enough our accident prevention work.

Much has been said and written about the foreman's place in industry, so I will not have to enter into a dissertation of the foreman's responsibility, except to say that a great deal is expected of this key man in increasing production, lowering operating costs, and so forth. He is informed that he is the manager of his department just as much as the works manager is in the plant over which he has supervision. He is not only responsible for getting out the work, but is charged with the safety of the men under him. He is a representative of the company and is supposed to interpret the policies of the company to his men. He is supposed to handle all grievances of the employees so that they are satisfied. If he is not a good representative, some of the fault may rest with the management for not sufficiently informing him as to just what is expected of him. If workmen come to him with complaints he should be sufficiently informed regarding the policies of the company to be able to explain why things are done certain ways, and the reason for such policies.

Accident prevention has always been an operating problem with us. We have depended a great deal upon our foremen for the elimination of accidents. We decided, however, after this experience in 1929, that perhaps our foremen didn't have enough information on the why's and wherefore's of accident prevention work. Accordingly, we decided to offer a course of specific training which we called our Foremen's Safety Discussion Course.

There are three chief ways of teaching: namely, the informational, the instructional, and the conference plan. We adopted a combination of the informational and conference plan. We felt that by the conference method we would encourage free thinking and free expression. We didn't want our discussion leader to lecture, but merely to lead the discussion.

I might say that under what we call our informational plan there might be two divisions, the lecture plan and the study and recitation plan. We practically combine the study and recitation plan with the conference plan. I think you all recognize the difference, and also the difference in application of those two plans. Usually the study and recitation plan is used as we do in public schools, where the student or learner has little information on the subject, while in the conference plan the learner must also have some experience or some knowledge of the subject. By combining these two we imparted certain information to foremen that we wanted them to study and think about, and then they assembled to discuss the subject in groups.

This plan of teaching has been used successfully in many branches of extension education. It has been found by those who have had considerable experience in this type of teaching that the conference group of about twelve was most efficient. We accordingly divided our 1500 foremen into classes of twelve to fifteen. The discussion leader called these groups together at such time as would work most advantageously to operating schedules. It therefore took us twenty-four weeks to cover our first course of twelve subjects, and then a general review was had. Discussions consumed about an hour each and were held on company time. The leaflets

were given out in advance so that the subject could be studied prior to the conference. The results of this work were so gratifying that when the National Safety Council adopted their course of Safety in Foremanship we decided to use this course as a text for another series of discussions. We are frank to admit that we were surprised to learn that after twenty years of organized safety work some of our foremen knew so little about accident prevention.

Let me give you an illustration of that. We had been conducting safety contests for a number of years. We put out what we called a monthly safety standings report showing the standing of the various departments in accident severity. We found that some of our foremen who had been receiving these reports for years didn't know that the department at the top of the list was the winning department and the one at the bottom of the list had the worst accident record. We had been taking too much for granted. We had not checked back to see that the talks which were given in our safety rallies and safety committee meetings, and so forth, had been understood. In other words, we were talking over the heads of a good many of our foremen and a good many of our workmen.

Our present plan of teaching has resulted in a greater interest and cooperation of our foremen and a greater understanding. The conference method of teaching assures the attention of the learner because he is likely to be called upon at any minute to answer a question concerning the subject under discussion. Various phases of the subject are discussed. This compels the foreman to think the subject out both in advance and during the meeting.

This question of reasoning is a very important one. Whether you are training foremen or whether the foreman is teaching his men, it is best to give the reasons why a thing should be done in a certain way. To say that it should be done a certain way because it is a rule is likely to bring a negative response. By showing the reason why things should be done certain ways, you are more likely to get cheerful cooperation and performance.

Mr. Griffith, Superintendent of Safety & Welfare in our Pittsburgh Works, will act as the discussion leader today, assisted by a number of safety engineers from the various plants in Western Pennsylvania, who will act as foremen. They will discuss subject No. 2 in the National Safety Council's "Safety in Foremanship" series. Understand that these foremen have read the subject matter printed in the text but may answer from their own experience giving their own version of the subject in their typical way. It gives me great pleasure to introduce Mr. Griffith and his able assistants:

Mr. HATTMAN, Standard Steel Spring Company, Coraopolis, Pa.
Mr. LEONARD, Western Pennsylvania Safety Council.
Mr. SHANNON, Fort Pitt Malleable Iron Company, McKees Rocks, Pa.
Mr. GIBSON, A. C. Spang Chalfant & Company, Pittsburgh, Pa.
Mr. MCCLAIN, Jones and Laughlin Steel Corp., Pittsburgh, Pa.
Mr. WEBB, West Penn Electric Company.
Mr. RALSTON, Pittsburgh Plate Glass Company.
Mr. HARRIS, McClintic-Marshall Corp., Braddock, Pa.
Mr. NOLEN, McClintic-Marshall Division, Bethlehem Steel.

Application of the Conference Method of Imparting Safety

Led By H. J. GRIFFITH

Superintendent of Safety and Welfare, Jones and Laughlin Steel Corporation, Pittsburgh, Pa.

Mr. GRIFFITH: I suppose you fellows have been wondering why you have been called in here today and just what this thing is all about. You got your notice and you got your pamphlet.

The first thing, I would like to get your names so that I won't have any confusion when I want to call on you.

(The men gave their names.)

Mr. GRIFFITH: The purpose of this series of foremen's safety conferences, as we call them, is to give all our foremen the opportunity of learning the fundamentals of accident prevention work.

A foreman, in order to operate his department efficiently, must (understand, I use the word "must") reduce accidents to a minimum. So the management proposes, if possible, to furnish you with the tools to do a good job in accident prevention work.

It has been said that more foremen fail from lack of information than from lack of ability and the management's idea is to provide you with the necessary information in accident prevention technique to make your safety work a success.

The discussion method of holding meetings has been suggested, and it has been felt it will be more interesting and will give everyone a chance to do some individual thinking, and express his own ideas.

There may be much that is not new to some of you in the text of the discussion subjects, but we feel this personal knowledge of the topic will enable you to express your opinions and make the conference more interesting. The general superintendent of this plant desires that you make the best of this opportunity, and hopes that what you have learned will be reflected by an improvement in your departmental safety record.

It should be evident to you as foremen and plant executives that any progress we make in accident prevention must largely come through the safety education of our workmen. It is also quite evident that this must be done through the foremen themselves.

This series of safety discussion subjects has been prepared and published by the National Safety Council. Seven subjects in all have been purchased, and they are given to you so you may be better equipped to supervise the men under your supervision.

Before we go any further with this discussion, I want you to understand that I am not here to teach you anything. I am just here to lead discussion. I want you to make yourselves perfectly at home. I want you to discuss these topics just the same as if you were out on the curb discussing them with somebody else. I want you to feel perfectly free. If you smoke, go ahead and smoke; that is all right with me. If you spit on the floor at home, go ahead and spit on the floor here. That will be all right, too. I want you to feel perfectly free and easy about this discussion.

Taking it for granted that you have read through your pamphlets and studied them, I am going to start in by asking you some questions. I am not going to read the pamphlet. I am not going to open the thing. I am just going to ask you questions pertaining to this particular pamphlet.

First of all, what are we going to talk about this afternoon? What is the topic we are going to discuss?

Mr. HARRIS: Production with safety.

Mr. GRIFFITH: Is that right, you fellows?

Mr. WEBB: The foreman's opportunity.

Mr. GRIFFITH: The foreman's opportunity; production with safety. I want you to get the idea. The thought is right there in that—the foreman's opportunity, or production with safety.

During your spare hours, sitting on the back porch or the front porch, or maybe in your home, have you ever given a thought as to just what it is that makes a good foreman? Have you ever tried to analyze that part of your job, just what you have to do to be a good foreman, just what really would go to make it up, being a good foreman? Suppose you were a plant executive, for instance, and you were going to select a man to take a foremanship. Just what would be some of the qualifications

you would want that individual to have? Have you ever thought about that? That is the way the man ahead of you thinks about you, "I would like John, Tom, or So-and-so."

Let's see what we can do with the blackboard on that now. First of all, I write up here: What makes a good foreman? What qualifications, in other words, does a man have to have to make a good foreman? I think probably everybody has some idea as to just what a man should be to be a good foreman. Mac, what do you suppose a fellow ought to have to be a good foreman, anyhow?

Mr. McCLAIN: I think about the first thing he would have to know is his job.

Mr. GRIFFITH: He would have to know his job. He would have to have some knowledge of his job then, wouldn't he? What do you mean by knowledge of his job, anyhow?

Mr. McCLAIN: I sort of have it in my mind, but I can't say it very well. It is like this: You wouldn't expect to take a man out of a carpenter shop and make a good boiler shop foreman out of him. He has to know all about heating rivets and laying out the work if he is going to be foreman in a boiler shop, how to use the burning torch, and how one part of the thing relates to another. He would have to know the job, is what I mean.

Mr. GRIFFITH: You would want him to know the details of the particular operation. You would want him to know that better than any man on that job. He is going to run that job and you are going to depend on him to do it. Therefore, you would expect him to know the details of that job. That is all right. That is a good explanation.

What is something else he would probably have to have to be a good foreman? Harris, what do you think about it?

Mr. HARRIS: About the most important thing I could think of is that he ought to have good common sense.

Mr. GRIFFITH: He ought to have some common sense, then. Mr. Harris, doesn't everybody have common sense?

Mr. HARRIS: Well, I suppose we should have, but sense isn't common, you know. That is what they say. That is what the foreman should have, however.

Mr. GRIFFITH: Isn't it common for the foreman to have sense?

Mr. HARRIS: It is common for a good foreman to have common sense. What I mean by that is that he must have good mental capacity, good judgment, know how to think accurately and properly, and size up a situation quickly, and that sort of thing. He must be intelligent.

Mr. GRIFFITH: You want, then, an intelligent man. If you are picking out a good foreman he has to have certain qualifications, and common sense of course is one of those qualifications.

What else is there that he might have? Webb, you might answer that.

Mr. WEBB: Well, he ought to have a little bit of initiative.

Mr. GRIFFITH: All right. What do you mean by initiative? What is initiative, anyhow?

Mr. WEBB: You mean what Mr. Webster tells about it? I forgot to look. Let's see now. I reckon a foreman ought to be able to stand on his own hind legs if he strikes a snag in the work some time.

Mr. GRIFFITH: That is the idea. That is it exactly. If he gets into a snag he doesn't want to get in the habit of going to the boss's office all the time? All right, we have three qualifications there: knowledge on his job, common sense, and initiative. There ought to be something else on this list. Mac, you ought to be able to think up another one. I am punishing you two fellows. You are not paying attention. I don't know which is guilty but both are implicated.

Mr. McCLAIN: I will think of something else in a minute. Let me go by for a minute.

Mr. GRIFFITH: Nolen, you are way down there enjoying yourself. You tell us something about it. What would you think a fellow ought to have to be a good foreman?

Mr. NOLEN: I would say ability to give proper supervision.

Mr. GRIFFITH: What do you mean by that, ability to give proper supervision? Can't these fellows supervise their jobs?

Mr. NOLEN: Some of them can, and some of them may not have the ability, but a foreman should have the ability to go to his men and say, "Here, I want such-and-such a job done," and they should do it without his hanging onto their trousers all the time until the job is done. He should be able to say, "Now, Jim, you go and do that job. We want it done by a certain hour and we want it done right." Maybe the foreman has to go to a safety meeting, or something, and he gives the fellows a certain amount of work to do while he is gone. He has to be able to give it to them in such a way that they will know what he is talking about without his supervising their work.

Mr. GRIFFITH: He must be able to supervise his department, and take care of it, shouldn't he?

Mac, you thought of something else?

Mr. McCLAIN: I am kind of a crank on this thing of being able to give instructions good, and tell them what you want done.

Mr. GRIFFITH: Ability to give instructions clearly? Suppose a foreman goes to a man and says, "Here, you do this, that or the other thing," isn't that clear enough?

Mr. McCLAIN: Oh, I don't think so. A lot of times you get into trouble by simply saying to a fellow, "You get your tools and get out on the job and fix that leak in the pipe." He might fix the wrong leak or get the wrong tools. I'll bet a lot of accidents have happened because men didn't know just what to do, and probably a lot of work has been spoiled because the boss didn't take time to give them instructions clearly. I think when a job is spoiled you don't always want to blame the men for it. You want to blame the boss part of the time because he didn't make it plain right in the beginning what was to be done.

Mr. GRIFFITH: He didn't specify some particular place?

Mr. McCLAIN: You have to tell them what tools, how to do it, where to do it, and see whether conditions are right. Suppose there was some ammonia, or acid, and they weren't looking for that. Some of them might be pretty badly hurt.

Mr. GRIFFITH: I can see where that is all right. You must tell them definitely what is to be done, the location, and the particular thing to be taken care of.

We might have something else. We have five qualifications. Shannon, what do you say about it?

Mr. SHANNON: I think leadership is a very important item.

Mr. GRIFFITH: All right, leadership. You mean the ump-de-ump fellow, the one who leads the band. Is that the idea?

Mr. SHANNON: I don't mean that kind of leadership exactly. I mean leadership where the men look up to you for proper instructions and may be able to follow your example. I mean that a leader must have a lot of initiative. I mean he must have a knowledge of the job. I mean he must have common sense. As a matter of fact, I think all those qualifications mentioned are what a good leader should have.

A good leader should also be a leader and not a driver. Above all things, I believe a good leader should see that his men get a square deal. Those are my qualifications for leadership.

Mr. GRIFFITH: I think that is all right, and is very good. I think those qualifications are good: a leader, not a driver; a man who will lead his gang to something, not drive them to it.

There might be something else added to that, I think. Mr. Ralston, you look very studious down there. What do you think?

Mr. RALSTON: I think he ought to show and have loyalty.

Mr. GRIFFITH: What do you mean by loyalty?

Mr. RALSTON: He ought to know the company program; he ought to know their interests. He ought to know the interests of the men, and he ought to follow them up and if necessary fight for them.

Mr. GRIFFITH: You want him to be loyal?

Mr. RALSTON: All the way around, both to the men and to his company.

Mr. GRIFFITH: You want him to be loyal to the company and to the men as well.

Mr. McCLAIN: Can he always do it?

Mr. RALSTON: He ought to.

Mr. GRIFFITH: Is a good foreman always able to do that?

Mr. RALSTON: Yes.

Mr. GRIFFITH: All right, let's go on. What else is there that might be thought about now? Leonard, I haven't asked you a question yet.

Mr. LEONARD: Dave gave me a thought there a minute ago when he answered one of those questions, and I think willingness to set a good example is a very important part of foremanship.

Mr. GRIFFITH: I guess that requires some explanation, too.

Mr. LEONARD: A foreman's conduct in or out of the shop and his method of dealing with his men at all times should be of such a nature, I think, that these fellows under him would be looking up to him and the principles he sets forth as a sort of ideal for them to follow. In other words, they are going to pattern or should somewhat pattern after him. He should set a good example. He should be the pattern for these fellows to follow.

Mr. GRIFFITH: I think that is all right. You can't expect the men to be something you are not.

Mr. LEONARD: That is the idea.

Mr. GRIFFITH: If you are going to be a good foreman and set a good example, you have to set a good example yourself.

Mr. SHANNON said leadership instead of driving.

Can we think of anything else there? Gibby, what do you think about it?

Mr. GIBSON: Well, I think a foreman should be willing to accept responsibility.

Mr. GRIFFITH: What do you mean? Don't they all want to accept responsibility?

Don't you fellows want to accept responsibility for the actions in your department?

Mr. GIBSON: We want to, but sometimes we leave out some of our responsibilities. We should be willing to accept responsibility for the work done by our men, the amount of work. I believe we should accept responsibility for the kind of work done on material, that is, work going through our departments, and the work that is done on the equipment which we handle in our departments. I think if a job comes into the department and we are properly accepting responsibility we should know just what men to put on that particular job, and we should know just where to get the proper tools to do that kind of a job. We should know when we are to start on it, and of course we should know just how soon that job is wanted, when we are expected to complete it. If we accept all those things and know all those things, and do all those things, then I think we are properly taking care of our responsibility as a foreman.

Mr. GRIFFITH: How about the case of an accident? Let me ask you a question. Suppose you have 20 or 30 men and you have to split up that gang on these various jobs you have to do. You send a couple of fellows away that you are well acquainted with, and you know them from A to Z, we will say. You send them away to dig a trench, for instance. You can probably get to them in fifteen minutes. After they have been gone about half an hour and you have made your rounds and are coming back, you hear that one of them is in the emergency hospital, and somebody runs up to you and says, "One of your men is down in the emergency hospital being fixed up."

You beat it over to the emergency hospital and find that during your absence these two fellows have gotten into a fight. One fellow struck the other fellow with

a bar and he has a large gash in the side of his head. The boss calls you in the office and says, "Gibby, that is your man; you are responsible." Are you willing to accept that responsibility?

MR. GIBSON: I don't know who else would. These two fellows worked for me and I would certainly feel I had the wrong fellows on that job, or else I hadn't properly impressed the fellows with the idea and the thought as to what constituted a proper workman. I believe I would be compelled to accept the responsibility for even a thing of that kind.

MR. GRIFFITH: We have had quite a bit of reaction from you foremen in the safety department, saying you don't think you are responsible in cases of that kind. So we have tried to divide the word responsibility, and we have also tried to make you see that your real opportunity is in accepting responsibility.

On the other hand, in this case these two men were away. You were not there, and we take the word responsibility and we say, "You are responsible for your men, but you are really not to blame for what those fellows did."

MR. GIBSON: There is perhaps a difference between blame and responsibility.

MR. GRIFFITH: If you look in Webster's you will find it means about the same thing. Nevertheless, there is a difference and that is what we have tried to show you fellows: that there is a difference between a man being responsible or accountable for his men, and taking the blame for them. Those two fellows are really to blame for what happened, but you are accountable for the men themselves. Do you think that is all right?

MR. GIBSON: That doesn't let me out with the boss.

MR. GRIFFITH: Is there anything else we want to add to the list of qualifications? Mr. Ralston, what do you think about it?

MR. RALSTON: He has to be sincere.

MR. GRIFFITH: I will put sincerity down here. What do you mean by sincere?

MR. RALSTON: He has to be what he appears to be. He has to say what he intends to say. He has to play fair by the men in the company.

MR. GRIFFITH: He has to be sincere about what he says. There is no use going around and saying something, and not staying with it. You have to be sincere about it.

Is there anything else? Harris, do you know of anything else? You look as though you were anxious to say something.

MR. HARRIS: There is one other qualification that I believe could be added, and that is reliability.

MR. GRIFFITH: You have to have a man who is reliable. I don't think that requires much explanation. He has to be able to be relied on. I don't know that you can elucidate on that very much more.

MR. HARRIS: By all means he has to be truthful and square about the things he has to do in the department. If the boss calls him in and asks him if he made a mistake, he has to admit it and in that way prove himself to be reliable.

MR. LEONARD: Can I ask a question now, Mr. Griffith?

MR. GRIFFITH: I would like to know, first, if you have nothing to add to what we have right here: what that is going to get a fellow if he has all those qualifications?

MR. NOLEN: A better job, and more money.

MR. GRIFFITH: Will it get him anything else?

MR. LEONARD: Happiness.

MR. GRIFFITH: What is happiness?

MR. McCLAIN: I don't know what it is, but that is what everybody is after, anyway.

MR. GRIFFITH: It will get him success; happiness. What are you after in life, after all?

MR. McCLAIN: I guess that is it.

MR. GRIFFITH: You are after happiness, aren't you? You fellows told me what you would have to do to get it. There it is.

You say in that connection "with safety." What does that mean? We have in our plant, for instance, 650 foremen with those qualifications. Would you have your safety engineer sweeping up some place?

MR. LEONARD: I would like to ask these fellows here: Do any of you fellows know of any actual case where one or more of these qualifications made for a foreman's success or, on the other hand, where the lack of any one of these qualifications made for a foreman's failure? Do you know of any actual cases?

MR. GRIFFITH: Mac, I think you have been a little out of order this afternoon. I think you are going to have to answer that.

MR. McCLAIN: I know of a place where I used to work. We had a pipe shop boss and he got to running around nights, drinking, and raising hell, and one thing and another, and some of his men went with him, and some didn't. The gang was sort of divided against him. He wasn't getting out good work. Things were slipping, and it was only about six months until he lost his job. He was fired. I don't know whether it was lack of leadership, loyalty, sincerity, or reliability, but I think it is in that list somewhere.

MR. LEONARD: The answer to my suggestion, setting a good example, comes right in there.

MR. McCLAIN: He certainly did not set a good example. That is where he was wrong. He didn't set a good example for his men.

MR. GRIFFITH: No, indeed. Does that answer your question?

MR. LEONARD: Exactly.

MR. SHANNON: If it is true that a man has to have all these qualifications for better production, what other qualification should he have to reduce accidents in his department?

MR. NOLEN: I would say none. Show me a good foreman with all those qualifications, and I will say he ought to make a good safety man also.

MR. GRIFFITH: Is there any difference between production and safety? Should safety be held as a side show? (Cries of "No; absolutely not.")

MR. GIBSON: What causes bad production records? We have them.

MR. WESS: I will tell you what does that. It is better to issue clear instructions. That is one thing. Then there are a lot of these foremen who don't follow up, and of course some of them haven't enough experience, and there is that old stuff you know, too much speed; "Get this," and "Give us that," speed all the time. That is what makes bad production records.

MR. GRIFFITH: Too much speed, not giving thorough instructions, and so on?

MR. WESS: Yes.

MR. GIBSON: That is quite the answer.

MR. GRIFFITH: Are there any other questions? Straighten them out if you have any.

MR. HARRIS: I will ask about the same question the fellow asked with reference to safety. Have we any cases where some slipped up and had a bad production record?

MR. McCLAIN: I know of a case where a man got killed because the foreman didn't give him the right instruction on the job. A boiler maker and his helper were told to repair a blast furnace. The foreman didn't pay any attention to the gas in the blast furnace or which way the wind was blowing. They went up there and the boiler maker pulled the mask down over his face and paid no attention to his helper. He got to strolling around and got mixed up with the gas, and the first thing he knew he was falling off. When that accident was analyzed the safety man at that plant put it up to the foreman that he hadn't covered that job. He hadn't followed those men and instructed them properly. I think that is exactly what caused that accident.

MR. LEONARD: What happened to that foreman?

MR. McCLAIN: I don't remember.

Mr. GRIFFITH: I don't think he stayed there long.

Mr. GIBSON: Don't we have accidents that a foreman isn't responsible for because of having these qualifications? Is every accident that happens due entirely to the foreman, and is it his responsibility?

Mr. RALSTON: We have what some people call acts of God, like lightning, earthquakes, cloud bursts, cyclones, and things of that character. You can't hold a foreman responsible for those.

Mr. GRIFFITH: Are there any other questions now? Our time is getting short. I was told not to keep you fellows longer than an hour. If I do, I will get fired.

Sometimes the management's part gets into this thing, and I want to assure you that the management of this corporation is intensely interested in accident prevention because it is humane and ethical. It recognizes safety work as a moral and social problem as well as an economical proposition. "Safety First" as a slogan has been worn threadbare, but safety is first with us. The management is desirous of doing everything possible consistent with good business principles to protect its employees from injury.

There are no secret roads to success in safety work, fellows. Accident reductions are accomplished only by continuous effort along common-sense lines and eternal vigilance on the part of the foreman and employee alike. This requires fair and effective supervision. The most effective ways of getting employees interested in accident prevention will be discussed later on in the course, but you foremen should make an attempt to get your men to look upon safety work as a matter of safe and efficient operation, making them feel that if they have an accident or cause one they are not measuring up to their jobs. Accident prevention is a business proposition, and the safe worker should be the best workman in the eyes of the foreman. If the employee thoroughly understands that he will be interested in accident prevention 100 per cent, for he is going to look out for himself.

Always bear in mind in teaching safety work or trying to put safety work across that a man is interested in his own comfort, success, and happiness. If you will make the man feel that what you are doing for him is for his comfort, his success and his happiness, you won't have many worries with your safety work and you will be carrying on one of the noblest acts that can be given man, that of saving human life.

Two weeks from today we will discuss another one of our subjects. I want you to read it over and come here prepared to answer questions. I think you have done exceptionally well today. Let's hope our next meeting will be as good.

CHAIRMAN MCKENNEY: Would anyone like to ask questions of Mr. Blank or Mr. Griffith?

W. J. UQUHART (Colonial Beacon Oil Co.): What type of training does the leader of these discussions have. Is he the safety man in the plant, or especially trained for that type of work?

E. F. BLANK (Jones and Laughlin Steel Corp., Pittsburgh): We had a little experience along that line that may be interesting to all of you. Our first course was somewhat similar to the course which the National Safety Council has now put out in this form, and which most of you have probably seen.

We had an educator come in and do a job of foreman training, not particularly safety training, and it didn't go over. The reason it didn't go over, I believe, was because the superintendents who had the first chance to put this thing on as a test didn't have confidence in the leader. I believe that Mr. Griffith, and Mr. McClain, who is also a Superintendent of Safety and Welfare in another plant, are putting this course across. I believe their success is dependent upon the confidence the men have in them. The men know these teachers; they know their background; they know they are unafraid to talk on the subject of safety. I would be a little bit afraid to take anybody who didn't know the technic of accident prevention work and let him lead a course of this kind because I am afraid the foremen would soon get him tangled up by some question he might not be able to answer.

O. H. DAY (Board of Education, Kansas City, Mo.): There are three questions of technic on which I would like your opinion. Do you not believe that having the participants read the discussions beforehand sets up the usual teacher-pupil situation where the foreman is waiting to be called upon and he will make an effort to answer the question as he thinks the leader is going to want it answered?

Do you not feel that in a foreman's conference a free response to a question is better than a directed response? In other words, is it not better to shoot a question into the air and let anyone answer it who feels inspired so to do at that particular moment or who has the ability to answer it?

Do you not believe that a wide opportunity should be given for discussion between men with the leader clear out of it, simply sitting on the side lines to steer the discussion and keep it from going off on a side track? Isn't the thing you are after to get the men discussing among themselves because they are the ones who know their problems, I believe, better than the safety director?

I would take issue with Mr. Blank regarding the necessity of having a man from within the organization lead the conferences. The best success I have ever had leading conferences has been with groups of men who were total strangers to me, because in so doing I was not prejudiced. I am perfectly willing to let the men bring their experience to bear on the problem without making any effort whatsoever to say the thing they think I want them to say.

Mr. GRIFFITH: In answering your first question, the only thing the man gets from reading his lesson is the idea of what he is coming to this class for. In asking questions, I ask them not as they are in the book. I will ask them questions along those particular lines, but not directly the questions that have been set down in the book. I find that the men really react very well and seem to get the idea.

Answering your second question, I find unless you start your class by asking them some direct questions you will not get any response. Your men will hesitate, or you will have a man in the class who wants to do all the talking and the other fellows won't get a thing. I find it is better to ask individuals direct questions, and in that way you get a better response.

Mr. DAY: In every group, I think you will always find one individual who wants to do all the talking. I think part of the skill of a good conference leader is knowing how to shut that man off.

It is a perfectly human characteristic to relax when another fellow is called upon to answer the question. If it is left open, it is up to me to jump in and give my idea.

Mr. GRIFFITH: You probably have twelve or fifteen men you are talking to. I usually arrange my questions so that everybody is going to get some question, unless there are some men in the class who I feel are timid and really wouldn't give a good response. I arrange my questions so that the individuals in the class all have an opportunity to answer.

We encourage the men very, very much. I only sit on the side lines as a referee in a fight, after the thing gets going. You have to get them started, but after the men get warmed up they will carry the thing along for you, and all you have to do is probably throw in a match in the dynamite to stir the thing up again.

Mr. BLANK: This was a demonstration of our first class in this course. I know that in both Mr. McClain's and Mr. Griffith's classes they don't call on fellows as pointedly as he did here today. That was a demonstration, and he picked these fellows out so they would come to their next class prepared.

In answer to Mr. Day's question about the success of a leader outside, I think that depends a great deal upon the leader.

Mr. WEAVER: Mr. Blank, are you using the conference method to teach anything other than safety?

Mr. BLANK: We are not.

Having the group come together, not knowing what the subject is going to be, and drawing out of them their expressions on the subject I believe is very good for superintendents, but when you have a lot of foremen, and some of them merely sub-

foremen and straw bosses of very little education, we try to give them this information in advance of the class.

If you don't pay attention all the time you don't get very much out of it, and probably 90 per cent of the fellows who take it and get their booklet after the class is over don't read it.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



General Round Table

Monday Afternoon Session

October 12, 1931

ARTHUR H. YOUNG, Chairman

Secretary, Industrial Relations Counselors, New York City

The General Round Table session was called to order by Arthur H. Young, Secretary, Industrial Relations Counselors, Inc., New York, presiding as Chairman.

CHAIRMAN YOUNG: This General Round Table is an ancient and revered Scottish custom. It is the place where we can raise the speakers, where we can exchange ideas and depart from the set papers. The text for today is taken from a chapter of the book of life headed "Why We Did Not Slice Our Safety Budget."

The first speaker on this afternoon's program is a gentleman whom it is a privilege to introduce to you. Mr. Gross began in 1917 as a clerk, and within ten years had reached the position of vice-president and general manager of an important subsidiary of the Firestone Rubber Company. He was then appointed factory manager, and it was at that time their safety work began to go.

Why We Did Not Slice Our Safety Budget

By R. R. GROSS

Factory Manager, The Firestone Tire and Rubber Company, Akron, O.

I am deeply indebted to the National Safety Council for this opportunity to come before you. Although it is true that I approached this situation with some misgivings, I felt it my duty to participate and to discharge in part, if possible, a previous debt which we owe and which we acknowledge to the National Safety Council.

It was within the last year that the National Safety Council awarded their Medal for Meritorious Safety Service to one of our employees, and at the same time, their Certificate of Commendation, to another of our employees, and it was my pleasure to present these to two upstanding and outstanding young men in our service. I shall not go into the details, but the Meritorious Safety Service referred to was the application of artificial respiration and resuscitation to one of our employees who came in contact with high voltage electricity. You are well aware of what has taken place within the past two years in all lines of business. You appreciate that it has been necessary to reduce the number of people on our payroll, and I am sure that you will appreciate the significance when I say that these two young men are still in the employ of our company.

The scope of the operations of the National Safety Council is so complex that one could only hope to cover a very small part of it, and I feel that I know little, if any-

thing, about it, and I must therefore limit my discussion to that small part of the program that my limited experience has taught me, which is industrial accidents.

I said a while ago that I came here to help pay a debt that we owe and acknowledge to the National Safety Council, but I want you to know that I also had another reason. That reason was a purely selfish one. I came here to get ideas, and before I leave this meeting this week I expect to have picked up one good idea—maybe two—or maybe three—that will help me in the work that I am supposed to do; and if in any way I can contribute just one thought or idea that will help you to more vigorously pursue the work of accident prevention, then I shall feel repaid for my efforts.

During this past week I have been on the quest of ideas. I have been on a trip with the National Research Council, and with them last year as well as this year, have visited the outstanding research laboratories of the United States, such as the Bell Telephone in New York—General Electric, Schenectady—Arthur D. Little, Boston—Eastman Kodak, Rochester—Ford and General Motors in Detroit—American Rolling Mills, Middletown—as well as Mellon Institute—Westinghouse—Aluminum Company, Bureau of Standards, and many others.

There is no question in my mind about the future safety of this country, and I can say to you that with all the new things which our scientists have developed and created, and are now in the making, there can be no question about the future safety in our national program. Great things are in the making for television; great things are in the making for aircraft; great things are in the making for the food industry, and the sum total of these things, I am sure, will serve to correct the economic out-of-balance situation in the future just as the automobile, radio, and the electric refrigerator have done in the past.

That is the picture as I see it for the long pull. The real question before us today is, "What are we going to do about it now?" When I say "it," you know what I mean, because I doubt if there has been one man in a hundred who has been on his feet before a group of people in the last year, or year and a half, who has not talked—either intelligently or otherwise—about our unemployment situation. I have seen all sorts of questionnaires—there have been data compiled by the ton—but I have yet to see my first unemployment questionnaire sent out by anyone who could do anything about it. There is only one way to correct it, and all of the statistical data in the world won't do it. The only way to correct it is to take these people who are out of work and give them a job, and the answer is just as simple as that. That is a subject within itself, and I want to leave that thought with you just that way.

Now, I want to talk for a moment to those of you who are safety engineers; those of you who are engaged in safety work, and who make the reduction or prevention of accidents your business. I am going to ask you one question, and I want you to answer it honestly and definitely in your own mind right now—"Are the people at the head of your business interested in the safety and well-being of their employees?" Now, when I say that, I can guess that your answers are 100 percent "Yes"; but let me qualify that by saying, "Are they interested in the safety and well-being of their employees actively, and not passively?" Now, what is the answer? Let me qualify that still further. When I say "the people at the head of your business," I don't mean your Board of Directors, and I don't mean collectively your president, vice-president, secretary, treasurer, and all your officers—I mean only, is the man or individual who is the one head of your operations actively interested, or is he passively interested?

I want to bring that point out for this reason. I know that it does not take collective executive action to do the kind of safety work that you all should be doing.

If you are the safety engineer of a plant where the boss of that plant is interested in safety, then I am sure that your problems are not great, and that your safety records are enviable ones. Now get this straight. When I say "Boss," I do not mean your Board of Directors or your officers collectively. I mean, that one fellow in your organization who is the driving power, who stands up and says "Yes" or "No" in your operations.

If you are the safety engineer in the plant where that individual is not actively interested in the safety and well-being of his employees, then my advice to you would be to go in just as soon as you get back, and have a show-down. Even in these hard times, and when jobs are as hard to get as they are, you are wasting your time unless the management of your business is with you and cooperating with you in the carrying on of this work. I can't say that it is altogether the fault of the management if it is not cooperating with you in that way. I will put that responsibility right up to you. You haven't sold the idea—you haven't been able to put over what it means in dollars and cents—and there is no business man alive who won't listen to a good dollars-and-cents argument.

You may say, "Well, why do I pick on this one fellow—why do I pick on only one man in your business as being the fellow who can put this program over?" The reason that I pick on him is best illustrated in that old saying, "There is always a lot of interest in the things in which the boss is interested, and if there isn't, he isn't the boss." You know there is a head man in every show, and unless the head man in your show is swimming with you in the work that you are carrying on, then you don't amount to much around your place of business.

Now, let us think about the management for a minute. It doesn't make much difference what you call him—whether he is a factory manager, production manager, works manager, or whatever else his official designation may be—he does not deserve that title if he is not actively interested in this great subject. He is not a factory manager—he is not a works manager—he is only a piece of one, and he is only kidding you and kidding himself.

That gets us around to the point of—what is a manager? A manager is just exactly what the name implies. He is a part of the management. His job is to handle men, and this gets us down to the first fundamental of all business success, and that is, that the first thing a man must have if he is going to get any place in this world is character.

There is no mystery about what it takes to prevent accidents, and the answer is just as simple as anything could be. You know, and I know, that fundamentally one has only to find out what caused the accident—remove the cause, and the problem is solved, but incidentally, things do not always work out just that easy in a large corporation. There are a great number of people involved. Different thoughts and different ideas are advanced, and you know as well as I know that there is nothing harder than your head or mine when a new idea is in sight, particularly if that idea originated with someone else. That is why I say that the plant management of your business must be actively interested in safety, because it is through that management that you can make the greatest progress in coordinating and correlating ideas of the various people and directing them on toward the one common cause. You cannot take something out of a product or an operation without putting something back in to compensate for it, and that something may be and generally is, more precision, finer methods, and closer control. This same thing holds true of all safety hazards. You cannot remove that hazard without putting something else back in, and that something may be, education of workmen, a change in method, or a simple guarding device to prevent it, but *talk alone* will not turn the trick.

I do not know of a better way in the world for a plant manager to get results in the reduction of accidents, than for that manager to spend five or ten minutes per week actively getting after somebody. I have found that a quite successful method is for me to find out within a very few minutes that an accident has happened, and then send directly for the foreman to come to my office. I don't mean by that, that I go through the department manager, or division manager, the superintendent of production, or the general superintendent, but send right down and get the foreman who is in charge of that room, and ask him about the accident, and then specifically, "What are you going to do about it?" Never yet have I found that this did not produce results—never yet have I found that that Foreman didn't do something about it, and

that always helps. Further than that, it is surprising how quickly that word spreads around through the organization that so and so was on the carpet in five minutes after an accident happened in his department, and that alone brings surprising results.

The subject that was assigned to me was "Why We Did Not Reduce Our Safety Budget," and I can only say to you that we did not reduce our safety budget because we don't have one. In our method of operation we have felt that it was not at all necessary. We have a one-man safety department. He is responsible for nothing. He is the minister, so to speak, or spiritual advisor, for our organization on the subject of safety, and the records of our performance are in his hands. He outlines certain campaigns, contests, et cetera, but when it comes to fixing the definite responsibility for an accident within our plants, that responsibility begins first with me and goes right on down through the organization, and we hold every man, from the plant superintendent right down to the foreman, responsible for the accidents that occur in his department.

After all is said and done, a good foreman is one who is just as alert on the subject of safety, as he is on the subject of quality, costs, or volume production. Good quality production cannot be produced with careless workmen, because their carelessness is not alone confined to their personal hazards. Good costs cannot be maintained with careless workmen, because their carelessness is not confined to themselves. Volume production cannot be maintained with careless workmen, and none of these things can be done with an indifferent management.

I should like to discuss, for just a moment, some of the things that in my opinion go to make up a good foreman. As I said a while ago, the first thing that a man must have is character. Second, he must maintain about himself that zone of respect through which he allows no man to penetrate. That isn't always easy. I think it is more difficult in a small organization where people are closer to each other, than it is in a large organization. A good foreman is one who is resourceful within himself, and he has generative and creative powers that keep him constantly on the alert, constantly on the watch for thoughts and ideas that will improve the conditions within his division. A good foreman knows that anything that is started right is pretty apt to come out right, and he likes to see things started off early in the morning, and with a bang.

Our labor departments keep records of people leaving our business, and this, according to their custom, they classify as labor turnover, and in most cases accept it as such. When you get to the bottom of what labor turnover is, you find something far more serious, and when any one man leaves your company, you can make up your mind that ninety-nine times out of a hundred, that man has created a one-man strike, and investigation will reveal that he is striking against one of three things. He is striking against the man for whom he worked; he is striking against the conditions under which he worked, or, he is striking against the pay he received for his work, and the number of cases that have been investigated by our labor division have shown that a far greater percentage of people were striking against the men, and against the conditions under which they were working, than were striking against the pay they received for their work.

Therefore, safety becomes a part of the program as a whole. We all know that the best salesman we ever had was a bang-up quality product and service. Safety is so inter-related with all of our operations—with our costs—with our quality—with our volume—with all of the things that we like to point to with pride as part of our achievement. Safety is so wrapped up and so vitally important to all of them that no sound thinking management can afford to wink at its importance or pass it off lightly.

CHAIRMAN YOUNG: Mr. Gross, we are certainly obliged to you for your presentation of this subject.

You have heard this man say that he has reduced accident frequency, accident severity in compensable cases substantially, 70 per cent. Evidently he must have some

stuff, if we judge by what he has produced. You heard him say it is quite easy to do; ten or fifteen minutes a week is all that is required.

Perhaps those subjects are challenging to you. Perhaps they arouse your curiosity. Your questions will be welcome.

Discussion

JOHN W. VREELAND (Standard Oil Company of New Jersey, Jersey City, N. J.): I would like to ask Mr. Gross on what basis he figures his savings in dollars and cents.

MR. GROSS: Frankly, we figure our savings in dollars and cents only on the basis of what it costs us per employee per year for compensation, hospitalization, and all of the other things that go into that type of work.

MR. VREELAND: Do you weigh against that the money you spend on safety appliances and guards?

MR. GROSS: No, sir. The money we spend for safety appliances and guards is part of our general plant expense and is carried into execution through our Executive Board who passes the appropriation, and that isn't charged up to the safety department, or any other department. That is money we have spent in the proper conduct of our business.

J. D. HALL (Atlantic City Electric Company): I would like to ask Mr. Gross just what he does about the foreman's responsibility for that accident.

MR. GROSS: It gets down to this: My job, of course, is to help the men in our organization as much as I can, and if by giving him some thought or idea we have made a better foreman out of him, then that, too, is in the right direction.

However, that foreman, whoever he is, and whether he has been in or not, understands pretty definitely that he had better not come in the second time.

MR. HALL: Do you penalize on the first accident, or not?

MR. GROSS: No, we don't penalize him. We might fire a man once in a while, if you call that penalizing. So far as charging anything up to him and putting a black mark on his record, we don't do that.

You only have to walk into a department and you can smell whether that place is running right or wrong. Some sense tells you, "Here is a place in which everything is clicking and everything is going well," or something tells you you had better begin to look into this place. When you find a place like that, reduction of accidents is only one thing out of a probable dozen that is being overlooked.

CHAIRMAN YOUNG: It is quite evident that Mr. Gross and his organization have reached the goal for which so many of us have been striving all these years. I think we have all of us regarded our jobs as specialists, not to accomplish the safety goal ourselves but to so inculcate the technic of accident prevention into the line organization that every man in the organization was himself a safety inspector.

The next bout before the members of the club is an age-old subject. It has to do with the safety committee; to be or not to be.

I think I might say that the title-holder is amiable Auel, Westinghouse Electric & Manufacturing Co., Pittsburgh. Mr. Auel is a past-president of the National Safety Council. He has been for at least ten years a member of its Executive Committee. Therefore, I introduce him as the title-holder in this contest. Mr. Auel contends that Safety Committees are not only desirable; they are necessary for a perfect safety organization, a well functioning safety organization.

His title is contended by Mr. George Prussing of the Union Oil Company of Los Angeles, California. He contends that safety committees are not only unnecessary and undesirable, but that they impede the progress of safety work.

The bout will take place immediately.

I take pleasure in presenting to you first the Pittsburgh battler, Mr. Auel.

Resolved: That Workmen's Safety Committees are Indispensable in a Safety Campaign

Affirmative

By C. B. AUER

Employees' Service Department, Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

I do not believe I can do better than present a description of the functioning of the safety committees at our largest plant, the method however, being similar, though on a smaller scale, at all of our other plants except at our small service shops.

At East Pittsburgh then, we have main safety committees, meeting regularly at least every month; sometimes more frequently. Some of these committees have in turn their sub-committees holding meetings or patrolling their departments once or twice a month or as often as the needs seem to require.

The membership of a committee varies with the size of the departments but is made up of salaried and hourly workers and is revolving; that is, the personnel undergoes more or less of a change at intervals of six to twelve months.

The hourly men serving on all committees are paid at their average earned rates for all time spent on safety work.

A regular order of procedure is followed at meetings, in general being

1. Call to order
2. Roll call
3. Reading or other disposal of minutes
4. Unfinished business
5. New business
6. Round table talks by the members, or talk by guest speaker
7. Adjournment

Endeavor is made to have each meeting presided over preferably by the departmental head or in his unavoidable absence, by his principal assistant, as lending more weight and as tending to impress the members constantly with the idea that the management is back of this movement.

Endeavor is likewise made, and for the same reason, to have 100 percent attendance of all the other members.

Meetings are generally scheduled to occur during the first half of the month and the proceedings are regularly typewritten and forwarded to central headquarters. If these proceedings do not arrive shortly after the middle of the month, there is still time to see if any meeting is liable to be omitted and if so, to insist on its being held before the month ends.

In some of the departments, inspection committees, patrols, or sub-committees go over their bailiwicks a day or two in advance of the holding of the regular monthly meeting so that in this way the latest information as to any infraction of rules or as to any hazards existing can be reported to the safety committee and discussed at the next ensuing meeting. However, these inspections or patrols are made at other times as well and in many cases regular ratings are given a department on cleanliness, neatness and the like.

If any item is brought up at a meeting which cannot be at once disposed of, it goes under the head of "Unfinished Business" and is continued from meeting to meeting until finally finished.

It has been found an excellent plan not only to number such items with regular serial numbers as are thus carried over, but to attach the date to each when first brought up as well, likewise the name of the party bringing it up and to whom

it is referred. In this way it can always be seen whether or not an item is dragging unduly and whom to communicate with as to its progress.

Occasional outside speakers are brought in, or men are secured from other safety committees or from other departments or a member of a committee may prepare some short dissertation or a round table discussion may be indulged in.

At the end of each month the works manager writes a letter as to the performance of the month just past, incorporating in addition anything pertinent to the subject of safety and this letter usually enters into the meeting.

The preceding gives in barest outline of the routine of our safety committee meetings.

Now, as to the results obtained. We have made notable improvement in our accident prevention work during the past six or more years (without going back any further) whether measured by a reduction in accidents, which has totalled 87 percent, or by hours of exposure in which there has been a gain of 526 percent, or by compensation costs in which the reduction has approximated 65 percent.

Owing to the great diversity of our occupations, and we have approximating 250 at our East Pittsburgh plant alone, it is simply impossible to compare intelligently our own performance with that of any other concern, and for the same reason it is hardly fair even to compare the record of one department in our works with another. Rather do we prefer to measure each department with its previous best record, but even so this will not always do because sometimes the variety of work in a single department undergoes marked changes from year to year. The one goal we are, however, constantly aiming for is "NO ACCIDENT", a single one being considered just one too many.

To show the rather odd viewpoints we are occasionally called upon to combat—one of our workmen some time ago was rather put out because we had found fault with him for having a lost-time accident due to his not wearing safety shoes. He said it was the only accident he had had in 18 years of service and thought he was entitled to at least one without so much fuss being raised about it.

We believe we are quite safe in making the general statement that our accident records have so improved in all states where our plants are located, that they are better than the average of all industries. Some of our plants have gone month after month without a single lost-time accident; some plants a year or more; one, as in New Jersey, has topped the state.

But let us now translate into plain language the arguments as we see them in favor of safety committees.

It is certainly common practice to do a vast amount of work both within and without the industries through the medium of committees. You do not need me to tell you this fact, as you already know it. Now why are committees so used when it is acknowledged that the chairman of a committee must do most of the work.

The principal reasons are that a considerable increase in the knowledge of a subject, over and above that possessed by any one individual, is thus brought to bear in the conduct of an investigation, or in the solution of a problem, or in the laying out of a line of procedure. Furthermore, the problem, or whatever it may be, is viewed from many different angles at one and the same time and suggestions in greater variety can be offered for its solution than would be possible with a single individual handling it; in other words, there are greater resources to draw upon. If investigation is necessary, then parallel lines can be set going instead of performing such work in sequence and time thus saved.

Again, there is less likelihood of starting off in the wrong direction with intelligent counsel at hand to assist.

The solution finally reached should therefore be more quickly arrived at and be more nearly complete and correct when reached.

It seems to us that all of these reasons bear with equal force on safety work as they do with almost every other line of activity.

But over and above all of these arguments, more hazards can be discovered in a

given time, and likewise corrected, than with a single individual only at work, and certainly the gospel of safety can be best and more quickly spread over a plant by having a number of men interested in it.

Assuming such interest is bonafide, then as a by-product must be mentioned the influence on the workers of the managements' humanitarian attitude toward their welfare, which feeling cannot be lightly dismissed.

We of course appreciate the fact, as already stated, that committee work throws considerable extra effort on the chairman, additional to his regular duties, and he more than anyone else can make or mar his meetings, but we are not dealing with misfits in the selection of chairmen.

The sending of all minutes of meetings to central headquarters where they are carefully gone over, is, we believe, one of the outstanding points that help make our committees successful. These minutes are carefully gone over and where comment or commendation seems called for, a note is sent right back to the chairman so that he is aware at all times that the work is undergoing scrutiny and is not being overlooked, and such comments are relayed by him back to his committee. Still again, any worthwhile matter encountered in these minutes is promptly transmitted to other departments as well as to other plants which might be interested or involved and thus added headway is made.

Through the practical help received from our committees, we have developed a number of bulletins which have aided materially in the accident campaign.

The first of these is called our Safety Inspection Calendar. This sheet is divided into sections marked annual, semi-annual, quarterly, monthly, weekly and continuous. From time to time items are placed in these sections which, in the opinion of these committees, it is felt should be inspected at certain regular intervals; as for example, hand trucks and portable ladders to be inspected quarterly, food handlers and testers physically examined semi-annually, etc. Could you develop so complete a record single handed?

The second of these bulletins is rather unique and was developed when one of our departments seemed to be having an epidemic of accidents. It is a set of resolutions, saying that "whereas accidents have increased in our department and whereas we are vitally interested in the welfare of our fellow-workers, therefore be it resolved that we, the members of the Safety Committee, pledge ourselves to do all in our power to reduce accidents and we likewise call upon all employees throughout our department to lend their aid." This bulletin was signed by every member of the Safety Committee, in the department and to make it more impressive, the members were sworn by a notary public, after which it was printed and posted throughout the department. Such a device would not be possible without a committee.

Still another bulletin is that of a cumulative record of our accidents for the month, prepared daily and showing the departments in which they have occurred and each department's monthly average for several years. This, we think, is one of our best contributions to the safety movement being, as it is, the equivalent of short daily meetings with the entire working force.

A similar bulletin, but issued weekly, gives the kind of accidents that have occurred during the month, and the department. Their distribution is effected with the aid of our safety patrols or committees.

Our committees further help in the preparation of slogans and bulletins for our safety devices, and coming from them, we feel they are not only close to the mark and more to the point than if coming from us, but the individuals submitting them take an even greater pride in their work when they see their efforts thus recognized.

You will appreciate that while much more might be said, enough has been shown to indicate why we believe in safety committees wherever it is possible to have them.

Finally, if safety committees are not to be advocated, then the whole policy of the National Safety Council, built as it has been on the mature judgment of many of

the most prominent safety engineers in the country, is wrong and should be changed. But we refuse to admit such a thing and so good friends we rest our case.

CHAIRMAN YOUNG: Now, ladies and gentlemen, I take pleasure in introducing "Petroleum" Prussing.

Resolved: That Workmen's Safety Committees Are Indispensable to a Safety Program Negative

By GEORGE F. PRUSSING
Safety Engineer, Union Oil Company of California, Los Angeles, Cal.

I didn't know, the last time I debated with Mr. Auel, that I was again to have the pleasure. They hauled the two of us out into the hall at the Cleveland Athletic Club because we tied up the dinner about thirty minutes due to an argument we got into. That was seven years ago, and we have not debated since.

The problem of accident prevention in a manufacturing concern, even one as diversified as the Westinghouse, is still tremendously different from what faced the pioneers in accident prevention in the oil industry. Think of the difference in age of manufacturing and the oil business. It was only in 1859 that oil was discovered and commercially put to use, and since that time it has grown to be one of the tremendous industries in investment and in number of men employed, not only in this country but in many others. I think it is this rapid rise in the industry itself, this tremendous expansion, which has made it necessary to do things in the oil industry which in manufacturing perhaps seem childish. The dispensing with the Safety Committee may go into that category.

A few years ago when we started our organized accident prevention work in my own company, it so happened that the man in charge was vice-president of our field operations and had come directly to us from the large manufacturing district of eastern Ohio. He was, like Mr. Auel, a man brought up in the manufacturing plants of that region who saw his entire personnel housed within a reasonably close area, who saw a reasonably small turnover, trained men, fixed habits of operation and thought and, furthermore, routine and discipline. One of the first things he imposed on me, as a condition of doing safety work in the department of exploration, or production as it is called, was that all the work was to be handled through committees of workmen. I say, frankly, that he put off the solution of that problem about three years, for it was three years before we got away from the idea of trying to do safety work in the oil fields by using committees of workmen and got down to brass tacks and started firing superintendents who wouldn't follow orders from above.

It works about this way: In the oil business to start with men were in the most individual of jobs. A crew of men drilling an oil well in the old days consisted of two men, a driller and a helper, and the helper was on the way to being a driller, two highly individualized persons who worked together for twelve hours a day seven days in the week. Out of those men—they were fine men—grew the foreman, the superintendent, and sometimes presidents of oil companies.

While they were on their way up from the ranks, engineers in equipment houses developed machinery for doing what they used to do by the most crude methods. Suddenly the oil industry found itself, as the manufacturing industry had years before, faced with the necessity for handling high-speed, heavy equipment with groups of men who hadn't slowly acquired their art, who had to work together not in groups of two but of five, six, or even more, and the accident rate went up until it was completely out of sight. I have seen accident frequencies well above one hundred in the producing fields, and accident severities that you men in manufacturing would scarcely believe. The accidents were not only frequent but horrible.

Into that situation, the idea of accident prevention was injected, and those men who were the second generation of oil men, picked up out of all sorts of occupations, were trying to handle this equipment without any previous training and were scarcely fit candidates for Safety Committees in order to solve that problem. It had to be solved by engineers, backed up by discipline, and it has been solved by men of that caliber.

I recall one instance when a man was killed on the adjoining lease to one of ours, and our local engineer called attention to the fact that the accident was due to improper technic in bringing additional drill pipe into the derrick. There was one right way of doing it and one wrong way, and this particular accident had occurred because the right way had not been followed.

I went to the superintendent and pointed out what had happened and asked him if he would issue an order making it mandatory to do this thing the right way. He said he had always been in the habit of leaving it to his drillers as to how they did the work. All he cared about was how many feet of hole they produced each trick.

Thirty days later an almost identical accident occurred in that man's division in Santa Fe Springs.

Our set-up imposes a form of investigation by department managers other than the one in which the accident occurs, and the facts usually come out very clearly as to why a serious accident happened. The record in this case was perfectly clear.

For Mr. Auel's benefit, I would like to say that I agree with him heartily that in certain situations an accident prevention committee or Safety Committee composed of either foremen or workmen, as the particular case warrants, is a very desirable thing.

Any of you who were in this room this morning and happened to see the distribution of those beautiful trophies may have noticed that the award for having the lowest accident record among the tanker fleets of the United States came to my company. The form of organization for accident prevention in the tanker fleet in our company is one of Safety Committees, and I make that acknowledgment and still insist that Safety Committees are not indispensable because at the same time we have done even better in percentage of reduction, although we have perhaps won no trophies using the other method.

There is nothing indispensable, to my way of thinking, so far as methods go in accident prevention. Every situation, like every engineering problem, has to be considered on the basis of "What are the facts?" If the facts indicate one type of organization, that is the one to be followed. You can't say in advance that this or that is indispensable, because history proves it to be wrong.

I have heard men say in safety meetings that it is absolutely essential that you must have the backing of the management or you can't do safety work, and I say it is the bunk because I have seen accident prevention work done in spite of management. So I say to Mr. Auel and you gentlemen that the committees may not be the bunk, but they are certainly not indispensable.

CHAIRMAN YOUNG: I promised there would be a contest; and we are not going to have much more of this kind of business that "I agree with my opponent" and "committee may be all right in some places." There is going to be a fight here.

Mr. AUEL: If committees are needless, then, Mr. Young himself should not be in the business he is. If committees are needless, why do we gather here and in other places as groups and exchange ideas? If committees are needless, then the National Safety Council plans are on the wrong track and we should commence over.

Mr. PRUSSING: Safety Committees, I think, are a means of putting over an educational idea. They may be the best way of putting over an educational idea for Mr. Auel, but if it is true that safety is part of the technic of operation, inseparable from efficiency and good production, good housekeeping and the other thousand and one things that you insist on from your line organization, then I can't agree that there

is any other saner method of promoting safety than by forcing it down the authoritative line and making the men in charge of operations clear down to the last foreman responsible for seeing that the product is made safely as well as efficiently.

CHAIRMAN YOUNG: Gentlemen, I said there would be a decision in this bout. The bout is finished. I shall now raise the right hand of the winner (raising his own hand). (Laughter and applause).

I am going to deal very kindly with the next speaker in my introduction. He is a practicing surgeon of national repute. Among other things, he has charge of the medical and surgical work of the combined Insull interests of some seventeen companies.

A very prominent part of his preventive work has been the organization of resuscitation work, and we are to be favored by a demonstration staged under the direction of Dr. Hart Fisher which will be conducted by specially chosen members of a squad of resuscitation men, every one of whom has a gold medal awarded for the actual saving of a human life.

The Evolution of Resuscitation *see photo in*

By HART ELLIS FISHER, M.D., F.A.C.S.

Chief Surgeon, Chicago Rapid Transit Company, Chicago *put R.S. 15*

The desire to aid our fellow man in times of adversity and misfortune is evidenced daily by the response given to calls for alleviating distress.

Closely allied with this desire to serve is that of hope, that our efforts will meet with success. No matter how dark and futile the present may seem, there is hope that the future holds brighter prospects for us.

Regardless of worry and anxiety, we are hopeful and soothed by the fact that things for which we hold the greatest concern seldom happen. These two virtues, desire to aid and hope, seem characteristic of all mankind to some degree.

So with mankind from time immemorial, it has been men's desire to revive those apparently dead. By his efforts and hopes of success he has been instrumental in the saving of countless lives that otherwise would have been lost.

This same desire for reviving the apparently dead is manifest in the bird and animal kingdom. Who has not seen some bird or animal mother make frantic efforts about their dead offspring in feeble attempts to bring it to life?

In ancient times man's efforts were directed to attempts at restoration of the apparently lifeless. While his efforts were primitive, they were many times of such practical character that success rewarded his labors. From the early times down to the present, there has been constant effort to improve on existing methods or discover new means of accomplishing this humanitarian service.

Prior to the year 1773 resuscitation was for the greater part carried on by the layman. Not until after this date did the medical profession take up this work seriously. In England, in 1773, the Royal Humane Society was organized to investigate and formulate rules for resuscitation. Records of authentic restorations of life begin with this society.

Experience has shown that man, in order to live, must be able to breathe air in quantity sufficient to aerate the lungs and purify the blood stream. The blood in turn carries oxygen and nourishment to the various organs of the body. The blood, in quantity and of a quality of normal composition supplied to the body organs, causes them to function in a harmonious manner conducive to good health. Should the blood be otherwise, imperfect function will result. Just as important is the return from the body organs of the venous blood to the lungs for replenishment of oxygen. Should for any reason the quantity or quality of the blood be reduced or suppressed entirely so that circulation ceases, then life would terminate. Permit complete stoppage of blood circulation in the body and resuscitative efforts will be in vain.

Should the lungs cease to function account of submersion in water, such as results in drowning, oxygen being depleted, for any length of time, the circulation slows up and comes to a standstill. Many times, to all external appearances, the patient seems dead. No respiration is apparent, and from tests the circulation seems to have ceased as no heart action is discernable. Why, after resuscitation is performed, do these cases many times recover? In fact, the circulation did not cease completely and the heart, while not heard, had sufficient blood to carry on until outside assistance was forthcoming to bolster up the feeble spark of life.

To the average person and even medical men, it is very often difficult to tell with a certainty whether there is life in the supposed dead body, until resuscitation has been attempted. For this reason, we give all cases of unconsciousness the benefit of a belief that they are still alive and work with the hope that our efforts will bring back life.

When respiration ceases it is essential that something be done at once, to aid in restoring breathing and promote heart action and cause blood circulation. When the person himself is unable to take in sufficient air, then some form of artificial respiration must be introduced if the patient is to live. The attempt by friends and physicians to stimulate respiration is called resuscitation.

The various methods of producing artificial respiration are manual, mechanical, medical, and surgical. The two former can be applied by the layman while the two latter must be left to the physician and surgeon. These methods must be instituted at once and be persisted in until, after lengthy trial, further effort is futile.

From the early ages many methods have been devised to secure this result. Many of them seem foolish and of little real value as restorative measures, but each has contributed something to the general knowledge of resuscitation. Medical records of resuscitation date back only about 150 years. Many of the simple methods practiced by the people before 1773 were successful and the principles underlying them are the basic factors of artificial respiration today.

The early methods were directed toward restoring to life those who were apparently dead from acts of violence, drowning, and suffocation from fumes and gases in caves and peat bogs. With the progress of civilization and its attendant discoveries came accidents from natural and artificial gas, electricity with its shock and burns, and asphyxiation from mine gas and industrial fumes. With the merciful benefits to humanity of ether, chloroform and various drugs, came accidents from their use that produced conditions which necessitated artificial respiration. At the present time we are confronted with the diseases producing respiratory paralysis for which artificial respiration is of great value in sustaining life until the diseased organs can resume their normal function. With the passage of time, new sources of accident will develop, and as these arise new methods of resuscitation will be devised to combat them.

The methods given in this paper have been brought together in a sequence that will be both educational and entertaining. Many of you who are interested in this art of resuscitation are acquainted only with the Shaefer method. This paper will at least be enlightening. It has been difficult in many cases to secure an exact and detailed description of each method on account of lack of description in the literature studied in the compilation. An honest effort has been put forth to describe as nearly as possible what was intended by the originator of the various methods. No attempt will be made to burden you with the anatomy or physiology of respiration, except as is required to properly demonstrate a particular method. The descriptions will be brief.

1. Earliest Method Recorded

The Bible records in 11 Kings, Chapter 4, Verse 34, that Elisha, in his attempts to bring to life the dead son of the Shunamite woman, lay himself upon the child and put his mouth upon the child's mouth and breathed therein and the child was revived.

A second recording is in 1 Kings, Chapter 17, Verse 21, that Elijah revived the widow's son by stretching himself upon the child three times and asking God's aid in restoring the child to life.

2. Warmth Method. (Early Ages)

For centuries the application of warmth in various forms was the means of reanimating an apparently dead person. This was accomplished by the use of warm clay tiles placed about the patient. Later special warming pans with warm ashes were used. An early hot water bag consisted of the bladder from an animal filled with warm water. Warm poultices of brandy and wine were popular with the people. In some countries the body of a freshly killed small animal was split open and the warm body placed over the chest. Placing of the patient close to the fireside to maintain body heat was followed by the use of clothing and blankets.

3. Barbarian Methods. (Early Ages)

Those people aiding in the restoring of an unconscious patient in the early ages were exhorted to create a great noise about the person. Attempts to inflict torture methods were used, such as burning the bare skin with a red hot iron. Melted wax, pitch and oil were poured on the skin. Scarification or cutting the skin with sharp instruments was common. The drawing of one or more teeth seemed a favorite method. Screaming and shouting into the ears of the patient in attempt to call him back from the dead were freely practiced. Instilling into the eyes burning or volatile spirits was another method. Boiling water was sprinkled on hands, feet and over the heart. The burning of moxa on the stomach of the patient was also done. You can readily imagine after such a procedure how the patient must have felt if he was so unfortunate as to recover.

4. Agitation Method. (Early Ages)

During the early ages, death was thought to be a deep and prolonged sleep. Attempts to awaken or restore to life were carried on by friends and relatives violently shaking or agitating the body by pulling on the extremities.

This was called tormenting the person and it was urged that at least five people were necessary to accomplish the purpose. The torment must be conducted near a large open fire for its warming value.

This method was successful in those conditions where there was temporary loss of consciousness as fainting, blows on the head, stupor from intoxicating beverages, and coma from certain diseases.

This method was reported in 1774 as still in common use by the people of continental Europe. It is still seen today in our country and is the first attempt at resuscitation.

5. Flagellation Method. (Early Ages)

The practice of whipping the patient with stinging nettles was in vogue in the early days. Later this measure consisted of striking or slapping with the open hand the face, body and extremities of the apparently dead person. This was still later supplemented by the use of wet cloths to strike the skin surfaces of the patient.

It was in use in Europe up to the year 1774.

At the present time it is a favorite method of reviving and keeping awake people in temporary coma from over use of narcotic drugs, alcohol or anesthetics.

The value of this method is in supporting blood circulation and preventing sleep or coma.

6. Friction Method. (Early Ages)

One of the earliest forms of resuscitation recorded was that of brisk rubbing of the soles of the feet with salt. Brisk rubbing of the face, body and extremities was at first performed over the patient's clothing. Later this rubbing or massage was done on the bare skin surfaces. Salt was commonly used in England and later was prohibited by law. Ammonia supplanted the use of salt in the rubbing. This massage

is still in use. The direction of the massage is toward the heart and supports the circulation of blood.

7. Rolling Method. (Early Ages)

After rescue from the water, the victim was placed prone on the ground and rolled over and over. This aided in expelling the water from the lungs.

Later the patient was rolled back and forth, pressure being exerted over the chest and abdomen.

8. Jack Knife Method. (Early Ages)

Hanging of a person, head down over a fence or wall was a favorite method in the reviving of the apparently drowned. This jack knife position with the head dependent favored the emptying of the water from the lungs. The village strong man was used to throw his weight against the patient.

This flexion of the body with the head down was instrumental in the saving of many lives. Later it became a prison offense to carry a person over the shoulder with the head hanging down.

9. Mouth to Mouth Insufflation. (Early Ages)

(See Figure 1.) This was one of the earliest methods used in Europe and England by the layman in restoring the supposed dead. It was practiced for the greater part on new born infants who were unable to breath at birth. The medical profession considered it a vulgar act.

The mouth of the operator was placed directly over that of the victim. The breath being blown into and sucked out of the lungs.

In later years the air was breathed into the mouth of the patient while the nose was kept closed by pinching with the fingers. Counter pressure was later made over the chest to aid expiration.

This method may still be seen in the resuscitation of new born babies, the doctor using a rubber catheter to carry the breath to the child.

10. Paracelsus Method—1530.

Early history shows that Paracelsus was the first to make use of the common fire side bellows for the purpose of introducing air into the lungs of apparently drowned persons. This is the earliest record of mechanical resuscitation.

11. Andrew Vesalius Method—1630.

This was the second person to make use of the fireside bellows to inflate and deflate the lungs.

12. Paracoli Method—1630.

This man was successful in resuscitating with the aid of a bellows those people asphyxiated from charcoal fumes. This method met with favor in Rome.

13. Fumigation Method. (Prior to 1711)

Charlevoix, in his History of New France, records that the North American Indians succored their drowned by using an animal bladder or piece of intestine, tying one end and inserting in the other end a quill or reed. Tobacco smoke was blown into the sac and the quill inserted into the patient's rectum. Squeezing the bladder forced the smoke in to the rectum.

14. Anthony Fothergill Method—1740.

This gentleman preferred the mouth to mouth method, provided there were charitably inclined people at hand to perform the task. He believed that pressure from the bellows was harmful to the lungs. He formed with his hands a funnel, which was



Figure 1



Figure 2



Figure 3

placed over the nose and mouth of the patient. He breathed his own breath into the patient's lungs without bringing his mouth in contact with that of the patient.

15. Swiss Method—1740.

The Swiss people resuscitated their apparently dead by placing the patient in a large hoghead barrel, the ends of which had been knocked out. The patient was then rolled over and over. This method was later prohibited by governmental decree. Reaumer introduced this method into France in 1740.

16. Counter Shock Method—1744.

J. Kundemann developed from the existing methods of resuscitation that method which later became known as the counter shock. The slapping or flagellation developed more force to the blows and they were applied over the heart and the soles of the feet. By the shock resulting from these blows the heart was stimulated to action. The efficiency of the method is well shown by the alacrity with which a tramp awakens after a few well directed blows on the soles of his feet from a policeman's club.

This counter shock over the heart is in practice in all operating rooms today to stimulate a patient who does not react well from an anesthetic.

17. Christopher Keil Method—1747.

This was the first introduction of the direct method of fumigation, tobacco fumes being forced into the rectum of the patient by means of a special anal nozzle attached to a flexible tube. The smoke was blown by the operator's mouth.

Reaumer of France recommended the use of the long stem of the pipe separated from the bowl and inserted direct into the rectum and the tobacco fumes blown through the pipistem.

18. Lawrence Heister Method—1750.

In Amsterdam fumigation methods had been practiced for years. On account of the laborious method of providing the tobacco smoke over a long period of resuscitation, it was necessary that some instrument be devised to perform this work. Heister's apparatus burned the tobacco and by the aid of a bellows forced it into the rectum.

19. Smellie Method—1763.

This was mouth to mouth insufflation through the medium of a flexible tube which was inserted into the throat and into the trachea (windpipe). Suction on the tube was made to free the lungs of mucus and air instilled into the lungs. A glass bulb in the middle of the tube collected the mucus and prevented great pressure of air within the patient's lungs.

20. Dutch Method—1767.

The Dutch of Amsterdam, Holland, had practiced resuscitation by the fumigation of the rectum by tobacco smoke for many years. Early descriptions of this method state that the crew and passengers on canal boats were many times called upon to furnish tobacco smoke for the method. The smoke was instilled into the patient's rectum by means of a small pipe or tube and blowing with the mouth on this tube.

In addition to the stimulation of the patient by the fumigation, the patient was kept warm by blankets, fires and hot bottles. Brisk rubbing and friction of the skin was done to aid circulation. The surgeons, if present, bled the patient from an artery. The nose and throat was tickled with a feather, or snuff was used to make the patient cough and sneeze. Inhalation of drugs such as ammonia was practiced, and counter irritation to the skin by poultices.

Artificial respiration was by the mouth to mouth method with pressure over the chest to aid expiration. The patient's nose was kept closed during artificial respiration.

In 1767 this method was introduced into England by Wm. Hawes who organized the Royal Humane Society of London.

21. Inversion Method—1770.

This method was in use in England and Europe by the laymen prior to 1767. They lifted or suspended the patient by the heels, head down, from the limb of a tree or a beam of a building.

In 1772 A. De Haen reported cases of successful resuscitation by this method of those apparently dead from drowning.

This method was also performed as follows: with the patient face down on the ground, the operator stood between the patient's legs; the legs were pulled up under the operator's arms until only the head touched the ground. Then he allowed the patient to slide back to the ground. The inversion was repeated until the patient showed signs of returning life.

Felix Plater in the middle of the 17th century reports seeing patients resuscitated by hanging suspended by the feet from trees. The inverted position drains the lungs of water and the chest is dilated by atmospheric pressure.

22. Barrel Method—1773.

(See Figure 2.) This method was in common use throughout the civilized world prior to 1767 on the sea coast and river banks for reviving those who were apparently dead from being submerged in water. The first authentic records of successful resuscitation were in 1773. This method is still seen today on the water front in most any city or town.

The victim is placed face down with the body flexed over a barrel. The operator rolls the barrel forward and back. With the head dependent the water drains from the lungs. The pressure of the victim's body across the barrel compresses the chest and causes expiration. When the barrel is rolled back and the pressure is removed, inspiration takes place.

A very convenient way to perform this method is with the patient face down across the barrel. The operator, holding the patient's legs under his arms, steps forward and the barrel rolls forward, depressing the patient's head and shoulders. He next steps back, causing the pressure to be removed from the chest, and inspiration occurs.

23. John Fothergill Method—1774.

Preferring the mouth to mouth method of artificial respiration, but not relishing its performance, he invented a bellows with a tube inserted into the patient's trachea to inflate and deflate the lungs.

24. Dr. Tissot Method—1774.

This physician believed in the value of warm breath instilled into the patient's lungs. He preferred the mouth to mouth method. Later he used tobacco smoke for inflating the lungs. He invented a special apparatus for blowing the tobacco fumes. He placed the nozzle of his bellows into one nostril of the patient and closed off the other with his finger.

25. T. Cogan Method—1775.

Another disciple of the tobacco fumigation method. He devised an instrument for blowing the tobacco smoke into the patient's rectum which was actuated by the mouth of the operator.

26. John Hunter Method—1776.

His original bellows invented in 1755 was for animal experimentation. This was a double acting bellows, divided into two chambers by a partition. One chamber being filled with fresh air while the other chamber was filled with the patient's exhaled breath as it was sucked from the lungs. When the bellows was compressed the fresh air was instilled into the patient's lungs and the re-breathed air was allowed to escape by way of a valve. One nostril was closed by pinching together after the bellows nozzle was placed in the other nostril. It was used on human beings in 1776, and adopted by the Royal Humane Society of London in 1782.

27. Cullen Method—1776.

Inflation of the lungs by bellows with a special nozzle. He also preferred the fumigation by tobacco smoke. He induced vomiting by tickling the throat with a feather. He performed blood letting and used stimulants by mouth in his resuscitation work.

28. Monroe Method. (Primus) 1782.

He used wooden tubes or pipes and these were introduced into the nose of the patient. The lungs were inflated through these tubes by using his own breath. Later he constructed a bellows after his own plan.

29. Nooth Method—1783.

Another bellows with nasal tubes, modified to instill graduated amounts of air into the lungs and deflate by suction.

30. Charles Kite Method—1786.

This was a 500 c.c. capacity bellows, to which was attached a valve permitting the automatic inflation and deflation of the lungs. A tube was placed in one nostril and the other closed off. The mouth was kept closed with the hand. Action of the bellows was aided by pressure on the chest. Pressure was made over the cricoid bone of the neck, to prevent the air from going into the stomach.

31. Monroe Method (Secundus) 1786.

(See Figure 3.) This bellows was of the type of kites. It was of 1500 c.c. capacity. It was a huge and ponderous wind machine.

32. Gorcy Method—1789.

This physician of Neuf Brisack, France, devised a bellows which caused the patient to re-breathe his own breath over and over again. He claimed this stimulated respiration.

33. Hens Courtois Method—1790.

This surgeon of Tournai, France, invented the prototype duplex metal cylinder respirator. From this date began the decline of the bellows and the beginning of the pump type of apparatus.

34. Ann Newby Method—1802.

Mrs. Ann Newby had a series of 500 successful cases of resuscitation, of new born babies who could not breathe at birth. These were at a maternity hospital in London. She used warmth and friction, supplemented by mouth to mouth insufflation.

35. Kite and Redlich Method—1802.

This was a bellows arrangement with an expansion bag, to equalize the pressure in the lung. A flexible nozzle was inserted in the nose of the patient.

They devised a wicker reed basket stretcher, so constructed that when the patient was placed in it, his position favored the water being drained from the lungs.

Another invention credited to these two doctors was a double walled water bath tub in which the patient was placed during resuscitation. At each end of the water bath was a large open fire ladle to give mild heat.

36. Russian Methods—1803.

People unconscious from extreme cold or inhalation of charcoal fumes were resuscitated by packing them in snow, leaving only the face exposed. In later years they buried the patient in new-fallen earth, leaving the mouth and nose open. Miners were buried up to their necks in earth in a standing position. Cold water was dashed in the face. Hot sand and ashes were used to cover the patient during the warmer months of the year. While these methods seem crude to modern thought, still records show these to be successful in a large percent of cases.

37. Field Method—1820.

An instrument maker of London, England, invented a large syringe to completely collapse the lungs, in order to stimulate the circulation. It did great damage to the lung tissue and was discarded. This same man devised silver tubes for the trachea to which a bellows or syringe was attached. Another of his devices was an instrument to occlude the oesophagus, preventing air entering the stomach during artificial respiration.

38. Mrs. Widgeon's Method—1829.

Application of warmth and friction to the body and extremities of new born children. This warmth in the form of moist heat was successful in a large number of her cases at a London Hospital.

39. Contrast Bath Method—1829.

Unable to find the originator or a definite date when this method was first put into general use, I have placed it here. From the fact that moist heat was a method about this time, we cannot be far off in our date.

Cold and hot water in turn was sprinkled over the chest of new born babies who did not breathe at birth. Later this practice gave way to the immersion of the baby first in a tub of hot water and then a tub of cold water. The resultant shock due to the extremes of temperature stimulated respiration.

40. Le Roy Method—1829.

Dr. Le Roy, of France, was the first to use the supine position of the patient for resuscitation. The patient was placed on the ground on his back, face up. The operator knelt at side of patient near the hips. One hand rested on the patient's chest while the other hand was placed on the abdomen. Pressure was applied over the abdomen and chest at the same time for expiration of air. When pressure was removed inspiration resulted.

41. Astley Cooper Method—1829.

With the patient on his back, the operator knelt at the side near the hips. One hand was placed over the chest and the other over the abdomen. The operator would exert pressure first on the abdomen and then on the chest.

42. Dalrymple Method—1831.

(See Figure 4.) Patient was placed on his back on the ground. A wide swath of cloth was passed under the body, brought up and crossed over the chest. The ends were held taut by two operators. They pulled on the swath compressing the chest, thus causing expiration of air. Their pull was released, and the chest expanded by its own elasticity, inspiration resulted.

43. Wooley Method—1835.

Resuscitation was accomplished by the immersion of the patient in water, the temperature about 100 degrees F. In England many successful cases were reported. There was a specially constructed bath later developed for the water method.

44. John Erickson Method—1845.

With the aid of a machine, warm air mixed with oxygen was blown into the lungs until the chest of the patient was expanded. Priestly, in 1774, discovered oxygen and soon after it came into general use in artificial resuscitation.

45. F. Sibson Method—1848.

A chloroform mask was made to fit closely the patient's face. A tube was inserted into the mask. The operator blew his own breath through the tube into the mask. Pressure was made over the patient's chest to expel the air.

46. Marshall Hall Method—1856.

(See Figure 5.) This was one of the first methods in which the patient was placed prone on his face on the ground. From experimentation, he found that the tongue would fall back in the throat and obstruct the air passages when the patient was placed face up.

Patient was placed face down on the ground. A folded blanket was placed under the chest. One arm was extended above the head and the other placed along the side of the body. This position favored the expelling of the water from the lungs.

The operator, kneeling beside the patient, facing him, with one hand grasps the shoulders and the other the hips. The patient is pulled over onto his side. This position is maintained for a second and then the patient is gently rolled back onto his face and pressure exerted on the back.

This method permitted greater ventilation of the lungs but it was tiresome to the operator.

47. R. L. Bowles Method—1856.

This is a modification of the Marshall Hall Method. The operator takes a position at the side of the patient who is prone on his face on the ground. A folded blanket is placed under the chest so as to arch same. The operator grasps with one hand the patient's shoulder and with the other the hip. The patient is pulled on to his side. The uppermost arm of the patient is then lifted from the body well above the head by a second operator. The arm is lowered as the patient is returned to the ground, face down. When the patient began to show signs of reestablished breathing he was kept on his side as this favored breathing.

48. Mary Widgeon Method—1857.

Warmth by the application of dry heat, later by the use of moist heat, supplemented by friction of the skin of the new born baby resulted in many successful cases. This lady was the daughter of Mrs. Widgeon, of 1829, and worked at the same London Hospital.

49. Sylvester Method—1861.

(See Figure 6.) This method approaches the ideal in resuscitation as it follows out in its performance the anatomical and physiological principles of the respiratory act. It is one of the most effective methods known for properly ventilating the lung. It causes thoracic breathing instead of abdominal breathing. Unless it is performed according to the originator's directions it is of little value. As it is practiced today, it is not done correctly, hence the many failures attributed to it. It is very exhausting to the operator. In the supine position, the patient's tongue falls back and obstructs the air passages.

The patient is placed on his back. The tongue is pulled forward and held from the mouth. The operator kneels at the head of the patient facing him. He grasps both of the arms at the elbows and pulls the arms out and upward until they are above



Figure 4



Figure 5



Figure 6

the patient's head. This traction increases the capacity of the lungs and permits a greater amount of air to enter the lungs. The arms are then carried back and folded upon the chest. Pressure is made to aid expiration.

50. Esmarch Method—1863.

Patient is placed prone on his face. The operator kneels on one knee at the side of the patient. He pulls the patient up and across his knee. The operator's knee is under the patient's abdomen. The head hangs down. The operator, with the hand nearest the head, grasps the tongue and pulls it forward. Releasing his traction on the tongue, he presses with his other hand upon the back of the patient, forcing the abdomen against the operator's knee. This causes expiration. The tongue is again pulled forward to encourage inspiration. The value in this method is in the performance of artificial respiration and the emptying of the water from the lung at one motion.

51. Ward Richardson Method—1865.

This was an operative procedure of injecting oxygen laden fluid into the great vessels of the heart. This fluid was injected by a special pump with rythmical strokes.

52. Pacini Method—1867.

This is a modification of the Sylvester method. The patient was placed on his back either on a table or the ground. The feet were held to the table by an assistant or tied in place. The operator stood at the head of the patient, facing him. He grasped the patient's shoulders at the armpits. The shoulders were pulled up and back. Traction was maintained for a second, and the shoulders were allowed to fall back to the table or ground. It was a sort of shoulder shrugging method. It was exhausting on the operator.

53. W. P. Bain No. 1 Method—1868.

Dr. Bain modified the Pacini Method in the manner in which he grasped the patient's arms. The thumbs rested on the front of the arms at the armpits, while the fingers and palm of the hands encircled the arm. Traction was applied pulling the shoulders back and up. Resting a second, the shoulders were lowered to the ground.

54. W. P. Bain No. 2 Method—1868.

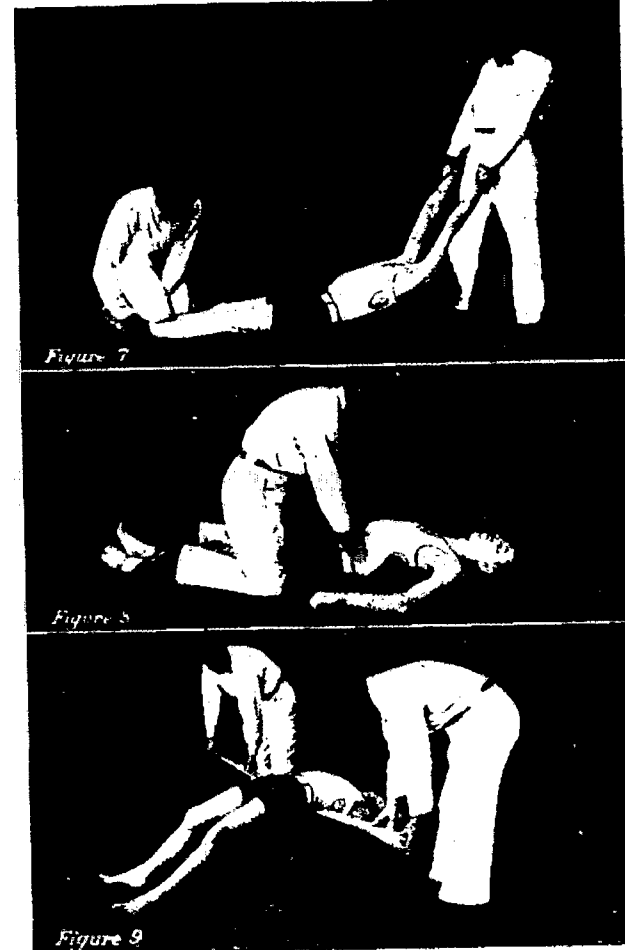
(See Figure 7.) The patient was placed supine (on the back) on the ground.

The feet of the patient were held by a second operator or secured so that they could not be moved from the ground.

The operator stood at the head of patient, facing him. The arms of the patient were extended above the head and grasped by the operator. He exerted traction on the arms, up and back, lifting the patient off the ground. A second assistant, kneeling at the side of the patient, exerted pressure over the chest.

55. Byrd Method—1870.

With hands together, palms up, slip them under the back of the new born child who is laying face up on the table. One hand supports the child's shoulders with the head hanging down. The other hand supports the buttocks with the legs hanging down. Bring the hands together, which causes an extension of the child's back. Then flex the legs and chest together, with the legs doubled up against the chest. The entire child is then inverted.



56. Schultze Method—1871.

This method was used to revive the new born babe that would not breathe at birth. The operator held the child suspended by the armpits with the child's back to him. The operator, with extended arms, raises the child above his head until the legs flex forward onto the body. This flexion induces expiration of air. The baby is then brought down slowly until it is held before the operator and this aids inspiration.

57. Flexion Method No. 1—1871.

Patient is supine on the back. The operator stands between the legs of the patient, facing the head. The feet are grasped by the operator and raised up to the hips. The patient's thighs are flexed onto the body, causing a crowding upward of the abdominal organs against the diaphragm which aids in expiration. When the operator steps back the pressure is removed from the abdomen and inspiration follows.

58. Flexion Method No. 2—1871.

Patient is held in a sitting position, the operator standing behind patient. The body is flexed forward until the head touches the knees. This forces the air from the chest and aids blood circulation to the brain. The body is pulled back into a sitting position and the pressure being removed, inspiration results.

59. Flexion Method No. 3—1871.

Patient prone on the ground. Operator rolls patient up onto his side, preferably the left. One operator grasps the legs while a second operator grasps the shoulders. The legs and body are flexed upon each other, producing expiration. Returning the patient to the first position causes inspiration.

60. Flexion Method No. 4—1871.

Patient face up on the ground. One operator grasps the patient's feet while the second operator grasps the shoulders. Both lift the legs and body into complete flexion. This position is held for one second, and the patient is returned to the ground.

61. Howard Method—1871

(See Figure 8.) The patient is placed face down on the ground with the arms extended above the head. A folded blanket is placed under the chest, and pressure is made on back of patient to expell the water. Patient is now rolled over onto his back and the folded blanket placed under the posterior part of the chest to arch the back. The operator kneels at the side or astride the patient at the hips. The hands are placed over the lower border of the ribs with the thumbs touching in the median line of patient's chest. The operator bends forward, throwing his weight on patient, causing expiration. Removal of his weight causes inspiration.

62. Schroder Method—1874.

The operator, with his arms outstretched before him, holds the new born child in the palms of his hands, face down. His hands so grasp the limbs and the shoulders of the child that when he flexes the legs and body together, he induces expiration. He straightens the child, overextending the spine to secure inspiration.

63. Dew Method—1875.

The new born child is held on the operator's outstretched hands, face up. One hand grasps the infant's legs at the knees while the other hand grasps the shoulders. To secure expiration, the legs are flexed on the abdomen. Inspiration is secured by bringing the child to the first position and extending the back. This is a modification of Byrd's method.

64. Adrian Shucking Method—1877.

Patient is placed supine (on the back) on the ground. The arms are placed alongside the body. Two operators take position at either side of the patient at a level with the shoulders. The arms are grasped by the operators and the arms pulled away or abducted from the body until they are above the head of the patient. This causes inspiration. The arms are returned to the sides of the patient and pressure applied, causing expiration.

65. Max Shuller Method—1879.

The patient is placed face up on the ground. A roll of blanket is placed under the back to elevate the chest.

The operator stands or kneels at the head of the patient, facing the feet.

The operator grasps the border of the costal arch (lower rib margins) and pulls out and up, raising the patient's back slightly from the floor. This position is held for a second and released, with the operator pressing down on the lower chest.

66. Fell Method—1886.

Dr. Fell performed an emergency tracheotomy (opening into the trachea) and inserted a tube into the trachea (windpipe). To the tube he applied a special bellows. The action of the bellows inflated and deflated the lungs.

67. J. A. Francis Method—1886.

(See Figure 9.) The patient is placed on the ground, face up. A pole is slipped under the patient's back. Two operators lift on the pole, raising the patient from the floor until only the heels and head touch the floor. This causes expiration. Lowering the body to the ground causes inspiration.

68. Champney Method—1887.

This is a modification of the Sylvester method. Patient is placed on the back on the ground. Operator kneels at patient's head, grasping the arms at the elbows. He rotates the arms out and upward above the head. They are then forced down to the ground, arching the back of patient. This overextension of the chest permits ventilation of lung. This is the inspiratory cycle. To secure expiration, the arms are returned to the chest and pressure applied.

69. Doe Method—1889.

In an air tight box he placed the new born child with its mouth near a small opening covered with rubber dam. A small tube was inserted through the rubber dam and the operator alternately blew and sucked air from the box. This was creating negative and positive pressure which would cause the child's chest to be compressed and expanded. There is no record of its successful use.

70. Benjamin Ward Richardson Method—1890.

His first outfit was a simple fireside bellows with a rubber tube and nasal point. He later used the Faradic current through electrodes fastened to the patient and the bellows. When air was forced into the lungs an electrical contact was made which caused an electrical shock to the patient with the idea of contracting the chest.

Still later he developed his India rubber bulb bellows, of which there were two bulbs ending in a common nozzle. To one of the bulbs was an expansion bag to equalize the pressure in the lung. The nasal nozzle was placed in the nose, one side of which was closed. Squeezing one of the hand bulbs forced air into the lung, and pressure on the second bulb deflated the lung by suction.

70. Benjamin Ward Richardson Manual Method—1890.

Place the patient in a sitting position. Right hand of the patient grasped by the right hand of one operator. The left hand of the patient grasped by the right hand of the second operator. The operators, standing on opposite sides of the patient, lift up on the arms until patient is raised from the floor. Relaxing their hold, the arms are quickly flexed, bringing them to the sides of the patient and exerting pressure at the same time to cause expiration.

71. Andrew H. Smith Method—1890.

Patient is placed on his back on the table. One operator pulls the arms above the head, exerting traction. The hold is relaxed and the arms held loosely by the operator. The second operator, kneeling or standing at patient's hips, places his hands over the lower border of the chest and exerts pressure up and back, producing expiration.

72. Cullen Method—1890.

Patient is placed on his back. Two operators kneel beside the patient. The one nearest the feet presses on abdomen in an upward direction. The operator at the head presses downward on the chest.

73. Prickett Method—1891.

This outfit for inducing artificial respiration consisted of a cylinder of oxygen to which was attached a rubber tube. The tube in turn was connected to a valve box which had a lever; one position permitted the oxygen to be propelled into the lung while the second position of the lever allowed the patient's breath to escape into the air. From the valve box a nasal tube was placed in nose of patient, the other nostril being closed.

74. Laborde Method—1892.

This was also known as the tongue traction method. It is not, strictly speaking, artificial respiration. It has met with considerable success and is still used in the stimulation of respiration at time of operation.

The mouth is gently opened and the tongue grasped with tongue forceps or with the fingers wrapped in sterile gauze. The tongue is pulled forward and held for a second and allowed to relax. The operator at the same time exerts pressure on the chest.

75. Prochownick Method—1894.

Child is suspended by the feet held by the operator, the head resting on the table. A second operator grasps the sides of the child's chest with his hands, the thumbs meeting in midline on the child's chest and the fingers grasping the sides of the chest. Pressure is exerted by squeezing. Where only one operator is available, he suspends the child by the feet with the left hand and grasps the side of the chest with the right hand.

76. Northrup Method—1896.

This was a special bellows of the double acting type. It was used in connection with an O Dyer tube.

77. A. E. Wright Method—1896.

This was a surgical operation, opening of one of the large vessels of the heart, preferably the artery. The purpose of this was to relieve the pressure on the left side of the heart. This was strictly speaking a hospital procedure.

78. Brosch Method—1897.

Patient placed on the ground face up.

The operator kneels at the side of patient. The patient's arms are flexed at the elbow and pressed against the chest exerting pressure and aiding expiration. The arms are then raised above the head and forced to the floor. This results in inspiration.

79. Michigan Method—1897.

Dr. Baker reported this method. Patient placed prone on the ground. Face turned to one side. The operator straddles patient at the hips, standing, facing the head. He bends down by flexing his own knees, squatting position. He places his hands on the small of patient's back with fingers encircling the sides. He keeps his hands in the same position when once placed. Pressure is obtained by squeezing his (operator's) arms between his knees. When this pressure is relieved, inspiration occurs.

80. Reverse Abdominal Method—1897.

(See Figure 10.) This was introduced about the same time as the Michigan Method. The patient is placed prone on his face on the ground. The operator straddles the patient at the hips, facing the head. He bends over, placing his hands on each side of the patient's abdomen at the border of the lowest ribs. He lifts the patient up to induce inspiration, and when he returns patient to floor and presses he exerts expiration.

81. Satterthwaite Method—1901.

Patient prone on the ground, face down. The arms are extended above the head. The operator kneels at side of patient. The hand nearest the head grasps the tongue and gently pulls it forward. At the same time, with the other hand he reaches across the back and up under the chest. He pulls up against the chest and produces expiration. Relaxing his hold and pulling the tongue forward causes inspiration.

82. Matas-Odyer Method—1902.

This was a mechanical appliance consisting of a two cylinder pump which carried air to a face fitting respirator. It was used to inflate and deflate the lung.

83. Shaefer Prone Pressure Method—1903.

(See Figure 11.) This method has become very popular throughout this country, being popularized for the greater part by the public utility industry. Its simplicity of operation, requiring only one operator for its performance, and the fact that it can be carried on for long periods of time without exhausting the one performing it, appeal strongly to those interested in resuscitation. Additional advantage in the method, over others, is that the tongue has the tendency of falling forward and does not obstruct the air passages. The value of the counter shock to the heart and the stimulation it affords the blood circulation are inestimable. When once learned correctly, it is never forgotten, and can be relied on to revive the greater part of the cases in drowning, asphyxiation and electric shock.

The patient is placed prone on the ground, head turned to one side. The arms are extended above the head. The head can be placed on one of the arms flexed at the elbow but this is not essential. The tongue falls forward in the mouth, but should it obstruct the throat, pull it forward by the fingers. Do not lose valuable time in beginning artificial respiration by attending to details. Begin the work at once without delay.

The operator kneels beside or astride the patient just below the hips. With the arms extended, the operator bends forward so that his open hands will be placed over the small of the back near the border of the lower ribs. The operator moves forward and

makes pressure for an instant, causing expiration. He then moves back removing his weight, aiding inspiration.

Close observation of this method, if done correctly, will show the head and chest move forward when pressure is applied. The force of the pressure is exerted in an oblique direction, toward the patient's head. The abdominal cavity is compressed, forcing the organs, liver, spleen, intestines and stomach, up against the diaphragm. This pressure in turn is transmitted to the chest cavity which, becoming compressed, causes the lungs to be deflated. At the same time the heart is stimulated. This forcing out of the air is expiration.

To secure inspiration, the weight of the operator is removed; the organs in the abdomen recede to their normal position, the diaphragm expands and the chest cavity, by the elasticity of the rib structure, expands creating a vacuum within the lungs and air enters and inflates the lungs. This method is performed at the rate of 16 per minute. This must be kept up until the patient recovers or is finally pronounced dead by a competent physician.

84. Shaefer Two and Three Man Method—1903.

Accidents arise that necessitate the adoption of a method that will permit of performing the Shaefer method on more than one patient at the same time. In 1912 the author if this paper instructed the employees of the Rapid Transit Lines of Chicago in the following method for mass resuscitation.

Where there are two persons to be revived, lay them side by side, prone on the ground, the heads in the same direction. The operator straddles the two nearest legs, or kneels between the patients' at their hips. He exerts pressure first on one patient and then on the second. He increases his rate of movement so that each patient will receive 16 respirations per minute.

Where there are three patients, they are all placed prone on the ground, with the heads in the same direction. The operator kneels astride the middle patient and exerts his pressure on each one in turn.

85. W. Freudenthal Method—1906.

This method was accomplished by digital irritation of the throat of the patient.

86. Crile and Dolley—1906.

This was a surgical procedure similar to that of Dr. B. W. Richardson. It consisted of the injection of fluids into the great vessels of the heart.

87. Mechanical Method.

(See Figure 12) In the foregoing methods you have seen the use of bellows and tubes to force air into the lungs. It is only since 1842 that mechanical appliances were introduced to inflate the lungs with air, and suck it out. These methods were of doubtful value when the results of their use were studied. Since they were mechanical, with many moving parts, it required constant supervision to maintain them in efficient working order. Many times they would not work at the scene of the emergency. Being costly, few were available in any locality, and if they were, many precious minutes were often lost in awaiting their arrival; in many cases they never arrived.

Those actuated by compressed air or oxygen often arrived with the tanks almost exhausted or gave out in the middle of a resuscitation. The rubber fittings deteriorated or had to be replaced often. These devices were promoted under the mistaken idea that to resuscitate one the entire air capacity of the lung had to be replaced with each inspiratory stroke. But in the living person each breath of air taken into the lungs is only a small proportion of the total capacity of the lungs. In order to aerate the blood, there must at all times exist in the lungs a certain amount of res-

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Figure 10

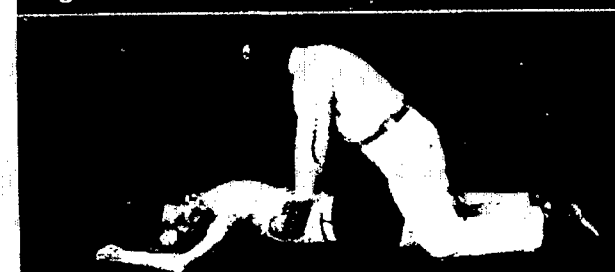


Figure 11



Figure 12

idual air. At no time is the entire amount of air in the lungs exchanged except in drowning or asphyxiation.

Another mistaken idea was that the lungs were thought to be bag-like, with a large cavity into which air in various amounts could be pumped. It was thought that they contained air in various amounts according to the age of the patient. The fact is there is very little open space in the lung. In its makeup it is similar to a sponge, having thousands of tiny air cells. The great danger in these mechanical appliances was that they were operated by people little versed in the correct manipulation of the machines. Neither did they possess knowledge of the anatomical structure of the lungs. The over distention of the lung precipitated shock resulting in hemorrhage or rupture.

Those appliances of the pump piston type were very dangerous as regards over distention and lung rupture. It is difficult to estimate from external appearances the capacity of an individual's lungs. In fact it cannot be done. The trachea, being in close apposition to the oesophagus, when air is forced into the open mouth some of it was bound to get into the stomach and distend it. Attempt at withdrawal of air by force resulted in the collapse of the oesophagus, and with each stroke as amounts of air were added to that already in the stomach, which could not be withdrawn, it was sooner or later overdistended to the point where it was fatal.

The machines listed here are but a few of the many different models on the market in the past ten years, but they are sufficient to give one an idea of their construction.

87. The Pulmotor—1911.

(See Figure 12) This apparatus was energized by compressed air and oxygen. A mask was placed over the face, after the tongue had been pulled forward. A small rubber bulb on a rubber tube was inserted into the oesophagus and inflated to prevent air being pumped into the stomach. The machine was automatic in its action and was intended to supply the necessary amount of air for the given case. A smaller device was to be had for children. A face mask was provided for use with this machine.

88. Lungmotor—1912.

(See Figure 12) This was on the order of the bicycle pump. It depended upon a two cylinder pump, controlled by a valve, so that one stroke of the piston gave the inspiratory action while the other stroke gave the expiratory action. On the top of the pump was a lever that regulated the amount of air for different individuals. With the early type of machine a canister was furnished to provide oxygen. This canister was responsible for accidents resulting from leaks. A special face mask was used with this apparatus.

89. Lyon Breathing Apparatus—1913.

(See Figure 12) This apparatus was a large caliber, one cylinder pump with a piston; the down stroke forced air through a mask into the lung and the up stroke deflated the lung. The length of the piston stroke determined the amount of air used.

90. The Salvator—1914.

This machine was on the order of the pulmotor. Dr. Pret was credited with an ingenious device of the same order for inflating and deflating the lungs.

Respirators and Barorespirators

At about 1914 there began to be developed apparatus of the so-called respirator and barorespirator types. They had the feature that air was not forced into the lungs and the mouth was not covered by any face mask. They depended upon creating

negative and positive pressure within an air tight cabinet which acted upon the patient's chest which was enclosed in a manner simulating the natural respiratory act. A few of the outstanding respirators are listed here.

91. W. Stewart So. Africa Method—1918.

This was a rigid air-tight chamber made in the form of a box which was connected with a large bellows. The child's thorax and abdomen were encased in the box. This permitted the child's head and neck to remain outside the chamber. The action of the bellows alternately caused a negative and positive pressure within the cabinet. This in turn caused the thorax to be compressed, forcing the lungs to deflate. When the pressure was released in the cabinet the lungs would take in air from atmospheric pressure. The need for such an apparatus was a result of the infantile paralysis epidemic in South Africa. Dr. Stewart thought by artificial respiration he could support breathing until the disease had passed the acute stage and the respiratory function restored.

92. H. & H. Inhalator—1922.

(See Figure 13) This apparatus is not a resuscitation machine and neither is it a pulmotor. It is a mechanical means by which a mixture of oxygen and carbon dioxide is provided in a convenient form for use with artificial respiration methods. It does not force oxygen into the lungs. The apparatus was designed by Dr. Haggard and Dr. Henderson and consists of two cylinders of the oxygen and carbon dioxide mixture. To these cylinders are attached flexible tubes ending in a face mask. The carbon dioxide stimulates respiration. These inhalators are valuable life saving measures and should be available in all resuscitation cases.

93. Panis Method—1923.

(See Figure 13) This is a mechanical device manually operated, to which the patient is strapped face down. A wide webbing strap encircles the chest and back. The head rests on a support. Under each shoulder is a support and when the handle is depressed, the shoulders are forced up and the chest is compressed. This really performs the Shaefer method of resuscitation by mechanical means.

94. Rudolph Eismenger Method—1926.

This was a bell shaped air vessel made of leather which was strapped over the lower chest and abdomen. It was operated by an electrically driven diaphragm air pump. Air was pumped into a pressure vessel and a suction vessel. These vessels in turn were connected to the leather dome on the patient's body and in operation they cause negative and positive pressure within the leather dome. This aided respiration in a natural manner.

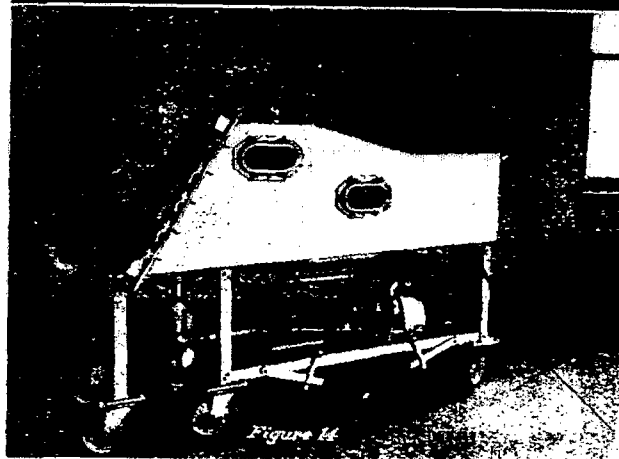
95. Thunberg Method—1927.

This method closely followed along the lines of the Stewart Method. It was a box like receptacle in which the child was placed with the head outside the cabinet. The air within the box, on being exhausted, caused a vacuum which allowed the chest to expand and the lungs to become inflated. Increased pressure within the cabinet caused compression of the chest and the lungs were deflated. The changes in pressure within the cabinet were produced by an electrically driven air compressor.

96. Drinker Respirator—1929.

(See Figure 14) Dr. Drinker of Harvard University was commissioned by the National Electric Light Association and the American Gas Association to make a study of artificial respiration methods. He studied all existing methods and from this research developed the Drinker respirator. The Consolidated Gas Company of

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New York sponsored the production of the respirator. These machines have gradually been installed in the hospitals throughout the United States and are proving by actual experience that they have a high life saving coefficient. Especially is this true in infantile paralysis cases where the respiratory muscles have become paralyzed from the disease. The press has applied the term the "Iron Lung" to this apparatus.

This is a large metal cabinet very ingeniously arranged for convenience and comfort for the patient. The patient is placed on a special wheeled bed stretcher and this is run into the cabinet. The cabinet is air tight to a high degree. The patient's head remains outside the cabinet, through a rubber ring surrounding the lower part of

the neck. An electrically driven air pump, through simple operating valves, creates within the cabinet a negative and positive pressure. This can be so regulated as to increase or decrease the amount of pressure required and can increase or decrease the rapidity of the respiration. The change of pressure within the cabinet acts upon the chest, compressing and expanding it so that the lungs are inflated and deflated as in normal respiration. Port holes in the cabinet are provided for giving of any treatment that may be necessary. These machines are not portable and are strictly hospital equipment. A small size is made for resuscitating new born children who do not breathe after birth.

97. E. and J. Resuscitator—1930.

(See Figure 12) This is a recent commercial apparatus that is similar to the pulmotor in its action. It automatically inflates and deflates the lungs by action of an automatic pump which sends only 4 cubic inches of air into the lung at a time. It requires a tank of oxygen and carbon dioxide for its operation. It also has the feature of being used as an inhalator. The makers claim no harm can be done to the lung tissue from the low used pressure nor can the air get into the stomach. The truth of that assertion can only come from actual experience with its use on actual cases.

98. Stern Syphon Method—1930.

This is not an appliance for actual artificial respiration but a simple means of obtaining carbon dioxide for respiratory stimulation until the inhalator arrives. As carbon dioxide is a valuable respiratory stimulant it should be used in connection with the manual methods of artificial respiration. Secure from the nearest drug store a syphon seltzer bottle and evacuate about one third of its contents. Then invert the bottle and depress the lever until the fluid drains out. Then the further pressure on the handle will cause pure carbon dioxide to flow from the nozzle. Attach a rubber catheter to the nozzle and hold near patient's nose.

99. Medical Methods. (All Times)

This paper would not be complete unless we mentioned some of the medical features used in resuscitation by the doctor. The use of adrenaline chloride has been given considerable prominence in recent years. It is recommended as a direct injection into the heart. The disadvantages of this are that the doctor often arrives without his proper syringe and needle of sufficient length to reach the heart. The delay in the arrival of the doctor at the scene of emergency often makes the measure useless. To be of value it must be used as early as possible. It is further difficult to get the injection in the heart.

There is a long list of medicines used as heart and respiratory stimulants which need no mention here. The use of spirits of ammonia inhalation is common. Some attempts have been made to use electricity to stimulate the heart and respiration but the value is doubtful. Bleeding or opening of a vein was commonly practiced in the early days. Dilation of the sphincter muscle of the anus stimulates respiration and is in common practice today.

100. Direct Massage of the Heart. (All Times)

This is an operative procedure and used only in the hospital during the course of an operation in which the body cavities have been opened. Should the patient cease to breathe and the heart cease to beat during an operation, direct massage of the heart is practiced by the surgeon. He reaches through the incision and attempts to massage the heart through the diaphragm. Some surgeons have opened the diaphragm and rhythmically massaged the heart direct in their hand. This procedure has saved many lives. Those practicing this method in the past were Schiff, 1874, F. Woodbury, B. M. Richter, H. M. Gray, W. S. Cooklin, all in 1905, and O. Zeller in 1908.

Conclusion

From the foregoing it will readily be seen that from ancient days down to the present time a continuous effort has been made, both by the layman and the medical man, to devise new methods or improve existing methods that will revive man from electric shock, drowning and asphyxiation.

Through these efforts countless lives have been saved from premature death. The main thought to hold in all resuscitation work is quick rescue and immediate application of artificial respiration without delay. Persevere in the performance of the resuscitation for at least three hours. Remember those cases that seem the most hopeless are often the easiest to restore.

The men who have so efficiently demonstrated these methods to you are employees of the Chicago Rapid Transit Company, each of whom has received the Britton I Budd medal for life saving and efficient first aid.

CHAIRMAN YOUNG: Two questions have been asked: (1) "Would you repeat the total number of methods established by your research?"

DR. FISHER: We have at the present time 100 different methods. We have shown 60 here, and by taking the various modifications they will run well above 150. Each day we are finding new methods. One method was sent to me from the Institute of Medicine of New York City, in a book which had been printed in one of the earliest days of printing. Pictures were given of the methods at that time, and the description of those methods, which in itself was very amusing to read.

CHAIRMAN YOUNG: The other question was: "What will become of the Schafer method in the case of falling patients in electrification accidents?"

DR. FISHER: One of our highest executives, about eighteen years ago, called me into his office and said he had been asked by a number of men and engineers to determine why so many men who received high voltage currents and fell from high areas to the ground apparently lived.

The question that has been raised is: Was it not possible that the counter shock they received in falling started the center of respiration and the heart going again, and for that reason precipitated a restoration? I was asked: Wouldn't it be a good policy for us to train our first-aid men to lift a man that had been electrified off the ground three or four feet and drop him, the counter shock aiding him, and then go ahead with our Schafer method?

Counter shock might aid in cardiac stimulation, but instead of adopting this radical method a good many of us started to do resuscitation by the Schafer method and then applied counter shock over the soles of the feet rhythmically, and over the heart area, and over the back area by hitting rhythmically. We don't know and cannot say with any degree of certainty that it helped any. It can and should be tried.

At the present time, I believe you will find the Schafer is done universally, and maybe some places you will see it taught where they are doing the rhythmical traction or rhythmical striking of the soles of the feet.

CHAIRMAN YOUNG: Another question that has been asked, Dr. Fisher, is: "What would you recommend be done in the case of a person needing resuscitation who was discovered to have a fractured rib?"

DR. FISHER: When a man has a fractured rib, you cannot do your straight Schafer prone pressure method, if the fracture affects the lower ribs. The pressure all comes low down on the lower section of the chest cavity, what we call the small of the back, and your pressure is up and forward. But you would not have a tendency to cause much injury to the ribs, unless the fracture is in the pressure area.

I wouldn't recommend doing the Sylvester method, because there you would certainly cause further damage to the chest wall. I would try one of the other methods. You saw them bring the arms over the head without any pressure. I would try the pulley traction on the tongue. I would try dilation of the rectal sphincter. In every event, if the case is one that necessitates resuscitation, I would take the long chance

and do the Schafer. Get your patient alive and you can take care of the other things afterward.

The three lower, or floating, ribs are the most elastic. The pressure, therefore, is on those ribs, and the chances are there would be no interference in doing the Schafer.

C. L. SCHAEFER (Western Electric Company, Chicago, Ill.): If I understood correctly, the Schafer method of artificial respiration was said to be not as efficient as the Sylvester method. Is that correct?

DR. FISHER: Up to 1903 Sylvester's method was considered to be the best method used by both medical men and laymen. After Schafer developed his method that was conceded to be the best.

R. A. YOUNG (Consolidated Gas Company, New York City): I think there was a slight error in who developed the Drinker respirator. The Consolidated Gas Company put up the money and purchased fourteen.

DR. FISHER: I did overlook mentioning the Consolidated Gas of New York. They put up the money and purchased the machines and put them in a number of hospitals in New York City for the use of the public.

J. J. CONNORS (Tennessee Electric Power Company, Chattanooga, Tenn.): I want to ask the Doctor's opinion of the Benedict method where the operator raises from the floor to the knees. They claim they get twice as much pressure on the body as otherwise.

DR. FISHER: I think you refer to Dr. Benedict's modification of Schafer's method. I don't want to go into modifications of the Schafer prone pressure method. Somebody is always adding something to it. Until those methods are absolutely proven efficient I, myself, don't care to enter into the controversy about it. But the fact is that the various large agencies, such as the American Gas, National Electric Light, the Bureau of Mines, and the Red Cross have all adopted practically the same method. If some of the newer modifications are more efficient I think time will bring out that fact.

O. R. BENJAMIN (Detroit Edison Company, Detroit, Mich.): How long should the prone pressure system be worked on a patient?

DR. FISHER: We have taught our employees to keep at it for a period of three hours. We have had authentic cases of living examples where men have been worked upon by the first-aid men. Medical men have come on the scene, pronounced them dead, left, and have been called back one or two hours later to aid in the further recovery of the men.

JOHN W. VREKLE (Standard Oil Company of New Jersey, Jersey City, N. J.): Would the average layman administering resuscitation be able to detect a broken rib?

DR. FISHER: I would say that the average layman would not be able to detect a broken rib unless there was a massive break of a great number of ribs on the same side.

J. MORGAN BUSWELL (San Joaquin Light and Power Company, Fresno, Calif.): I would like to have you tell, Doctor, what your opinion is regarding the administration of carbon dioxide and oxygen in cases other than carbon monoxide poisoning. For drowning or electric shock, do you strongly recommend the administration of oxygen or a mixture of oxygen and carbon dioxide with the prone pressure method of artificial respiration?

DR. FISHER: My answer to that question would be that where you have anything that will aid in stimulating respiratory action it should be used, especially in asphyxiation, drowning, submersion and electric shock causes. Use any one of the inhalators to provide carbon dioxide and oxygen mixture.

MR. SCHAEFER: In your administration of stimulants before the patient begins to breathe naturally, or when he is beginning to gasp, would you recommend any inhalant, such as an ammonia inhalant?

DR. FISHER: Stimulation cannot begin any too early regardless of the nature of your condition. If you are doing a Schafer prone pressure method and you are getting

air to the lung, there is no harm in having your spirits of ammonia or other inhalants held to the nose to stimulate the cardiac center.

The trouble with first-aid is that we get to the point where we teach it and get enthusiastic about it, and the first thing we know we are teaching employees too much and they don't assimilate anything.

MR. BUSWELL: The reason I asked the question is that I think it is one which should have suitable discussion, and we should know more about it in the field. We have had several cases of resuscitation of men who have been drowned or received electric shock, in which they fought for hours after they were taken back to the hospital, requiring three or four men to hold them under control. Fighting in a shocked condition is dangerous, of course, and the cause of it was attributed to the supply of oxygen given to them during resuscitation.

DR. FISHER: You can get that fighting or maniacal reaction following electric shock in persons where oxygen or carbon dioxide-oxygen have not been used. That seems to be characteristic of certain types of people. They fight when they come out.

I have interviewed boys who have been rescued. Invariably these men would say that their first impression on awakening was that they could hear voices in the distance. Some would say it was akin to coming out of an anesthetic, and some of them were fearful.

When our boys talk to these patients they reassure them, like you do with a patient coming out of a fainting attack or an epileptic seizure. As you start talking to them, they will start struggling. The idea of talking to them is to convey to them what it is all about. Naturally a good many of them are bewildered.

CHAIRMAN YOUNG: I am going to utilize the two remaining minutes of our session, before we close on time, to call on a very distinguished guest from Canada, Mr. Wills MacLachlan.

WILLS MACLACHLAN (Electrical Engineer, Toronto, Ont.): I think you are to be congratulated on having the opportunity of seeing this demonstration here today.

There is one possible enlargement on that, if you can give me a couple of your men, a blanket, and a couple of minutes. I will try to show you the development or the evolution of the Schafer method.

(Demonstration) Schafer started with his patient in that position (face down) and he rolled up a blanket and put it under the patient's face, kneeling at the patient's side, putting his hands thus, thumbs parallel to the spine, with the hands over the ribs in that way, then caused pressure and release. You will see that I bring more pressure on my left side than on the right. The natural thing was to straddle the patient and bring the pressure in that way. Any of you who have had any experience in setting up exercises know that your chest is larger if your hands are over your head, so the hands were put over the head, and continue the same way. We taught men to put a coat under the patient's head to raise the patient's mouth out of any dirt. The men ran a half mile for the coat. We have an arm doing nothing, so simply bend it and put the hand under the head.

Most men have very much heavier muscled hands than I have. If I carry on with my thumb in that position and cause pressure, and then release, the thumb is on stiff ribs doing no good. Get it out in a natural position, cause pressure, and release. If you carry it on that way for very long you become muscle-bound in your arms, so we simply say: Cause pressure, and drop back to a natural position.

That is the development from the original Schafer to the present standard technique as was shown by these men.

In connection with the resuscitation from electrical shock, through the use of stimulants, or the use of oxygen, or oxygen and carbon dioxide, the results we get are negligible. For that reason personally, being more interested in electric utilities than gas, I am not using any stimulation but one.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Fire Prevention

Friday Morning Session
October 16, 1931

R. E. VERNOR, Chairman

Manager, Fire Prevention Department, Western Actuarial Bureau, Chicago

The Fire Prevention Session convened with R. E. Vernor, manager, Fire Prevention Department, Western Actuarial Bureau, Chicago, presiding.

CHAIRMAN VERNOR: The theme of the general fire prevention program has been directed largely to industrial fire prevention. This is an especially appropriate subject in view of present business conditions, because anything that adds to the load which industry is carrying that can possibly be eliminated or lessened is worthy of study and discussion.

I am sorry to advise you that I have just received a telegram from Chief Eldridge, who was to be our first speaker on this program. I will read it: "Sorry to cancel engagement for Safety Congress on account of continued illness." We all regret that Chief Eldridge cannot be with us. I understand he has been in such condition that it was not possible for him to submit a paper.

We thought we were confronted by an emergency yesterday, but we are not totally unprepared. Mr. Percy Bugbee, assistant managing director of the National Fire Protection Association, has very kindly consented to step into this breach. I am sure we are all very grateful to him for his kindness in agreeing to assist us in handling this first section of our discussion.

Problems in Industrial Fire Protection

By PERCY BUGBEE

Assistant Managing Director, National Fire Protection Association,
Boston, Mass.

I would like to run over for you some rather random thoughts about this whole subject of industrial fire prevention that might lead to some discussion and give you a chance to get a general picture of the subject.

I think I can assume that many of the men here are representing industries and have to sell the idea of proper fire protection and prevention to the powers that be in their own plants. I think a great many business men don't think through on this question of the proper fire prevention in industry. If they provide adequate fire insurance to cover the building, the machinery and equipment in the building, and the raw stock or finished goods in the building, that is about as far as they think. There are a good many other factors that ought to be considered by an executive in planning

an adequate fire protection program for his establishment, and if he fails to consider those he is often a loser when a fire occurs.

Take the question of valuable dies and patterns in industry, oftentimes not covered in the insurance policy. A fire in the pattern shop destroying the basic patterns of the industry may cripple the industry for months and cause a serious loss of time and effort and money.

Consider the protection of records in industry. Some of our biggest losses have been in essential records rather than the destruction of plant property. One of the most classical examples of that was the Burlington building fire in Chicago in 1923. The fire swept through seven floors and the records lost alone were tremendous. I think one of the officials said it would take his drafting department a lifetime to replace just the plans of right-of-way destroyed.

Then there is the loss to employees when the fire occurs. The skilled employee drifts away to other plants. He isn't going to stay out of work without wages and becomes a permanent loss to the company. Customers are going to a competitor at the time the plant is out of operation, and the competitor is going to do all he can to keep the customer satisfied. The good will lost when a fire occurs is an important factor. I think the day is coming when, in our industrial plants making parts or pieces of machinery that other industrial concerns are depending on, in case of a fire it is not going to be just "Too bad" or "Sorry," but they are going to permanently lose the good will of their customers. Some of our biggest plants today, depending on other industries for their parts or service, are making very rigid investigations of the fire hazards and fire protection facilities of the supplying companies.

In planning a fire protection program in a plant there are a good many factors to be considered. Most of the new buildings are being properly constructed, but unless the construction includes the proper protection of openings, so as to limit the spread of fire, the job isn't complete. I had an opportunity to go through a large plant recently shortly after a fire. It was a very fine building which was nearly completely destroyed, and we found that of twenty-seven fire doors provided eighteen of them were blocked open with crowbars or something else, so that the fire swept through the whole building. The failure to make adequate use of the existing fire protection in a building is to be considered.

I think the plant layout is important. Too many plants consider their plant layout from the efficiency of floor layout and not from the question of fire protection. Some plants will put a very hazardous process, for instance, directly over a floor where they store inflammable materials. They don't give any thought to the layout to take care of these factors of fire protection.

In the protection of the plant, I think a most important thing to think of is the good will of the local fire department. It is highly important for an industry to have the fire department of the city come in and get familiar with the plant, familiar with the location of sprinkler shut-offs and of exits, the general hazards and particular hazards that may be found, so that in the event of a fire they will know where to go immediately. The industry that fails to establish that good will and contact with the local fire department is making a big mistake.

I think there is no question in the minds of any of us that the automatic sprinkler system is a vital force in protecting big industrial establishments. We have a record in our office of some 60,000 fires where sprinklers have operated, and they show something like 96.5 per cent efficiency.

Then there is the problem of proper first aid equipment, the chemical fire extinguisher equipment for the plant. There are certain types of extinguishers suitable for certain types of fires, and the industry that fails to appreciate the importance of providing the proper equipment for the hazard is making a serious mistake.

That leads me to the subject which was supposed to be discussed here this morning, of industrial fire brigades. One of the most effective industrial fire brigades I know

of was developed by the Canadian Wire and Foundry Company, with plants through Canada. They have developed their work to a high degree of efficiency. They maintain fire brigade contests in the plants every three months throughout the year. There is the utmost rivalry and spirit of contest in those competitions. They are all timed. The men in the plants of that particular company consider it a high honor to be selected for the industrial fire brigade.

After all, it is a question largely of arousing the proper spirit and interest of the employee in the fire protection of the industry. If it is looked at as just another task, it isn't going to amount to very much, but if you have the proper spirit behind it and the proper interest in it, then your industrial fire brigade is going to be an important factor in your program.

I think there are some men in the hall more intimate with this subject than I am. I notice Mr. Filmer, the head of the fire protection department of the Youngstown Sheet and Tube Company of Youngstown, Ohio, and I know he has had a lot of experience on this subject. I wonder, Mr. Chairman, if it would not be proper to ask him to say a few words.

CHAIRMAN VERNOR: We would be, very glad to hear from Mr. Filmer. Thank you, Mr. Bugbee.

W. T. FILMER (Fire Prevention Director, Youngstown Sheet and Tube Co., Youngstown, Ohio): I believe I can offer you something as to our experience with fire brigades. At the Youngstown plant we have about 67 different companies. These companies are distributed around the plant in the various departments in which the men are employed. They are selected because of their intimate association with the department. They know absolutely where everything is in the department. They also know what the principal hazards are and how to handle them. Each of the companies consists of a captain, a lieutenant, and eight or ten men. If the chief is not available at the time, the captain or lieutenant is in command.

Every possible contingency which it is possible for us to be able to visualize is worked out ahead of time. I find we are undertaking to use a principle which we heard in the psychology class this morning, the principle of indoctrination. That is a nice way of putting it, but that is what the psychology professor said it was, to be prepared for everything before it happens, so that whether anybody was there to take care of it or not, the men would know what to do. The chief puts a hypothetical fire up to the captain and lieutenant and he goes over with them how that particular fire ought to be handled. Everything in that department is anticipated. In that way the captain and lieutenant know pretty well what they ought to do. At the drills, the captain and lieutenant put the question up to their men, so that if by any chance the captain and lieutenant are not available, the men of the companies know what to do. If it is a paint fire they know what to do, or if it is an oil fire or an electrical fire or just an ordinary house or building fire, the men in the department and in the company have been thoroughly instructed as to what they are supposed to do.

We have had very good results from this manner of handling our fire brigade. The men are paid for the drills and are paid twice a year. At the beginning of the year the company gives the members of the fire brigade a banquet. We usually have anywhere from six to seven hundred members present. In the middle of the year a field day is held. In the spring and fall the men take care of their own entertainment.

The pay for the first of the drills is turned over to the commissioners whom they elect themselves, and in the spring and fall a theater party is given, or a smoker, as the case may be. Out of that fund also comes the relief of any individual members who may be in need. There is an advantage in belonging to the fire brigade in that the members of the fire brigade are usually the last ones laid off, so that it is an advantage to belong to the fire brigade and it is never any trouble for us to get the best men available for that service.

I should not only speak of the fire brigade. We must consider our fire prevention

activity. In that we have had the assistance of the men of the fire brigade in taking care of the specific hazards in their own particular departments.

In 1926, before our fire prevention program began, we had 2,274 fire alarms. For 1930 we had just 260 fire alarms. Up to October first of this year we have had 108. We believe our fire prevention program, coupled with our fire brigade operation, in cooperation with the fire brigade, has produced results which should be apparent to everybody who has a vital interest in the question of fire prevention.

There is just one little side issue which comes out of fire prevention which I believe ought to be known. I will give one instance of it. We found in one department that there were quite a number of fires occurring and we went in and made a study of it and found that the men who were doing the oiling were not particular flow. The floor would be covered with oil and then the suggestion was offered that if we made the man who put on the oil clean up the mess, the chances were that he would not use so much oil. It worked. Two months afterwards the superintendent of that department sent me a statement showing that in his department he had saved \$583 a month in the cost of oil and grease. That is one of the side issues of the fire prevention activity. Fire prevention pays, but you must have the wholesome cooperation of the fire brigade; they are the men upon whom you depend. A fire prevention director or fire chief cannot do it alone; he must have cooperation, and the best way to get it is through a fire brigade that believes in your doctrine, working along with you at all times, believing that upon each one of them individually rests a responsibility and the company looks to them in this matter. This matter of individual responsibility is one that we stress very highly.

A. L. ARMSTRONG (General Supervisor of Safety and Fire Prevention, Eastman Kodak Co., Rochester, N. Y.): I wonder what Mr. Filmer does with his brigades relative to taking care of the plant at night. Do they sleep there?

MR. FILMER: Our fire brigade is composed of the regular employees of the plant, and the plant operates on three eight-hour turns, each turn having its own company, so there is a separate company on each turn.

CHAIRMAN VERNOR: I should certainly like to express what I know is in the minds of all of you, our appreciation for the splendid way in which these gentlemen have filled in this breach and emergency. I think we have had a very profitable and interesting discussion.

We will pass on to the next number on our program, which is to be discussed by A. L. Armstrong, general supervisor of safety and fire prevention of the Eastman Kodak Company. We are very fortunate indeed to have him here to discuss this subject.

Securing the Cooperation of Employees in Fire Prevention

By A. L. ARMSTRONG
Eastman Kodak Company, Rochester, N. Y.

We believe that cooperation of employees can be obtained by proper education and a knowledge of our policy in regard to fire prevention. We also believe that this education must start in the employment department. It is a part of the employment manager's duty to impress upon the new employee the fact that we have certain definite rules and standards which everyone in our plants must live up to. We feel that it is also his duty to explain to the employee in a general way the necessity of studying the book of rules which he receives at the time of his employment.

When a new employee goes into a department the foreman explains to him any special hazards with which he may come in contact and tells him what precautions should be taken in order to avoid having a fire.

After the employee has been on the job for two weeks and has had an opportunity

to find out something about the way his department is operating, he comes to the safety department where he is given a quiz to determine just how much he knows in regard to the general rules and to discuss any rule that is not clear. He is given an opportunity at this time to ask any questions he may have in regard to safe practices pertaining to his work.

In order to impress on his mind the necessity of handling materials in certain definite ways, we have set up a course of instruction to teach the employee why it is necessary to do things in a certain way, also the reason for different types of safeguards.

Men who work around flammable solvents have an opportunity to see the different types of solvents burn. They also have an opportunity to see different types of extinguishers used for extinguishing solvent fires. We explain to them why one type of extinguisher will work on one type of solvent fire and not on another.

When we run demonstrations we discuss in a general way the flash point, ignition temperature and explosive mixture. One of the examples we use is to point out that the breaking of a gallon bottle of solvent in a room 10x10x10 feet, may, under certain conditions, render the air in this room explosive, and if an explosion of maximum intensity occurs it can exert a pressure of 90 pounds per square inch.

We not only discuss proper grounding of tanks and equipment and the handling of solvents but we actually demonstrate what will happen when static charges are built up and discharged. How the human body, insulated by rubbers, will build up static charges which will jump to ground and ignite solvent vapors, and how some solvents, while being poured from a pail by a man with rubbers on (providing the pail is not grounded), may build up a charge sufficiently strong to jump to ground and ignite the vapors. We demonstrate how important it is to prevent damage to ground wires by the following method: we use a static collector, first showing how the charge is carried through the wire to ground, then breaking the wire and building up a sufficient charge to jump the gap.

We also ignite solvent vapors with static sparks and discuss fires which have been caused by static electricity, not only in our own but in other plants.

Men who work around flammable solids get the same type of education as those working around solvents. We show these men how friction will generate heat and ignite, not only flammable but also combustible materials. This is done by the use of a motor with a 4-inch pulley, running about 1,000 R.P.M. The material we wish to ignite is placed between a piece of wood and a piece of perforated metal. This is brought up against a pulley to show how quickly sufficient heat is generated to cause ignition.

Another example is the electric light bulb. If a 150 or 200 watt light is used, a cloth can be ignited very quickly and it is even possible to ignite wood by laying a bulb on it, providing the upper part of the bulb is covered up.

The short-circuiting of electric wires is demonstrated and we discuss frankly the hazards connected with the use of improper extension cords. We also discuss fires which have been caused by equipment of this kind.

We point out hazards connected with over-fusing of a panel board or the use of hay wire or bolts in place of fuses, and also the fact that electric light lines are put in for a specific number of certain sized lamps and if larger sized lamps are used overloading of wires and cables will result and may cause a fire.

In regard to hazards of motor installations in industrial plants, we discuss this subject in some detail. Motors which must operate in atmospheres subject to flammable vapors or finely divided dust should be constructed for these conditions and be properly approved for use in hazardous locations. Of greatest importance is frequent and thorough inspection service. We discuss different phases of the problem with the employees for the purpose of preventing them from piling combustible materials on motors, turning a water hose on them, or using conduit boxes as steps.

We also point out that it is a part of their job to watch equipment of this kind closely and report immediately any motor that is, in their opinion, over-heating or in any way out of order.

To demonstrate how heat from a radiator or steam pipe will ignite flammable material, we use an electrically heated hot plate of about the same temperature.

Employees who handle acids and caustics receive the same type of instruction—by demonstration—and our men who handle cylinders of flammable gases receive definite instructions as to their respective hazards. Whenever it is possible, we have the supervisors of departments handling these materials look over accidents or fires which may have occurred within the city where our plant is located. We have in our organization an expert inspector on acetylene equipment who inspects all of the portable equipment in the plant and has the authority to stop the use of any equipment which, in his judgment, creates a hazard.

We find that improper tools, such as electric drills, extension cords, steel hammers and steel knives, are often the cause of fires where flammable materials are handled. This also includes wrenches which might be used on drums or tanks and on pipe connections.

One of the most difficult facts to get over to the average employee is, that a drum or tank car from which flammable solvents have been pumped offers a much greater hazard than a full drum of such liquid. The explosion test, we believe, is the best method of getting this over to the employee. By using a too rich mixture it is easy to show why the full tank car or drum will not explode, and by using only a few cc's of this material it is easy to show how dangerous solvent vapors really are. By using the explosive chamber in comparison to a drum or tank car we are able to get the employee to appreciate the fact that a real hazard exists.

It is not only necessary to see that employees use proper tools and follow out definite rules in regard to safe equipment, it is also necessary to see that they are properly informed in regard to wearing shoes with nails in them and it is just as necessary to be sure that they understand that they must not work around solvents with rubber soled shoes or with rubbers over their shoes.

We pay special attention to the type of instruction that is given to our truck drivers. It is necessary for these men to handle many types of hazardous materials in various kinds of containers and they should know what will happen when different materials come in contact with each other.

All of the materials in our different plants are handled in definite sized units and the trucks for handling these materials are of a size which will not permit the putting on of a larger quantity than it is felt safe to handle.

As an example of how much cooperation we get from this method of training employees, we have had instances where employees have prevented engineering and maintenance men from doing any work in a department until the foreman was notified, because the man on the job thought that if this work was permitted to go on it might cause a fire.

We stress housekeeping conditions and have a competent inspection force who are constantly checking throughout the plant. It is also a part of the duty of these inspectors to talk to the foreman in regard to methods of handling materials or of any hazard which may exist in his department.

The use of open flames throughout our plants, especially in hazardous locations, must be approved by the safety department and if it is necessary to do a job which creates a hazard all of the safety precautions possible are taken.

In regard to our inspection work, about half of the departments in our plant are inspected once a month and a written report with recommendations is made of every inspection.

One of the most important things in educational work is the discussion you get from the employees. In starting this work it was our thought that if we could point out many of the hazards to the employees and discuss them freely that they would in turn tell us of conditions throughout the plant that created hazards of which

we had no knowledge. After about four years of experience we found that this worked out very satisfactorily, so much so that employees working around any flammable materials come to the safety department once a year for a demonstration and discussion.

It is not difficult to get the employee to discuss conditions which exist in his department providing the right type of safety man is chosen to take charge of this work. This is important if you wish a plan of this kind to succeed. The first thing that must be done is to win the confidence of the men in the group. We have found that a group of from 25 to 30 is about the best number to talk to. When you exceed this number it is extremely difficult to keep them interested in the subject you wish to discuss.

Some of the very best illustrations of heat causing fires have come directly from the employees. One tells of a fire which occurred in his home when he wrapped a cloth around an electric light bulb to prevent light from shining into the eyes of one of his youngsters, who was ill. After putting the cloth around the light he left the room and upon returning about four or five minutes later the cloth was burning.

Another example, which shows how dangerous flammable liquids are, was given by an employee who said that while driving his car in the winter he froze his radiator. He drove it into the garage, took off the radiator cap and put a blanket in front of the radiator, letting the motor run to thaw it out. He had some alcohol in the radiator but the quantity was not sufficient to prevent freezing. While the motor was running, he stepped to the rear of the car and lit a cigarette. There was a flash and he explained that the radiator burned like a blow torch. Before the Fire Department arrived the car and garage had burned.

It takes about one and one-half hours for each class and about 3,000 employees came to our safety department last year for discussion and demonstration. This takes about two months.

A great deal has been written about the uncertainty of the human element in industry, also about the gross carelessness of the individual. It has been our experience that most of the things that happen are not due to carelessness but rather to a lack of knowledge on the part of the individual who was responsible. Some may think that there would be a tendency for employees to feel that they were working under extremely dangerous conditions if they know all of the facts. This is not true, providing the job is properly handled.

The employee who does not have a knowledge of the hazards connected with his job may get by, but the employee who has direct interest in his job and does have a knowledge of all of the hazards connected with it will be a real asset to any organization. There is one thing that must be borne in mind, and that is that safety standards for the employee must be the same as the standards for everyone else in the organization and, of course, these standards must be based on a uniform company policy.

CHAIRMAN VERNOR: Thank you, Mr. Armstrong. I think this question of how to secure the cooperation of plant employees in a fire prevention program is a very vital one.

There was one thing that particularly impressed me about this discussion and that was the fact that what may happen is actually visualized to the plant employees. Sometimes I think if we gave enough time and thought to the actual dramatization of what the consequences of the disregarding of certain fire hazards may be, that some of this educational work could be made more effective.

W. T. FILLMER (Fire Prevention Director, Youngstown Sheet and Tube Company, Youngstown, Ohio): May I ask what is done in the event of any employee violating any of the fire prevention provisions which you make?

MR. ARMSTRONG: We hold the supervisor responsible. We must do that. He must

take whatever course he deems advisable in a case of that kind. The safety department has no authority in the plant over an operating department.

GEORGE F. PRUSSING (Safety Engineer, Union Oil Company of California, Los Angeles): I was very much interested in Mr. Armstrong's paper. The problem that he has is one that I think every organization has that handles flammable and explosive materials; but the problem of education in fire prevention is handled differently by different people and I thought it might be interesting to say that in some of the large refineries, in the West particularly, fire prevention has been taught largely through teaching the operating men how to fight fires, the point being that by teaching the operating man where the fire is apt to originate, you teach him how to prevent it. And since in a chemical or refining organization fire fighting consists primarily of stopping the flow of flammable products; in other words the fires are caused almost invariably by the rupture of equipment containing these materials, spilling things that will take fire spontaneously, and the fighting of fire will consist primarily of stopping that flow, it is something that no outsider can do. In those cases the fire fighting consists of work done by the plant personnel, always starting with the particular small unit in which the fire may originate.

In our organization no man is allowed to go to a fire until called to it by his own superior. It is a dismissal offense for a man to be present at a fire unless it happens in his own operating unit unless called there by his superior. But the actual instruction in fire prevention has come almost entirely from teaching these men how to fight fires, which may in some cases have happened in similar units, either there or someplace else.

THOMAS RYAN (Chief of Eleventh Battalion, Chicago Fire Department): The last article in Mr. Armstrong's paper is particularly interesting. Everybody should live up to any rules set up by the organization. In the last two or three weeks there was a fire on the south side of Chicago, in an ice cream plant, where a lot of cartons and packages, covered with paraffine, were stored. It was caused by smoking. They had "No Smoking" signs in the plant. It was understood to be a cause for dismissal if an employee was caught smoking. The manager questioned certain people about smoking and they admitted they had been. He said, "Nobody is allowed to smoke here at all."

I said, "You smoke, don't you?"

He said, "Yes, but what is a pipe? That isn't going to cause a fire."

I said, "Your matches that you throw down will cause a fire."

I told him that the employees felt that if he smoked they should be able to smoke too if they were careful.

That is the attitude the employees take if they see the executives smoking. They are apt to throw it up to the executives if a fire occurs.

Fire prevention is a hobby of mine. We have had a few fires in the district caused by acetylene welding and acetylene cutting. I should like to know what precautions these companies take when they are going around the plant making repairs with acetylene torches?

MR. ARMSTRONG: The torch itself is turned in every night—that is the pipe. The hose on each piece of equipment is inspected every day. The inspector has the authority to shut off any tank and cut the hose if he wishes to do so. That is absolutely his responsibility. The equipment is handled only on approved trucks and by approved men. We have at times 130 or 140 portable sets of welding equipment out at one time. The place where those are to be used must be approved by our department. We find that we have some grief with the outside contractors. Sometimes we have some outside contractors in and we have found it necessary to even inspect their equipment.

I asked one fellow where his gauge was. He took it out of his pocket and showed it to me. The face was broken, the hand broken off, and I said, "How do you get along in safety with that kind of equipment?"

He said, "When you are shipping this stuff around the country you can't expect to have gauges and that sort of thing. You have to take a chance."

That is practically the way accidents occur on equipment of that kind.

MR. RYAN: We have with us here Mr. MacKenzie, fire chief of Armour & Company. He goes around all the plants of the Armour Company throughout the country, and he could tell you how Armour takes care of acetylene welds.

M. MACKENZIE (Fire Prevention Engineer, Armour & Co., Chicago): We have our own private fire department. Any time an acetylene welder goes out he has a fireman with him, carrying portable fire extinguishers. Even then we have fires, especially when working close to walls. Last year we had only one fire. In all the plants last year we went without a loss in the Armour organization.

CHAIRMAN VERNOR: That is cheering news.

REMY G. LANDUYT (Fire Marshal, Montgomery Ward & Co., Chicago): In our building we have about forty acres of floor space. In order to secure the cooperation of our employees on fire and accident prevention we have started this year a good housekeeping prize contest. The departments are inspected every month. We have a chart, the winning department receives a banner, and every employee working in that department gets one day off with pay. So far we are able to report a no-fire record since the first of the year.

R. W. HARDY (Safety Engineer, Olds Motor Works, Lansing, Mich.): I would like to ask Mr. Armstrong a question regarding inspection of acetylene outfits, in the matter of leakage or escape of gas. We have an inspection monthly, but they tell us our limits are quite low.

MR. ARMSTRONG: We hold our limits to 15 pounds.

MR. HARDY: Ours are four pounds.

JOSEPH T. PRATT (Supervisor of Safety, Reading Co., Reading, Pa.): All of the fire houses in Reading are volunteer, and the company employees are frequently members of those companies. Our men are permitted to leave their jobs if their company is called out to a fire. We therefore have a very good fire brigade because practically all our brigade members in our buildings are members of the fire department.

MATHEW B. LYONS (Chief, Fire Watch and Service, Pullman Co., Chicago): In the way of fire prevention I think we have about as nice a place as there is in the city. We go through a yearly inspection of our hose, also a weekly inspection of all our spray nozzles, also a yearly inspection of our sprinklers. From our last reports from the Sprinklers Association I got an A-Number-One rating for The Pullman Company. In other words, every one of our 202 sprinkler systems was in working order.

We have a weekly drill of the personnel, that is the foremen throughout the plant, organized into ten different companies, eight men in a company. We have a drill of about two hours daily. We are intending next week to organize a demonstration showing all the foremen the different operations of all the different chemicals and what they are to be used for. Of course we are not giving any prizes as yet, but we expect everybody to be there when there is a fire.

MR. RYAN: Fire prevention is the first line of defense. The second line of defense is fire equipment and fire brigades and fire companies, that is outside of municipal fire prevention. Speaking of plants putting out their own fires, I don't think anybody should go home with the idea that their fire brigade is A No. 1 and they can extinguish all fires. I believe that no matter how small a fire may be in a plant, the fire department should be called. In most cities you are bringing in firemen who are graduates from fire colleges in the extinguishing of fires, saving of property and saving of lives. You know as well as I do that in a good many plants they fight a fire for some ten or fifteen minutes with a carbon tetrachloride fire extinguisher, the employee using it loses confidence on account of the smallness of the stream, the fire is getting away from him, and the fire department has to be called. I know of a case where

that happened. The man applied the carbon tetrachloride fire extinguisher. The fire kept rushing to him. He ran over to turn in the alarm, the wires were burned off and he didn't know it. Somebody saw the smoke from a distance and put in the alarm and the fire brigade from Chicago went to the scene, with the result that we had to put in seven or eight additional alarms. The fire brigades in the city should be called out to the fire. You probably won't get praise or medals for putting out the fire alone.

CHAIRMAN VERNOR: Before passing to our next subject I want to call upon our friend, George Opp, retiring Vice President of the National Safety Council, to say a few words.

GEORGE OPP (The Detroit Edison Co., Detroit): As a retiring Vice President of the National Safety Council, I certainly want to compliment the chairman and members in attendance at this session for what appears to be one of the best sessions so far, just loaded with discussion. On Wednesday afternoon the Board of Directors of the National Safety Council, in their meeting, went unanimously on record endorsing the resolution passed at the National Fire Waste Council held in Washington on September 25, calling the attention of the nation to the fact that 1932 is designated as a year of special effort along fire prevention lines, and asking all of the members of the National Safety Council and all of its allied local councils to put forth that special effort that is necessary to cut down the national fire waste and help in the return of prosperity so dependent upon the reduction of waste along economic lines.

CHAIRMAN VERNOR: I am sure we are pleased with this bit of news.

The next speaker on our program has been more or less of a fire fan all of his life. He is Mr. R. J. Anschicks, president of the Protectoseal Company, Chicago.

The Safe Handling of Flammable Liquids

By R. J. ANSCHICKS
President, Protectoseal Company, Chicago

This subject is of such a broad scope that we must, of necessity, limit the discussion to certain phases in the brief time available to us.

There are, of course, a great many classes of hazardous liquids. They vary in respect to the degree of hazard involved by their handling. Many are both volatile and flammable. There are not only the standard well known products, such as gasoline, naphtha, benzol, thinners, etc., but there are many similar liquids manufactured under trade names that can well be included in one of several classes. We will divide these various liquids into three groups.

1. Those with a flash point below 25 degrees F.
2. Those with a flash point between 25 and 75 degrees.
3. Those with a flash point over 70 and up to 190 degrees.

By flash point we mean the lowest temperature at which the liquid will give off ignitable vapors. Classes 1 and 2 are the principal troublemakers, in that they will flash at ordinary room temperatures or lower. In this class, 1 and 2, we may include such liquids as gasoline, naphtha, benzol, acetone, ether, etc. In class 3 we include such liquids as fuel oil, kerosene, turpentine, etc. The higher the flash point the less the hazard in connection with these liquids. Hence we will confine our discussion primarily to classes 1 and 2.

Before entering on details regarding the problems connected with the handling and storing of flammable liquids, classes 1 and 2, I will give a few details on the inherent nature of these liquids and peculiar properties that make them highly dangerous. I will then discuss same in relation to transfer from one container to another, actual storage, above-ground and underground in bulk, and handling of same in relatively small quantities for particular plant operation. And finally some principles of protection.

Our discussion will relate primarily to the use of flammables as applied to the industrials. When it comes to oil companies, who manufacture these various liquids where they have involved processes, their particular problems are part of their daily production.

With the industrials, however, the use of flammables is incidental to their general run of business. A fire or an explosion in an industrial plant has a greater potential damage than would probably be the case with oil companies. The latter have their operations spread over wide areas, frequently in isolated places, and a fire or explosion will result in the damage to that particular unit, being only a part of many other units.

In an industrial concern, however, the use of flammables is frequently within the plant. Storing and handling is, of necessity, confined to close proximity to the plant and fire or explosion, therefore, involves not only the flammable material, but frequently extends out into general plant operation with very serious consequences to general production.

Furthermore, an average factory may have various small operations involving the human element and the oftener hazardous liquids are transferred or used, the greater, of course, are the chances for trouble. In the following discussion I will refer most often to gasoline, but I want you to bear in mind that this is a term which is intended for the various similar liquids as outlined above as belonging to class 1 and 2. After all, within any given class there is not much difference between the various hazardous liquids. One may have a greater range of explosive mixture; another may flash at a lower point; another may develop greater pressures under combustion; but any one of them has sufficient potential power to be considered as distinctly hazardous.

I do not want to create the impression that the use of gasoline is a constant menace. Millions and billions of gallons are being used by many plants.

Many an individual goes through life constantly in contact with flammable liquids and yet has not been burned or harmed. We, on the other hand, must not feel, as is unfortunately the case of many individuals, that these liquids are not dangerous. They distinctly are, and there has been enough bad experience with them to convince us that they are a good servant but a bad master. So it involves really the proper control of these liquids in their every day use.

Now, proper control pre-supposes a thorough understanding of the nature of the liquids. Gasoline in its liquid state is not hazardous. It cannot be set off to explode by detonation. Therefore, in a sealed container, without the presence of flame, is perfectly harmless. Unfortunately, however, we cannot confine gasoline to a sealed container at all times because we must make use of it. That involves the transfer from one container to another, whether from a large one to a large one, to a small one, or any combination. Furthermore, we cannot be assured that when it is stored in a container that the occasion will not arise when fire is brought in close proximity.

As stated before, the liquid itself is not harmful. It is the vapors which are given off by the liquid that are the trouble-makers. The latent hazards are increased in proportion as the volume is increased. If you were to take a match or open flame and inject it suddenly into the gasoline and there were no vapors suspended above the liquid, the match would be extinguished as readily by the gasoline as it would by water.

However, this liquid if spilled on the floor would immediately vaporize and mix with air. A gallon of gasoline completely vaporized can make explosive a room containing approximately 70 cubic feet of air. Now a gallon in itself is a small quantity, about 231 cubic inches. You can, therefore, readily see that any substantial quantity of gasoline when vaporized would create explosive atmosphere in very large volume.

Now, if this explosive atmosphere were confined in a steel chamber of the room of a building, and were to be ignited through any source, these vapors in turn would

again expand at a terrific rate. If they do not have area in which they can expand, something must give way.

When gasoline and air mixtures in explosive proportions are ignited under atmospheric pressure, they can produce 100 pounds pressure per square inch in .03 of a second. Now, an ordinary tank containing a few thousand square inches of wall area, or a room containing many thousand square inches cannot withstand even considerably less than 100 pounds per square inch. The result is, in the first case, a burst container, or in the second case a demolished building.

There is some confusion as regards the expression "explosive mixtures." An explosive mixture in gasoline implies a range from one and one-half to about six per cent gasoline vapor, mixed with the balance of air. Under those particular conditions, these vapors will burn without additional oxygen. If they be sealed within an air-tight container, a spark injected into that mixture will result in combustion so rapid that it becomes practically an explosion.

On the other hand, if the mixture were in a room or a tank in which the gasoline vapors were above the explosive range, say from 8 percent up, combustion would not be possible without additional oxygen supplied to the room. You might step into that room and find a very pungent odor of gasoline. It might be above the explosive range. In that event with all walls sealed you could take a blow torch and enter that chamber with an open flame and not get a fire. I once witnessed a test made where a container was filled with saturated atmosphere, and a candle was held inside, a rubber bulb containing oxygen squeezed against the flame permitted the candle flame with a sort of halo or sphere of fire to burn in the midst of this saturated vapor-air mixture.

A party told me of an experience that he had with ether where a large bottle of ether had dropped from a table in a small laboratory, and the room became filled with fumes. He said that balls of fire would flash through parts of the room, particularly near the window, indicating that combustion, of course, was present where there was additional oxygen. If air had been injected into that room there would have been a violent explosion.

Now the particular problem in connection with gasoline air mixture is that it is not possible to determine by any of the human senses whether or not an atmosphere is explosive. There are instruments which are used to determine these mixtures, and yet there may be a very sudden change within a room, or a building, so the answer is "Prevent the accumulation of vapors in any room or building."

Here is where ventilation becomes important. As will be pointed out later these vapors are heavier than air. They will not escape from pockets. You must provide air currents with vent openings at the floor level, or if at a higher point sufficient draft to carry them away. Too much emphasis cannot be placed on proper ventilation where open stocks of liquid are used or where transfers are made.

These gasoline vapors which are passing off from this small container, represented on the diagram, have another bad habit. That is, they migrate. As mentioned just previously, gasoline vapor is heavier than air. If you have a saturated condition in one part of your plant, maybe where you have spilled a large quantity of gasoline on the floor, or where you were performing a washing operation, which constantly causes a turbulence of liquid, forcing it to give off vapors, a slight draft or air current may carry the vapors to remote parts. They will cling to the floor and travel along with the air current as much as 100 or 200 feet. Thus if you have taken precautions around your storeroom or work bench, where gasoline is being used or where you are transferring quantities from one container to another, particularly large volumes, you may not be at all safe. These vapors, if carried away a few hundred feet to a small pilot light or a glue pot, or in the presence of motors or open flames of any kind, may flash back the entire distance to the source of the vapors. There are many instances of this kind on record and most of you have had one or more in your own personal experience. I might cite one, a particular

interesting one, which occurred several years ago here in the city. A barge was being loaded and there was a fuel line of several hundred yards leading from the tank to the boat. There were no evidences of open flame near the storage tank, nor boat, but vapors accumulated from the filling operation were drawn together. Way down the shoreline there were some boys with a bonfire. The air current carried these vapors along the shore of the river, down to the bonfire, with the result that the flame flashed back to the boat and there was complete destruction.

There are still other sources of danger in connection with a given quantity of gasoline. If a gallon is sealed, it is, of course, not giving off vapors. But in the presence of flame around the container, the contents of this container will begin to boil. Gasoline boils, at least some grades, at 130 degrees F. It gives off vapors which must find room in which to expand. If you were to confine water in a container and apply heat you would finally build up sufficient pressure to burst the container. The same is true with gasoline. With water, however, the vapors themselves are not flammable, and the bursting of the can will not involve any additional hazard. With gasoline, however, as soon as this liquid is released under pressure, it flies around and immediately becomes ignited. We will discuss later certain phases of this in connection with larger storage.

There is a further bad quality in this representative gallon of gasoline. We have mentioned the migration of the vapors. We find also that the liquid itself, the source, of these vapors, if released in sufficient quantities will also start on a tour.

All liquids will flow, but when you have a liquid which burns as it flows you have a real problem. This unit of gasoline may start flowing through the plant spreading the fire, which may otherwise have been localized. Barriers for ordinary fires—water for instance—have little effect on a stream of flowing oil. In fact if it encounters a body of water it will float along on top making a river of fire. It takes some unusually mobile equipment to combat these roving fires. I will refer later to means of confining this gasoline, so that it can't escape.

There is also a fifth hazard in connection with gasoline, and that is a possible explosion of the container due to internal ignition. Now the condition within this container must be such as to permit of internal combustion; otherwise there will be no explosion. If this container is filled with liquid, there is, of course, no chance for an internal explosion. There must be space within; and this space must be filled with a certain mixture oxygen and vapor. Furthermore, if this container has a large opening relative to the volume of the gases within—just the same as if this particular room had a hinged ceiling or hinged walls—the ignition of the mixture within would upon expansion be freed through the orifice, and, of course, the room or the container would not be damaged.

But it is not practical on most containers to have a large opening. Tanks and receptacles for hazardous liquids are generally built with a proportionally small opening. Their walls are not strong enough to withstand the maximum pressure of explosion, with the result that in case of an ignition, the container is destroyed.

So this container, when empty or nearly empty, is apt to be a bad actor. If the contents have been drained out, sucking in fresh air, or if the container has been nearly empty, or if there has been a sudden cooling to contract the atmosphere within, causing additional oxygen to enter, then bringing a spark of flame in the presence of that opening will permit an interior ignition. We never know when the condition exists. It is, no doubt, true that with an average container with a quantity of liquid in it, times at which the mixture is exactly right for an explosion are relatively few and of short duration. But there is the element of risk and that is why we must recognize that there is a hazard.

Thus by way of summary, a quantity of gasoline has five distinct phases to guard against.

1. If not sealed, it passes off explosive vapors in its immediate presence, which vapor may result in complete destruction upon ignition.

2. These vapors may not entirely lodge within the immediate vicinity of the container but may travel a considerable distance, become ignited, and flash back to the source.

3. If the container is sealed and no provision has been made for pressure relief, the container will burst from internal pressures due to surrounding fires, creating additional fire.

4. The contents may flow while burning—flow considerable distances, spreading what would ordinarily be a local fire, and defying ordinary extinguishing methods.

5. If the opening is relatively small and there is a void within the container, and this void has the proper gasoline-air mixture, ignition of flame or spark will cause an interior ignition that will burst the container, with possible fatal consequences to a bystander.

We all like to feel that we are using precautions against matches and flame of any kind in locations involving hazardous liquids, but the sources of ignition are so numerous, and in many instances so remote, that even the most careful and far-sighted cannot guard against possible sources of ignition. Get at the root of the problem and control the material itself. We will now enter into the specific illustration of the handling of hazardous liquids, keeping in mind these five sources of possible trouble.

Let us take first the transfer in volume. We will start with the large storage tank which already has been filled. You are now transferring from the storage tank to another large container, say a tank car. The flow of gasoline through pipes or hose or dropping through the air induces friction, and develops static electricity. There has been a good deal written lately about static electricity in relation to hazardous liquids because it explains a good many fires and disasters which have previously been classified as of unknown origin. There is a tendency, I believe, to blame a good many things on static, which should be really attributed to some other cause. Nevertheless, static is important and it can be guarded against by the use of grounding. If these charges build up in the pipes or containers, these charges can be carried off into the ground by bonding. There are a number of concerns that furnish bonding material and there is considerable scientific data on the installation of bonds.

The National Safety Council has a very adequate pamphlet on the proper grounding of pipes, tank cars, and tanks.

Now in transferring into the tank car, we run across the passing off of vapors. This is in large amounts. In an article in the American Petroleum Journal last year there was a very thorough write-up on the passing of vapors in transfer to a tank car. By actual demonstration and test, it was shown that, due to the turbulence of the liquids and the change of temperature, the contents of air and vapors passing off of a tank car during filling may be as much as 230 percent of the volume of the tank car. Now, these vapors are a hazard. Incidentally, I might also mention that they represent a considerable economic loss. It was determined that on a single filling of a tank car the escaping vapor represented .27 of 1 percent loss by volume in a single transfer.

One method of controlling these vapors is by means of a special adaptor attached to the tank car dome, or tank; a flex connection is made between the filling line and the adaptor, and a second flex connection is made between a vent line in the adaptor piped back to the storage tank from which the liquid is being drawn. You now have a closed cycle. If you are not in a position to control the vapors in this manner, why not pipe them away from the plant? Some oil companies are now burning these vapors, and we recently had occasion to go into the problem of an arrester to prevent flash back from these burning vapors.

This transfer of liquids in tank cars is typical transferring from one large container to another, so that it will apply equally to stationary tanks in close proximity to your plant. If this transfer be made within the plant, the condition is extremely

hazardous in that these vapors will tend to lodge within the building. By all means the filling should be done by direct connection and the vent line carried outside of the building.

I touched on the static condition. If there are flammable vapors present and you get a static spark, you have a real fire. The tank car probably would not explode because its walls are strong and the dome opening relatively large, so that the pressures will be relieved. But a flash may result in the throwing of burning liquid over a considerable area which may result in the loss of human life.

An empty tank car, or tank, is also a distinct hazard if open. The tank may contain an explosive atmosphere, and there are on record many instances where lives have been lost by the explosion of an empty container.

Let us take a few moments to review the storage in bulk. Theoretically, the safest way to store flammable liquids is underground. There may be objections to the cost of excavation; there may be objections to the deterioration of the soil, and the fact that you cannot inspect it; but if you have liquid underground, you at least have it free from dangerous or exposed fires and it cannot flow away from the source. You also have an economic saving in that the temperature changes within the liquid are comparatively small, and the loss by evaporation due to the breathing is considerably cut down.

There is one source of danger, however, and that is the static spark during filling. That can be greatly relieved by the use of direct connection for filling and protected openings to prevent flash into the tank if contents within are explosive.

Nevertheless, probably more gasoline is stored above-ground than underground.

On the above-ground tank you have a number of things to safeguard against. There is, of course, the passing off of vapors due to breathing. The volume may be large. A seal of two or three ounces against a large storage tank will reduce the breathing by about 50 percent. Vapors, of course, passing off may be carried long distances and flash back to the tank. The Underwriters Laboratories have done a great deal of work in connection with flash arrestors on large bulk storage, and there are available fittings which will prevent the flash back through these vents on the tanks.

Now, a flash arrester on the vent is not sufficient, unless the vent in itself is sufficiently large to vent the tank during fire conditions. There has been great laxness on the part of tank builders and inspectors in that they have provided inadequate venting. The orifices are large enough to take care of the breathing out during filling and breaking of vacuum during pumping out, but little thought has been given to what would happen to that tank if surrounded by fire. It is not an extremely difficult problem. There are bound to be unknown factors but with margins of safety we can supply adequate venting.

Discussion

Now we have protected this tank against interior ignition and we have assumed that the opening and venting will be large enough to take care of the volatilization of the liquid within, and the tank itself will remain intact for a considerable period. I would mention here a peculiar phenomenon regarding tanks involved in fire. During the fire the vapor within the tank has become saturated and will not explode. The Fire Department comes along and pours water on the tank. Fire is under control, the tank cools, and draws in oxygen which may create an explosive mixture within it.

It may happen that a second flash breaks out with a temporary flare. Unless the vents and openings have all been of sturdy structure to withstand the first exposure, there may well be an interior ignition and explosion when the fire is practically extinguished. I emphasize this point so that the importance of sturdy structures and proper fittings is realized. Sub-standard appliances will not give safety.

I want to mention just briefly the practice of dyking and the errors to guard

against. If you have a series of tanks, each tank should be dyked separately. In case of fire one tank only would be involved. Furthermore, any dyke must be of greater capacity than the contents of the tank; otherwise this burning liquid may overflow the dyke and spread to distant parts.

We now come to the handling and storing of lesser quantities of hazardous liquids within the plant itself. The methods and means of doing this are legion, and the faulty practices as numerous. I will mention just a few points for caution, and these are only intended as basis for comparison in similar operation in any plant, whether you use tanks, drums, cans, portables, or what not.

Many plants use drum storage. A drum in itself is generally a sturdy container and is not subject to the criticism that is found with cheap unapproved cans with loose covers and leaky seams. But the volume of a drum is 30 to 50 gallons. These are generally located in the storeroom in close proximity to plant operators. A sealed drum does not give off flammable vapors, but there is a potential hazard in case of fire. You have a boiler with 50 gallons of hazardous liquid. Surrounding fire breaking out in the storeroom will heat the drum and build up internal pressures sufficient to burst the container. The contents will feed the flames and may start on a trip through the plant or to the floor below.

We had occasion to test some drums through the Factory Mutuals and it was discovered that a drum half full of gasoline built up a pressure sufficient to raise a 10 pound safety valve in eight minutes, and in less than 15 minutes, although this safety valve contained four one-fourth inch holes, it burst because of inadequate venting. The plug now in use on drums when put in place permits of no pressure relief. If the workman takes out the plug in order to more adequately drain from the drum, the container will give off flammable vapors that may lodge in corners for trouble later. By all means this drum should be sealed, yet there should be an arrangement for venting under pressure.

Complete equipment on a drum should include the seal, the pressure relief, the vacuum breaker, and the protected openings. Avoid the very bad practice of using a manually operated faucet. It is easy to leave the faucet open and spill drippings on the floor. There are self-closing faucets which help but the best way is to remove the contents by means of a pump. If you must have a faucet, let it be a self-closing one, and arrange a drip pan or drain that will remove the liquid from the storeroom.

The handling of gasoline in safety cans is not fully established, yet many concerns rely on anything to carry the liquid around. Underwriter's cans are strongly built and easy to handle, so that the investment is well worthwhile. There are, of course, various grades of approved cans. The stronger built, the sturdier, the means of protection by furnishing protected openings in addition to the self-closing spout, are all matters which should be considered by the safety engineer, or plant superintendent. We cannot assume that a can is a can. The best is none too good for the handling of a hazardous liquid.

When you are forced into washing operations, remember the hazard of passing off of the vapors. Remember the hazard to the worker whose clothes and hands get saturated with gasoline. In case of an ignition in an open can or tank, the fire will continue to burn. If you must wash in open containers provide them with a mechanical contrivance to snuff the fire in case the container is in flames. You are all familiar with fuse link operation. Every tank and washing container with necessary large opening should have a hinged cover held open by a fuse link during operation and then closed as soon as not in use. During operation, in case of a fire in the container, the fuse link would melt, permit the lid to drop, and snuff out the fire.

Much time could be devoted to discussing use of fire extinguishers and automatic systems. They are all a part of plant protection, but if you keep after the source of the trouble, and extinguishers are never called into use, you have had the very best service out of your protection.

CHAIRMAN VERNON: The last speaker on our program is an old friend of mine. I know what he is going to do and I know you are going to enjoy it. Without further remarks I will introduce to you C. B. White, chemist engineer, American-LaFrance and Foamite Industries, Inc., Elmira, New York, who is going to discuss and demonstrate "The Use of Chemical Extinguishers."

The Use of Chemical Extinguishers on Incipient Industrial Fires

By C. B. WHITE, M. E.

Chemist Engineer, American LaFrance & Foamite Industries, Inc., Elmira, N. Y.

During the past fifty years many great changes have taken place in our means of transportation, in our methods of manufacture, in our systems of lighting, heating and communication. In fact our present machine-made civilization is virtually the product of the past fifty years. Our current popular literature is replete with reminiscences by such able writers as Mark Sullivan and Samuel Rhyne, who very dramatically point out our accomplishments and our failures since "the turn of the century."

But little has been written upon the effect of our altered civilization on our methods of fire fighting. It does not fall within my province to list all of the changes which have taken place and which are taking place nor to philosophize upon the advantages and disadvantages of each. A very little retrospection will reveal to the thoughtful student the fact that our problems in the science of fire fighting have multiplied since the day when kerosene lamps lighted the homes of America.

As a single outstanding example, gasoline was a waste product in the year 1890. The distillation of crude oil was carried on largely to obtain the then valuable product kerosene. The gasoline was thrown out and burned up at the refinery. It was not only valueless; it was a nuisance. But all this has been changed by two revolutionary inventions—the incandescent lamp and the internal combustion motor. The former replaced the oil lamp and the latter transformed the waste material gasoline into one of our foremost necessities, so that the relation of the value of kerosene to gasoline today is almost the reverse of what it was forty years ago.

The rapid changes in our methods of doing almost everything, coupled with a tremendous increase in the number and variety of our inventions, have introduced fire risks into our daily lives which were unheard of a generation or two ago.

Fifty years ago fires were largely confined to simple free burning materials in houses, barns, small factories, graneries and the like, and water in limited quantities could be counted upon to take care of practically all of these risks. Today even our fires in free burning materials are apt to be of much greater proportions than formerly, because of the centralization of industry into much larger units; but in addition we now have the oil and gasoline risks, the electrical hazard, the pyroxylin plastic risk and the fire hazard brought about by the introduction of scores of new solvents for all sorts of purposes.

Our ancient scientists had only a vague idea of the nature of fire. The alchemists classed fire as one of the four elements of which earth, air and water were the other three. In fact it was only a century and a half ago that Lavoisier, by a series of brilliant experiments, gave to the world the first inkling of what fire really is. It would be interesting (purely from a speculative standpoint) to determine just how far the science of fire fighting would have progressed if we were today still laboring with the phlogiston theory.

Modern science, however, defines fire as the combustion or rapid oxidation of a substance at, or above, its kindling point. If oxygen is absent combustion will not take place, no matter what the temperature; and conversely, a substance below

its kindling point will not take fire even in the presence of abundant oxygen. This gives us valuable information regarding fire extinguishment—either cool the burning material below its kindling point or exclude the oxygen of the air from contact with the burning substance. All modern fire-fighting methods are based upon the application of one of these two principles or upon a combination of both.

Water

Probably water will always be the most common fire extinguishing agent because of its abundance and wide distribution. But water is not particularly under discussion here, because that which makes water a modern fire extinguishing medium is not the water itself but the means of its application.

From the days when water was delivered upon a fire by means of a bucket brigade or a crude hand pumper with its leather hose, we have made some mighty strides until today we are capable of delivering enormous volumes of water easily and rapidly. Single pumps with a capacity of 500, 750 and 1,000 gallons per minute at pressures as high as 450 pounds are standard equipment for the modern fire company. Many great inventions have made possible these high rates of delivery. The internal combustion engine besides increasing the road speed of fire apparatus and insuring its prompt arrival at the scene of the fire and immediate capacity discharge has stimulated the perfection of high speed pumps such as the rotary and the centrifugal types. Modern water works and high pressure mains in our larger cities are essential to the success of fire fighting on a large scale. Among the most important factors is one we frequently overlook, the utilization of rubber. Without rubber tires high speeds for motor vehicles would be out of the question; without rubber lined hose our high rates of water delivery would be futile because we would lack a proper flexible means of conducting the water any considerable distance.

Regardless of quantity or rate of application, however, there are fires which water will not extinguish; indeed there are certain types of fires which are greatly intensified and increased by water. We therefore must resort to the use of other agents for many present day fires and one of our purposes here is to classify these agents and assign to each its proper place in the scheme of modern fire protection.

Carbon Tetrachloride

Carbon tetrachloride CCl_4 is a clear, water-white liquid at ordinary temperatures. Its specific gravity at 21 degrees C. is 1.5817. Its freezing point is -23.77 degrees C. and its boiling point is 76.74 degrees C.

Carbon tetrachloride is very volatile and its vapor, heavier than air, will not burn nor support combustion. These properties are made use of for fire extinguishing purposes by directing a stream of the liquid upon the fire which rapidly converts the liquid into vapor. Its chief value as a fire extinguishing medium lies in the smothering action of the free vapor, although in certain cases the cooling action of the liquid itself is valuable. The quantity of vapor which may be produced from one pound of the liquid is about two and one-half cubic feet at room temperature and normal barometric pressure. If we assume an arbitrary figure of 600 degrees F. for the temperature of the atmosphere immediately surrounding an ordinary fire the quantity of vapor which may be produced from a pound of the liquid will be five cubic feet.

Much has been written about the fumes generated in extinguishing fire with carbon tetrachloride. That undesirable fumes are formed under these conditions cannot be denied. Fumes of CCl_4 itself have anesthetic properties and in addition to these there are other fumes of an objectionable nature formed in small quantities by the decomposition of the CCl_4 .

JOURNAL OF THE FRANKLIN INSTITUTE, October, 1920, pages 543-585. N. F. P. A. Quarterly, January, 1921, pages 227-243.

The consensus of opinion of the various investigators regarding the character of the gases formed and the precautions to be observed may be expressed briefly as follows:

1. Carbon tetrachloride extinguishers are usually small.
2. They are designed for incipient fires only.
3. Discomfort to the operator from fumes produced under special conditions is limited to cases where such devices are used in closely confined spaces where ventilation is poor and from which the operator cannot make a prompt exit.
4. These isolated cases of possible danger should not prevent the acceptance of carbon tetrachloride extinguishers for the protection of those risks for which they are preëminently fitted.

The devices used in the application of CCl_4 range in capacity from 1 quart to $2\frac{1}{2}$ or 3 gallons. There are a few types for special purposes larger than this but they are rare. In fact the most common size is the 1 quart. The method usually employed for ejecting the liquid from its container is hand pumping although the sizes of 1 gallon or larger are equipped with cylinders containing air under pressure, which is capable of forcing the liquid out of its container through a suitable nozzle. The normal range of stream for the hand pump devices is in the neighborhood of 20 feet under full pump pressure.

Mention of the capacities of the most common tetrachloride devices serves to bring out the fact that they are usually of rather small calibre. Therefore in any discussion of the merits of this fluid as a fire extinguishing material we must limit the size of the fire in mind to the size of the extinguishers commonly available.

For Class A fires (wood, textiles, paper, rubbish) carbon tetrachloride is not recommended but under favorable circumstances will give a good account of itself. It is not recommended because other types are better adapted to this class of fire and because of the difficulty of confining the free gas at the seat of the fire; in the case of the hand pump devices the force, range and duration of the stream are not automatically assured; the fluid must be used with caution in small rooms or other confined spaces.

For Class B fires (grease, oil, gasoline, kerosene) tetrachloride is acceptable for small, incipient fires where the depth of the flammable material is superficial. In cases where the fuel is present in considerable depth, liquid tetrachloride passes through the flame without volatilizing sufficiently to produce a non-combustion-supporting atmosphere and since the liquid is miscible with practically all the materials in Class B it promptly distributes itself through the fuel. In the case of gasoline it is necessary to add a volume of tetrachloride equal to half the volume of the fuel before the mixture will cease to burn. For instance, a mixture of 20 per cent carbon tetrachloride with 80 per cent gasoline will burn. A mixture of 30 per cent carbon tetrachloride with 70 per cent gasoline will just burn. A mixture of 40 per cent carbon tetrachloride with 60 per cent gasoline will flash and go out.

For Class C fires (electrical machinery) carbon tetrachloride is recommended because it is a non-conductor of electricity and may be used with safety around live electrical machinery and switchboards. Here again the question of size of apparatus is a factor, and where the fire has spread beyond the extinguishing capacity of the extinguisher other materials are to be preferred.

The value of tetrachloride for strictly electrical fires may be summed up by the statement that for such fires as fall within the limited capacities of available carbon tetrachloride extinguishers CCl_4 is as good an extinguishing medium as we possess.

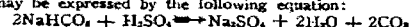
For Class D fires (trucks, buses and pleasure motor vehicles) carbon tetrachloride extinguishers are the best available. In this class the majority of fires occur under the hood, where the fire-smothering vapor of CCl_4 may be banked in a very confined space while the operator remains in the open free from objectionable fumes. The

devices are compact, comparatively light, rapidly brought into operation and not subject to freezing.

For certain classes of motor vehicles such as the oil tank truck, other types of extinguishers are sometimes preferred, but in the main the Class D risk is best protected by CCl_4 .

Soda and Acid

The type known as soda-acid is the oldest form of chemical fire extinguisher in use today, and it has proved its value for the extinguishment of fires in free burning materials beyond any question. Extinguishers of the soda-acid type depend for their operation upon the reaction between an acid and a solution of a carbonate. In the most common form the acid is sulphuric and the carbonate is sodium bicarbonate. The reaction may be expressed by the following equation:



The two solutions are normally kept separate until the extinguisher is brought into play when they are allowed to come together. The reaction evolves sufficient volume of CO_2 to eject the liquid contents of the extinguisher through suitable hose and nozzle.

Properly designed charges for soda-acid extinguishers are provided with an excess of sodium bicarbonate to guard against an occasional "flash" or "slug" of the acid, which might escape through the nozzle during operation and cause damage and injury. In fact, the common soda-acid charge contains twice as much bicarbonate as will satisfy all of the acid present so that the equation really becomes



and the danger of expelling free acid with the stream is minimized.

Opinion among fire-fighting engineers is somewhat divided regarding the extinguishing value of the soda-acid stream as compared with an equal quantity of water similarly applied, but the majority hold to the belief that the difference if any is slight. The value of soda-acid equipment lies in the fact that it may be brought into play instantly, that it is self-actuating and that the stream range is such that a fire may be fought from a distance of thirty to forty feet.

Soda-acid extinguishers generate a relatively large volume of CO_2 gas. For instance, the average $2\frac{1}{2}$ gallon size will produce $3\frac{1}{2}$ cubic feet of CO_2 or something more than ten times the volume of the liquid capacity. At first glance this quantity of fire smothering gas would appear to be a very substantial addition to the fire extinguishing properties of this type. As a matter of fact, however, the CO_2 generated by the soda-acid extinguisher is practically valueless for fire smothering purposes except back of a partition or in some similar, small, dead-air space where draughts and the heat of the fire will not dissipate the CO_2 . Therefore, the fire extinguishing effect is limited for all practical purposes to cooling.

Soda-acid machines are manufactured in a variety of sizes the most common of which are the $1\frac{1}{4}$ gallon, $2\frac{1}{2}$ gallon, 20 gallon and 40 gallon portable machines and the 40 gallon stationary engine for mounting on motor fire apparatus.

For Class A fires within the limits of available sizes soda-acid devices are recommended.

For Class B fires soda-acid extinguishers and engines are not recommended, because of the absence of smothering effect and because the force of the stream frequently causes spattering of the burning liquid fuel.

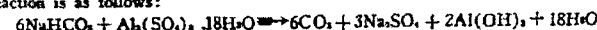
For Class C fires soda-acid streams are not recommended, except where the electric current is known to be turned off, because of the wetting effect and because they are conductors of electricity to some extent.

For Class D fires soda-acid machines are not recommended partly for the reasons given under Class B fires and also because of the bulk and weight of the available sizes and because the liquids are subject to freezing in cold weather.

Foam

In the discussion of soda-acid volume of CO_2 evolved was mentioned as being relatively large when compared with the volume of the solutions which produce it. In its free and unconfined state, however, the volume of CO_2 produced by these devices is practically valueless for fire smothering purposes. Many years ago it was recognized that if this valuable gas could somehow be trapped so that it could be applied locally and be held for a sufficiently long time in contact with a fire without being carried away by draughts it could be put to work as a fire smothering medium. It was known that the action of an acid upon a sodium bicarbonate solution is attended by numerous bubbles of CO_2 which produce a temporary froth, and it was recognized that if these bubbles could be made strong and tough enough the problem of entrapping the CO_2 would be solved.

The reaction between aluminum sulphate solution and a solution of sodium bicarbonate will produce a fairly durable bubble structure because the bubble film is reinforced with insoluble, colloidal aluminum hydrate. The equation expressing the reaction is as follows:



But the bubbles so formed, even though more rugged, migrate rapidly and the friction attending their passage through a short hose and nozzle quickly breaks down the bubble structure allowing the CO_2 to escape.

If to one or both of the two solutions a suitable protective colloid be added to keep the bubbles of CO_2 in a finely dispersed form the reaction will result in a stabilized foam that will withstand considerable abuse without breaking down. As a rule the colloidal stabilizer is added only to the bicarbonate solution.

A great many colloidal substances may be made to serve in the capacity of foam stabilizer but the practical application of most of them to fire fighting is limited. In order for the foam method to become commercially possible the stabilizer must be inexpensive and easily available in practically unlimited quantities. It must disperse in water with a minimum of sediment, be free from a tendency to decompose and be capable of producing maximum strength and durability of bubble wall. Egg albumin, glue and other substances of animal origin are capable of producing a very fine bubble structure, but besides being expensive they decompose readily and lose the characteristics which make them valuable as fire-foam producers. Foam stabilizers, therefore, are taken preferably from the vegetable kingdom. Among the most successful of these may be mentioned secondary extract of licorice root, saponin and soap bark.

The oldest form in which the foam method of fire fighting came into general use is the foam system for the protection of oil storage tanks. After this the portable extinguishers were developed together with a variety of automatically operated foam contrivances. Of comparatively recent origin are the dry powder foam devices. Each of these divisions of the foam method must be treated separately.

The Foam System.—Using 3 per cent foam stabilizer with 8 per cent sodium bicarbonate and 89 per cent water as one solution (called "B") and a 13 per cent solution of aluminum sulphate, $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$, as the other (called "A"), means are provided for the protection of oil tank farms and refineries. The two solutions are kept in separate tanks from which they may be pumped simultaneously, when needed, through twin lines of piping to appropriate mixing chambers installed on the oil storage tanks. Here they meet to form foam which issues from the mouth of the mixing chamber and flows over the surface of the burning oil. Hose stations are provided at suitable points along the course of the twin solution lines to make the system as flexible as possible and to provide protection for various hazards outside the oil tanks. All hose lines are also twin—a line for each solution—and the two solutions are siamesed together at a common nozzle, thus insuring, as in the

case of the mixing chamber, that the foam produced will be subjected to a minimum of loss by friction.

An average foam installation in the oil fields would be represented by 100,000 gallons of each solution stored in appropriate tanks and a twin duplex horizontal steam pump capable of delivering 500 gallons of each solution per minute to the mixing chambers and hose stations. There are smaller systems than this in use in the oil industry and there are also much larger ones. By opening the appropriate valves and starting the pump the foam producing solutions may be directed to any one of the oil tanks in the farm or to any hose station.

There are ten million gallons of these foam system solutions periodically examined by me and it is estimated that fully as many more are in use. In addition to these land systems there are a great many marine systems installed in steamships, such as the "Majestic" and "Leviathan", for protection against the oil hazard in their boiler rooms. These systems, of course, are much smaller than those used on land.

Portable Foam Devices.—Turning now to the portable foam extinguishers we find the "B" solution very similar in strength to that used in the foam system, viz., 8 per cent bicarbonate (or a little better) plus the stabilizer of course. The "A" solution in portables is somewhat more concentrated, usually running 50 per cent of the theoretical $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$ or close to four times the concentration found in system practice. Naturally, a correspondingly smaller quantity of this stronger "A" solution is required to preserve the theoretical balance of the "A" and "B" salts demanded by the chemical equation.

This is as it should be, for any saving in bulk and weight results in greater carrying ease. The decrease in water content also results in a stiffer quality of foam. This is highly desirable, because the idea of portability carries with it the idea of limited capacity, which means that the operator must use the foam at his disposal in an economical manner. The stiffer foam allows him to do this because it has a tendency to stay where it falls. Portability also implies the presence of a human hand to direct the stream to the spot where it will do the most good and to be less dependent upon the fluidity of the foam to spread itself over a burning surface as in the case of system practice.

Automatic Foam Machines.—Devices for automatic foam protection vary somewhat widely in type but all depend for their actuation upon some device which is influenced by heat, such as a fusible alloy which melts at a prescribed temperature or a bulb containing air which expands upon being heated and which in turn operates a series of levers or diaphragms to release the two solutions into a common chamber for the production of foam. In some cases pipe lines lead the foam to suitable nozzles situated near the surface of the hazard where the foam is ejected by virtue of its own expansive force. For smaller risks the automatic machines are hung directly over the hazards and the foam is allowed merely to drop by gravity on to the fire. Automatic protection finds its greatest usefulness in the protection of dip tanks for enamelling automobile parts, in oil quenching tanks, etc.

Dry Powder Foam Machines.—It will be noted that between the 40 gallon engine, which is the largest portable foam device, and the 100,000 gallon system there is a tremendous gap. Some apparatus was demanded to take care of the fire hazards which are beyond the capacity of the portable device but too small for the fixed system—something which might be used by fire fighters for stubborn fires which would not yield to water—something flexible, easily transported, not bulky.

This most recent development for the application of foam is the dry powder foam machine. Stripped of technicalities it may be described as a device for the continuous production and delivery of foam capable of extinguishing fires. The idea comprises flowing water from a source of supply toward a point of discharge, effecting a substantially continuous introduction of suitable foam producing ingredients in powder form into the water stream from an exterior supply. The proportions of the

foam producing chemicals introduced into the water are substantially constant with respect to each other and to the rate of water supply so that when the reagents are conducted together in the presence of a foam stabilizer they will react to produce a stable gas filled foam capable of floating on oil.

The essential features of the apparatus are shown in Figure 1. Water under pressure is supplied at the water inlet and is forced through a restriction or orifice at high velocity. As the water is expelled from the orifice as a solid jet it tends to create a vacuum. Powder poured into the hopper will be drawn into the water stream by the vacuum.

It is obvious that by the use of such a machine only 15 per cent of the total weight of foam-producing materials (the dry chemicals) need be transported to the scene of the fire and the other 85 per cent (the water) would be pumped to the machine from the nearest source. The dry chemicals are provided in powder form. The powder may be compounded of the correct proportions of aluminum sulphate, sodium bicarbonate and dry stabilizer as a single homogeneous mixture, in which case it is fed into the machine and the foam is produced in the discharge hose leading to the nozzle; or two separate powders may be used, one consisting of aluminum sulphate and the other of a mixture of sodium bicarbonate and dry stabilizer, each powder in this case being fed into a separate machine. In this latter type of dry powder

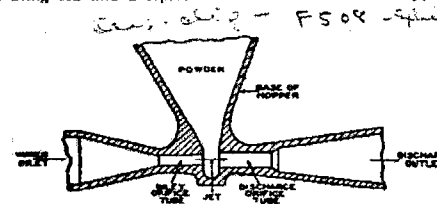


Figure 1

foam machine, the two streams are either brought together at once into a common hose line or two separate lines, one for each solution, are carried out to some place together at a remote common point to produce the foam.

In the single powder type (or in the two powder type in which the two streams are brought together immediately into a common line) the length of single discharge line can be longer than is practicable in the fixed solution system, without impairing the quality of the foam, because the foam is being made in transit, so to speak, solution and reaction occurring in the hose. Discharge lines of 100 to 150 feet lengths are permitted without a destructive friction action on the foam.

In the two powder type in which two separate discharge lines are used it is obvious that these lines may be extended a considerable distance because the foam is not produced until the solutions are brought together at the point where the foam is needed and consequently the foam is not broken down in transit. I prefer the single powder type with the single machine equipped with hose and nozzle for portable practice and the two powder type equipped with twin lines leading to a remote mixing point for fixed system practice.

For Class A fires foam is highly recommended, because it clings with great tenacity to both horizontal and vertical surfaces and besides its smothering action it has a decided cooling effect. In this connection it is interesting to note that although the foam is composed of 90 per cent CO_2 by volume it contains by weight more than 85

per cent water. Foam also contains aluminum hydrate which possesses the property of rendering cellulose somewhat fire resistive.² This fact is thought to contribute to the fire extinguishing value of foam on free burning fires by inhibiting the tendency of fire to reflash over surfaces on which the flame has once been extinguished.

For Class B fires foam is the best available. Heavier than air yet lighter than the lightest flammable liquid, foam stands preëminent. Its value is especially marked in oil fires of large dimensions.

For Class C fires foam is recommended with reservations. The reason for the reservations is that foam is a conductor of electricity, though a poor one, and if the voltage is high and the current cannot be turned off the equipment there may be danger to the operator. It also leaves a considerable deposit to be cleaned off electrical machinery after a fire. Frequently the Class C fire resolves itself into the question "When is an electrical fire not an electrical fire?" For example, the oil switch or oil-cooled transformer fire may very properly call for foam.

For Class D fires foam type extinguishers are not recommended, except where climatic conditions are such that the solutions will not be subject to freezing temperature or where they can be protected, and where the bulkiness of the foam devices is not objectionable, for example on oil tank trucks and motor buses. When used for motor vehicles specially constructed extinguishers are used to prevent the solutions slopping together due to the motion of the vehicle.

Carbon Dioxide

Carbon dioxide at ordinary temperature and pressure is a gas, one and one-half times as heavy as air. It is readily reduced to a liquid by applying suitable pressure if the temperature is below 88 degrees F., the critical temperature of CO₂. This property is made use of in placing the material on the market. It appears in heavy steel cylinders, the commonest size holding 50 pounds. The pressure within these containers is the vapor pressure of carbon dioxide and this varies with the temperature. At ordinary room temperature the pressure will be between 800 and 900 pounds per square inch. One pound of liquid CO₂ when converted to gas at room temperature and normal atmospheric pressure will occupy approximately 9 cubic feet. Thus a single cylinder with a capacity of 1.36 cubic feet containing 50 pounds of CO₂ is capable of producing 450 cubic feet of the gas when released into the atmosphere.

The knowledge that free carbon dioxide gas will extinguish fire is old and the art of using it for that purpose is also old. The only reason why the CO₂ method has but lately found a general and widespread use is that only during recent years has there been a real need for it.

In order to be used most effectively for fire-fighting CO₂ must of course be discharged rapidly and in adequate volume. The common commercial cylinder of liquefied CO₂ is not well adapted for rapid discharge because it is designed only for carbonating water and beverages, which calls for a very low rate of discharge. Any attempt to use such common type of cylinder for fire extinguishing is likely to be unsatisfactory for this reason and may result in the freezing of the liquid CO₂ before it escapes. Cylinders with larger outlets and used either inverted or provided with syphon tubes are therefore employed.

As in the case of foam there are two general classifications of CO₂ devices, the fixed system and the portable extinguishers. These are so different that they will be treated separately.

The Fixed CO₂ System.—The difficulty cited above has long since been solved by the use of ordinary puncture type valves, which permit sudden and rapid exit of the gas, and by providing outlet orifices sufficiently small in proportion to the diameter of the piping to minimize the drop in pressure between the cylinder and the nozzle.

²The Textile World, Oct. 29, 1921. Scientific American, February, 1921.

Preserving a proper ratio between nozzle orifice and pipe diameter will prevent or minimize expansion within the system and confine it to the outside of the nozzle so that freezing and snow-making occur only beyond the point of discharge. For discharges lasting for long periods the nozzle should be of such a shape that its coldness will not cause freezing of the liquid CO₂ or water therein and cause stoppage.

Where fire may be expected to occur in an enclosed space in which a fire extinguishing atmosphere of CO₂ may be established and maintained for a given period of time the enclosure may be provided with a suitable fixed system of CO₂ protection. It is merely necessary to dilute the air in the enclosed space with enough CO₂ so that the resulting atmosphere will not support combustion, and to maintain this condition until the fire is out. A very good example of such a risk is the enclosed electric generator. Figure 2 shows schematically the general arrangement of closed generator protection.

If fire should occur in the generator the rise in temperature would cause the thermostat to set off an initial discharge of one or more 50 pound CO₂ cylinders,

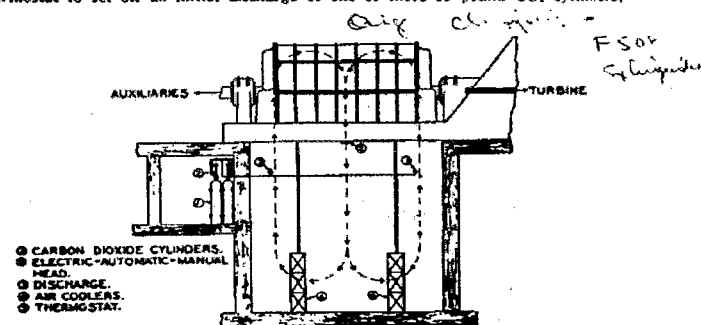


Figure 2

the number having been predetermined by a knowledge of the static air content. At the same time the generator would automatically be cut out and the armature would start to slow down; but from 1800 R.P.M., for instance, to complete rest takes about thirty minutes. During this time the initial discharge of gas would have to be augmented by the discharge of additional cylinders at intervals to maintain the concentration of CO₂ between proper limits. The number and timing of the additional cylinders, which would be set off by an electrically operated time delay unit, would be determined by the rate of leakage of gas from the generator housing.

In much the same way cargo spaces on shipboard may be flooded, as well as fur storage vaults and similar risks. It is necessary to know the cubic capacity of the space to be protected and the amount of leakage likely to occur. An atmosphere of 25 per cent carbon dioxide is taken as the basis for the design of space protection apparatus. This figure has been determined experimentally to be sufficient to extinguish fires in most common combustible materials. The time necessary for complete extinguishment depends entirely upon the character of the burning material. At one extreme we may have, for example, burning alcohol or gasoline, for which it is merely necessary to provide the extinguishing atmosphere momentarily. At the

other extreme we may have a bale of cotton the core of which is a smoldering mass, which would require many hours in a normal extinguishing atmosphere of CO₂ before extinguishment would be complete. In other words, smoldering fires in general are not easily extinguished by CO₂. However, it is hard to generalize on the subject of glowing carbon because in the case of the cotton fire, if the fibers, instead of being closely packed, were spread out so as to present a sufficient surface for heat radiation, the glowing spots would yield very easily to the treatment in a reasonably still atmosphere.

It is hardly necessary to add that space protection should be laid out and installed by competent engineers. Each installation presents its own problems and each should be separately engineered.

Portable CO₂ Extinguishers.—For fires in the open, portable CO₂ devices are available in various sizes from cylinders containing as little as 5 pounds up to 50 pounds. The smaller ones are designed to be lifted around by hand while the larger units are mounted on wheels.

It is obvious that although CO₂ gas is heavier than air it cannot be depended upon to fall through flame and heated vapors and strike at the seat of the fire. The natural tendency of the free gas is to expand under the influence of heat and to rise with the draught created by the fire. Hence in the design of portable CO₂ apparatus it is desirable to discharge the gas as much as possible in the form of a column with the least coning or divergence and at a proper velocity. Any pipe of proper dimension is suitable for this result. Added to this is the fact that freshly expanded CO₂ has a very low temperature (110 degrees below 0 degrees F.), but although this undoubtedly has some effect it is now believed to play only a minor part in the extinguishment of most fires.

Portable CO₂ equipment possesses certain advantages over all other types of portable fire apparatus. It is quick in action, especially good for certain hazards, it has no wetting effect, it is "non-freeze," a non-conductor of electricity, it is "three dimensional" in its action, requires little maintenance and the contents are good until used.

On the other hand, the range and duration of discharge are both short, the devices are heavy, the cylinders must be sent away for recharge and they are awkward to handle in narrow places. In addition, this type of extinguisher should be handled by an operator experienced in the use of the device and who understands the specific fire which confronts him. For a few seconds the operator, on account of the short range, must take a little more heat punishment than the unskilled fire fighter would stand up to. There are no half-way measures with CO₂. Either the operator "gets" his fire entirely or he fails completely. The CO₂ blanket is so rapidly dissipated that if a speck of flame remains the entire fire area may reflash and the work of extinguishment has to be done all over again.

For Class A fires portable CO₂ devices are not recommended, except for fires in burning insulation resulting from electrical fires in switch-boards and similar hazards. These fires are regularly extinguished by means of portable carbon dioxide extinguishers.

For Class B fires CO₂ is recommended where the conditions are favorable, viz., where the oil or gasoline fire is in an enclosed space which can confine the gas at the seat of the fire; or for fires in the open which are protected by adequate portable CO₂ extinguishers operated by experienced operators.

For Class C fires CO₂ is the best available where total flooding may be used, for example in the closed electric generator. Also for certain electrical hazards in the open where it is inadvisable to use carbon tetrachloride.

For Class D fires CO₂ is not ordinarily recommended because of the size and weight of the portable devices. Certain special cases such as oil tank trucks are

Fire Prevention *Biggins* Characteristics of Fire Extinguishers

TYPE	TETRACHLORIDE	SODA-ACID	FOAM	CARBON DIOXIDE
CHEMICALS EMPLOYED	Carbon Tetrachloride with a small amount of alcohol, or carbon tetrachloride alone.	Backsiphon of Soda Sulphuric Acid	Aluminum Sulphate with Mercuric Yarn	Commonly pure liquid carbon dioxide, or carbon dioxide with small amounts of alcohol, etc.
METHOD OF OPERATING	PUMP	INVERT	INVERT	OPEN VALVE
METHOD BY WHICH PRESSURE IS CREATED	PUMPING ACTION	CHEMICAL REACTION	CHEMICAL REACTION	PRESSURE STORED IN CYLINDER
EFFECTIVE RANGE OF ACTION	UP TO 40 FEET	UP TO 40 FEET	UP TO 40 FEET	UP TO 40 FEET
WATER LIQUID CAPACITY OF AGENT	4 GALLON	3 1/2 GALLONS	3 1/2 GALLONS	15 LBS
QUANTITY OF PRINCIPAL EXTINGUISHING AGENT	QUANTITY OF AGENT Varies with size of tank	3 1/2 GALLONS	3 1/2 GALLONS	15 LBS
NATURE OF PRINCIPAL EXTINGUISHING AGENT	FREE GAS	LIQUID	FOAM	FREE GAS
EXTINGUISHING EFFECT	BLANKETING	COOLING	BLANKETING	BLANKETING
IT IS RECOMMENDED AS ADAPTED FOR USE ON	Class B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, 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SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	Class B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, 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ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ

sometimes protected with portable CO₂ devices, but in these special risks the question of the weight and bulkiness of the apparatus is not a serious factor.

Special Types of Fires

Among the flammable liquids are several which require special mention. *Carbon disulphide* is a particularly flammable liquid and for this reason one would naturally suppose that foam would be the best available material for extinguishing fires in it. Foam is capable of doing the work fairly well, but because of the high specific gravity of carbon disulphide water may be used. The much lighter water will float

on the surface of the CS₂ and smother the fire. However, it is necessary to apply the water gently to prevent splashing.

Alcohol.—Fires in alcohol and acetone are not successfully fought with foam. Foam is miscible with alcohol and the latter breaks down the bubble structure of the foam to a very marked degree. Fire in these liquids may be extinguished by diluting with water to the point where they will not burn, if there is sufficient space in the storage tanks, or the fire may be extinguished with CO₂.

Pyroxylin Plastics.—Fires in pyroxylin plastics may be divided into two classes and treated separately.

1. Motion picture film, X-ray film, etc., in small quantities, such as one or two rolls of motion picture film, may be protected by foam, but it is to be remembered that no hand extinguisher can be considered as 100 per cent effective from the standpoint of extinguishing even small film fires. The real measure of relative value lies in subduing the flames and protecting adjacent material not on fire.

For film fires of large proportions water is the most efficient extinguishing agent. Since the Cleveland Clinic disaster of May, 1929, much study has been given to this subject. With the pyroxylin at a temperature above its decomposition point it breaks down, producing deadly gases which are often more far reaching in their effect than the fire itself. The necessity, therefore, is for an extinguishing agent which will cool the mass below the temperature at which it will decompose. Water in great abundance is therefore recommended.

2. Pyroxylin Lacquer.—Here the fire is less a pyroxylin risk than a solvent risk and water is valueless. Foam or CO₂ are recommended.

Tar, Pitch, etc.—Certain substances like tar, pitch, asphalt, paraffin wax are solid at ordinary temperatures but become liquid if heated and finally ignite if heated high enough. Obviously, to cool such a material below its ignition point is all that is necessary to extinguish such a fire. Water is not recommended for this purpose because the ignition points of most of these materials are above the boiling point of water which evolves steam in contact with the fuel and causes boiling over. If foam is used with care the surface of the burning material may be cooled and the fire extinguished. Foam in too great abundance, however, is liable to cause boil-over. CO₂ is valuable for these fires.

Metal Dust.—Finely divided metal like aluminum dust frequently ignites. Water and foam merely aggravate the fire, causing it to burn with greater violence. CO₂ is not effective. The most useful material for such a fire is dry sand or some other material which will absorb heat without adding moisture.

Calcium carbide in the presence of moisture liberates acetylene which is highly flammable. Obviously water as a fire extinguishing medium must be avoided and although foam has successfully extinguished so-called carbide fires it requires very skillful application. Either carbon tetrachloride or CO₂ is indicated for extinguishing carbide fires.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Industrial Health Section

Officers 1930-31

General Chairman—Dr. W. A. SAWYER, Medical Division, Eastman Kodak Co., Rochester, N. Y.

Vice-Chairman—Dr. W. A. COLCORD, Chief Surgeon, Carnegie Steel Co., Clairton Works, Clairton, Pa.

Secretary—C. O. SAPPINGTON, M. D., National Safety Council, Chicago, Ill.

Monday Afternoon Session

October 12, 1931

DR. C.-E. A. WINSLOW, Chairman

Vice-President for Health, National Safety Council; Professor of Public Health, Yale University, New Haven, Conn.

The first session of the Industrial Health Section convened with Dr. C.-E. A. Winslow presiding.

CHAIRMAN WINSLOW: I am so sorry it is not possible for Dr. Sawyer, general chairman, to be here. At the last moment he was detained, and as Dr. Colcord, the vice chairman, is also absent, I was asked, as Vice President for Health, to call the meeting to order and preside this afternoon.

It is a special pleasure and an interesting experience for me to introduce the first speaker. I think that Dr. Evans and I first became acquainted about twenty years ago when he was Health Commissioner of Chicago, and at that time I was tremendously impressed with his vigor and enthusiasm and efficiency. One particular address that he made out in the steel district on, "What is the Matter with Southside Chicago?" always lingered in my mind as one of the most effective public health talks I ever heard.

The Significance of Industrial Health

By Dr. W. A. EVANS

Health Editor, "The Chicago Daily Tribune," Chicago

The industrial health program—of all health programs—is one of the latest and, at the same time, one of the most promising. It is never possible to set a time at which any movement began and have complete agreement, because urges and trends are always "in the air" for some time before they begin. The yearning, or urge, or whatever one chooses to call it, breaks out in different places and in different

manifestations—each capable of sustaining a claim as being the beginning of the movement. In most courses, in time, there comes to be something of an acceptance of some of these manifestations as the beginning. With this understanding of the meaning of the word "beginning," we set somewhere around 1875 as the time of beginning of the modern public health movement, it being in that and nearby years that the several states were engaged in organizing health departments. It was just about fifty years later that industry began organizing their departments of preventive medicine.

One part of the significance of industrial health is because it is so evidently a stage in the development of preventive medicine. Just as it was sequent to community prevention by government action, it will in turn be followed by other types of health activities, and by other agencies. To this significance another, having the same philosophical basis, can be added.

Industrial health is the fourth step in the evolution of industrial medical service. Organization within the industry, to take care of a medical need, began with first aid to the injured. Probably, at first, this consisted of nothing more than having the address of a physician whose services could be secured quickly, after accidents. Later, some sort of a business understanding was arranged with the physician. A first aid office within the plant was a natural step in progress. In the course of time, there came damage suits, personal injury lawyers and doctors, legal doctrines so artificial that workmen's compensation legislation became necessary. Compensation and its forbears supplied enough evidence of the economic cost of accident to favorably incline industry to prevention.

It was in order to serve in this stage of the evolution that the National Safety Council was organized. I assume you would like to know how at least one man in public health work was impressed, and what was his reaction when he heard of the organization of the National Safety Council, and later learned something of their methods of organization. I am the man I refer to. I did my first turn in public health work in a yellow fever campaign in 1888; and I had some connection with Chicago's first tuberculosis hospital in 1898. I was active in the organization of the Chicago Tuberculosis Institute and the Infant Welfare Society. I was Health Commissioner of Chicago from 1907 to 1911. These facts indicate that my mind had been occupied with the problems of health for a good many years when the National Safety Council was organized. My reaction to it should be about that of all health men who endeavored to see the situation in all of its angles.

I am sure we were glad to see it organized. We hold the promotion of physical and mental well being as the domain of health work, and this came easily within those limits. We are very much guided by vital statistics. Such statistics showed that accidents were rapidly rising in the very period when deaths were falling. We give especial thought to the ten chief causes of death. As we saw the diseases against which we warred falling in this list of ten most important causes, and many of them disappearing therefrom, we saw accidents come into the group and gradually work its way to the top. We saw non-fatal accidents assume a dominating position among the non-fatal causes of disability. We saw that these causes were trending upward, and we could foresee some of the possibilities of harm in this mechanized age when the people are being increasingly exposed—outdoors and in—to heavy and powerful machinery, operated by unskilled as well as skilled. We saw other similarities. Certain types of accidents, peculiarly hazard the young and the old—both groups in which health departments had a special interest. Accidents are groupable into public and private—another point of similarity. We could foresee that accidents, like disease, would be preventable.

For all of these reasons, we saw where the National Safety Council would have work to do, and how that work would overlap with work of any health department administered by a man with the point of view of a statesman.

I am frank to say we were sorry to see the National Safety Council develop its task so apart from health departments. There was so much that you were to learn

by experience that we thought you could have learned more economically from our experience. We saw you begin your experimentation in the field of education, a field in which we had been experimenting a long time. We felt that the Council and the Health Department would have exchanged views and experiences with profit. Nevertheless, we were glad to have you enter the field for more reasons than one, and we admire you for the success you have made.

After this digression, I return to the steps which industry took in arriving at industrial health. After accident prevention, in the logical succession, came medical care in industry. In this, the industry was taking care of the medical end product, just as in surgical work it was taking care of the surgical end product. In course of time it is always discovered that limiting oneself to the care of end products is wasteful. Given brains in responsible positions, taking care of end products brings about prevention. Thus we see how industry has traveled step by step from emergency care of the wounded to the fourth member of the group—industrial health. This, I am sure, health men saw as inevitable when they learned of the formation of the National Safety Council.

One part of the significance we are discussing is the evidence it offers that, having started health work at its point of natural beginning, industry moves in logically and orderly fashion through the undertaking. There remains to do much more than has been done. Judging by the past, industry in the health field will not turn back but will move from job to job in an orderly and defensible program.

One significance of industrial health is the proof it offers that business concerns recognize the economics of disease. They believe in the economy of prevention. The value of a worker to his employer is only a small part of his total value. He is of greater value to himself, to his family and, on occasions, to the state. His obligations to industry once took the form of slavery and since that stage there has been a steady evolution, through serfdom and other stages, to the present relation in which industry has fewer rights with the employee than ever before in the history of society. In spite of that which is the plain trend, we find industry increasingly concerning itself in employee-welfare. Since relations between employer and employee are constantly becoming less personal, and more on a basis of economics and, simultaneously, interest of industry in the welfare of employees is constantly increasing, it is fair to infer that proper regard for economics, broadly speaking, is behind well thought out and long sustained welfare measures.

This is more true of health than of other features of these measures. Lowered capacity and disability due to illness are matters of great economic loss. While the individual and his family bear the larger part of the loss, as they represent the larger part of the man's value, the industry itself pays a part of the toll. Those of us who consider health in its economic and other aspects think the industry has no mean item in figuring costs. But we can understand why employers think our judgment not a well balanced one, in that in it health is magnified. It is significant that industry, as the result of reports by its own actuaries and based on its own experiences, regards illness—especially in its preventive phases—as of economic importance. It is significant because of its effectiveness.

Mark Twain is generally credited with saying, in substance, that everybody grouches about the weather but nobody does anything about it. At times health workers have the same pessimistic opinion about health, although we do not know how to say it in any dramatic or epigrammatic way. We preach, write, and fulminate with all the force and inventiveness we can, but most people remain indifferent until disaster is upon them. Prophets are without honor in their own country, or amongst their own neighbors, or on their own theme.

We are right now in the midst of the worst period of ineffectiveness in our history. In olden times we were subject to devastating epidemics of which people were very much afraid. These epidemics have been wiped out and through this, in part at least, health workers have lost the advantage that could be made of the great fear motive. As matters stand, health people have not one basis for an emotional

appeal of great power. Much reconstructing must come about before health conditions can be improved by the use of any of the great urges.

Health work in industry is largely centrally directed. Decisions as to health policies and programs are made by individuals in whom authority is concentrated. These decisions are made by judgment and forethought, and are based on experience and knowledge. Policies are carried out with definiteness. Accomplishments are weighed. In this era, when the support for health work cannot be based on emotions, and the public mind is not prepared to support it on the basis of judgment and what-is-the-best-in-the-long-run, the intervention of industry is of almost priceless value. They can adopt policies and carry them out and, in doing so, make demonstrations that eventually will be of great value in settling public opinion. Let us use this illustration. Small pox once was a constant and by no means trivial menace to certain large department stores. In order to protect themselves against this hazard they make successful vaccination a condition of employment. The fear motive for vaccination rarely operates now and in its absence this example motive is about the best urge we can make use of.

Another illustration is the sanitation and personal hygiene standards which certain food producers are compelled to enforce in order to protect themselves against the great hazard of food-caused disease. This position of industry has done more than health and food department compulsion to bring about high standards for product and production in the industry as a whole. The producer of foods for his own family use, or for the use of a small circle, has been compelled to meet these standards. It is possible for industry to require certain health practices of its employees and to secure their co-operation in effecting them to a degree that cannot be otherwise accomplished.

The industrial health movement is significant because the influence of what is done in the factory, store, or office is carried into the home. One of the most difficult questions to determine practically, and to work out in operation, is—Just how far shall relief extend? Shall the employee be given treatment for the relief of symptoms that are only in evidence while he is at work? Shall medical care be limited to emergency care? Shall the employee be also cared for when sick in his home? If medical service is given outside the home shall it be limited to the employee or, in other words, when it is a matter of curative care where is the line of demarcation to be drawn between the employee and his dependents? This line is not easily drawn. It is still more difficult to maintain it. It is not even remotely approximating possibility to maintain a line of demarcation between the man and his family when it comes to applying the principles of prevention. If a man has a set of health habits for the factory he will have them for his home. If he has them in the home they will influence the health habits of other members of the family. For instance, if he learns the principles of ventilation in his work place, he will apply what he learned at home, and in time his family will follow suit. If he bathes and changes clothes as he leaves his work it stands to reason that that fact will react on the bathing practices and standards of the family.

Industrial health is significant from the standpoint of future health improvement. The earlier tasks of health work are nearly consummated. The reference is to the control of communicable disease. Those of major epidemic importance are all, except influenza, practically eliminated; and those of secondary importance, such as typhoid, scarlet fever, diphtheria, small pox, measles, and even consumption are not worth the money and time expended on them. Shortly, health work will be concerned with cancer, the degenerative diseases of middle age and beyond, and mental and personality disorders. Cancer can be eliminated from this discussion since no one knows what is the way out. So far as we know, the way out for the degenerative diseases, and for mental and personality disorders, lies only through training. The persons subject to these disorders must change their habits. Groups must change their customs.

The diseases of this order are only, to a minor degree, the result of infections

In fact, to only a minor degree, are they the result of environment. They result from the acts and attitudes of the individual concerned. As it becomes necessary to abate the cause of anything, the difficulties increase progressively as we proceed from the periphery to the center. When the job of controlling a disease was a matter of fighting a microbe—an obvious enemy and one away off at the periphery—it was relatively easy to get the consent of the individual on defense. When the job was one of controlling a disease through control of some environmental influence, the job was not so easy. Comfort, or cost, or other factors might interpose to prevent action. When the effort to control involves asking a man to change his habits the difficulties increase. In reported surveys of the preventable diseases, their causes and cure, which have been made—such as one made on the employees of the New York City Health Department—it has been shown that hours of sleep, drinking habits, eating habits, exercise habits, and matters of that sort were of great importance. In the field of mental hygiene the considerations are quite as intimate, or even more so. The difficulties of health work where the matters are of such personal character are readily appreciated. They are increased by the fact that it is well people who will be called on to change their habits to prevent illness, as much as sick ones to cure themselves. Furthermore, what is done must be long continued; the diabetic must expect to keep up his regime for life, and the organic heart case can never expect to go back to a careless life.

The health forces will continue to need the example and help of industry. They have had it in such instances as entrance physical examinations, periodic physicals, fitting men to jobs, and others. They expect this cooperation to continue.

The proof that industrial health pays is regarded as non-conclusive by some employers. The new health work is so necessary for efficiency of labor—and not regulation of death rates nor even lessening of sickness rates being its major purpose—that it is bound to appeal to employer and employee; and certain to be a part of industrial health. Industrial health is significant because it is leading health work into this field.

CHAIRMAN WINSLOW: This paper is now before you for discussion. Dr. Hayhurst, don't you want to open this discussion? I know of no one better prepared to discuss the broad philosophy of this meeting.

DR. E. R. HAYHURST (Columbus, Ohio): I have listened with great interest to Dr. Evans' observation that preventive medicine is getting away from the major road signs which it has followed—the prevention of communicable diseases—because they are so rapidly coming to be controlled; and it is getting away from another great attractive guide, the infants' and early life death rate which has been largely controlled, and is becoming interested in a later phase in life, mid-life, where Dr. Dublin has pointed out that, on the average, eight years of life are lost when related to industry. That, I think, is a very significant thought. It is an economic proposition of great importance.

I have felt for years that we were not giving the attention to industrial health which it ought to get from sanitarians and from public health officers themselves. They have always been tied up with communicable disease and the high infant death rate, and this and that, and have considered industrial health more ungraspable than mental hygiene, for instance. However, data have been created by the Public Health Service and by various public agencies, even business agencies, to show that a great deal can be done in this—I would think we might say—the third great stage of advancement, the prolonging of life through care of the industrial masses.

I have felt for some years that it was always going to be settled within five years, but I begin to feel now that perhaps within the twentieth century health workers, preventive medicine, and so forth, will be stressing industrial health most and the health of the working masses, the health of the industrial center, the community in which they live; going into the housing question and all of those questions that are closely related to the pay envelope and to personal hygiene.

About 1919 an attempt was made in the American Public Health Association, at

the New Orleans meeting, to establish a section on personal hygiene. It was impossible to do so; there weren't enough members of the American Public Health Association interested to get such a section going.

Sanitarians, hygienists, the world over, are telling us today that our great flaw is in personal hygiene and that industrial health is but a grouping, a massing, of the personal hygiene of the employees.

CHAIRMAN WINSLOW: I wonder if Dr. Redden wouldn't say something about the points Dr. Evans made in regard to the methods of health instruction.

Dr. W. R. REMICK (New York City): I think we are all impressed with the fact that, in the case of accidents, they are dramatic because of law. The people who are paying the damages are willing to do anything to prevent accidents. Industrialists are not so convinced that sickness falls within the scope of their activities and it is harder to sell this matter of sickness prevention, medical service, nursing service, for the sick, because sickness is drab. To be sick is just to be out of the game. If a man has lost an eye, he has something to show, but this matter of sickness is drab.

The matter of personal hygiene, cleanliness, environmental hygiene, and sanitation, to my mind, does carry over into the home. That is one of the significant things about industrial health and hygiene. Now, you know the psychologists tell us that it is impossible to train the older person, the older man, that you can't change his habits. But, I can say this: that if you put a supervisor over a lavatory and make every person whose work is handling food wash his hands when he comes out, he is going to wash his hands. I have seen it work in the American Cigar Company in the last few years.

If it pays to put out clean products and train men to be hygienic and clean, if they are spending eight hours a day in an industry, that type of thing is going to carry over into the home, and looking at it from the reverse point of view which Dr. Evans presented, that carry-over into the home is going to help the health officer in his whole problem of building up health.

Now, sickness costs about \$15,000,000,000 a year, in all its ramifications. The figures I give you come from the Russell Sage Foundation which knows something about that phase of figures. Sickness is the cause of poverty. Now, even as drab as sickness in industry happens to be today, an industry will pay for proper preventive measures if they are profitable. And if you lose 260,000,000 days a year because of sickness, as Dr. Lanza formerly of the Metropolitan has quoted a number of times, if you can show the industrialist that industrial health work decreases labor turnover, that it increases production, that it decreases absenteeism because of sickness, he will pay for this matter of medical and nursing service and education, because he has the money to do it. If you go out to the general public and say, do all these things, they will do about as they please. I believe those of us who are interested in industrial hygiene can convince the industrialist that a good health service and proper education in the ordinary factors of health and hygiene will pay.

Dr. O. E. STEWART (Crystal City, Mo.): I am interested in this phase of industrial health, but I do think this: that before any real constructive measures can be accomplished along that line, the medical officer in charge should be given some authority. During the Spanish-American War, I believe we had about 60,000 soldiers at Chattanooga, with about 20,000 cases of typhoid fever, with a medical department without any authority. I believe our record in the late war was quite an improvement, due to the fact that the medical officer was given some authority to do something.

If I have a criticism to make, it is to say that one of the factors that is interfering with the development of this program is that the medical officer in industry today hasn't any authority. He can make recommendations, but the actual carrying out of his policies is up to the industry itself, and until that situation is changed, I feel confident that you are going to have difficulty in producing the results that you would like to see in industry.

CHAIRMAN WINSLOW: I should have announced at the beginning of the meeting the appointment of a Nominating Committee to nominate at the end of this session

officers for the coming year. I will ask Dr. V. S. Cheney, Dr. W. R. Redden, and Dr. Rudolph Engel if they will be good enough to serve.

The next speaker I haven't known personally as long as I have known Dr. Evans, but we have all known his organization. I think I am right in saying that the International Harvester Company and the U. S. Steel Company were the two pioneers in recognizing the responsibility of the employer toward the employee, by the creation of compensation schemes before any legal compensation schemes were thought of in the United States, and it is a pleasure to have a paper by the very able representative of the former company, Dr. J. A. Britton.

Health Services in Industry: Equipment, Personnel and Cost

By JAMES A. BRITTON, M. D.

Medical Director, International Harvester Company, Chicago

Any consideration of health service for industrial employees should include a review of the development and growth of that work in the past, the accepted standards of such service at the present time, and the probable future developments.

The real beginning of this work dates back to the middle of the nineteenth century. This first effort took the form of a hospital built to serve the employees of certain textile mills. Coincident with the development of the railroads, special industrial health services saw their real beginning. Strange as it may seem, other industries did not follow the lead of the railroads until much later.

In about 1912 the general consideration of the importance of health as related to efficiency of employees in industrial establishments began to be more or less commonly discussed. This was about the same time that the anti-tuberculosis organizations began their intensive drives for the purpose of securing proper care for those who had tuberculosis and for preventing the spread of this disease. It was also about this time that the community's attention was focused on the lack of any systematic provision for the care of those who had been injured while engaged in factory work. The question of responsibility for disease and injury in industrial establishments was aggressively and persistently argued.

Out of all of this discussion came the desire, on the part of those in the management of industry who were sincerely interested in trying to meet their own problems, to know the degree of responsibility which industry had for those safety and health conditions which were known to be unsatisfactory. It became evident that, in order to determine with any degree of accuracy the cause of disabilities which developed among industrial employees, it was first necessary to know the condition of health and the physical defects of those who went into industry. Thus began physical examination as a part of the regular routine of employment.

It was only a short time before it became the policy of most industrial establishments to make adequate provision for surgical service for those who were injured while working. The problem of disability because of illness, however, has never been as simple as that of industrial injury and there was a wide difference of opinion as to what should be and what could be done.

During the past twenty years the managements of various industrial establishments of this country have tried out and are still carrying on many different types of health service. These types vary all the way from the simplest and most superficial, and hence the least expensive, to the most elaborate and complete service that can be devised. In a great many of the smaller industrial units and practically all of the larger industrial units provision is made for a more or less complete physical examination of all prospective employees. Some of the larger establishments offer or require a subsequent complete physical checkup once a year. The great majority of industrial or-

ganizations do not attempt to treat the sick employee where it is evident that he has a condition which prevents him from working. Most industries provide a first-aid station where minor ailments, such as headaches, slight colds, etc., can be treated. In quite a large number of places the medical staff is sufficient to be used as advisors and consultants as to the kind of medical service needed and how to obtain such service in the community. In the industrial organization whose activity necessitates maintaining workmen and their families in an isolated community, such as at a saw mill or coal mine, it has been the practice for some time to furnish complete medical service for the whole community. In some such places the medical service is very elaborate and very well carried out; in others it is not so elaborate and consists of only those things which are fundamentally essential. In a few places in this country the managements of large industrial establishments have seen fit to provide complete medical and surgical service for employees and their families, irrespective of the possibilities of the community for such service.

At the present time, then, medical service in industry varies all the way from the simplest rudiments to the most elaborate. The personnel of such service varies all the way from a first-aid boy or a practical nurse to complete community service requiring physicians and surgeons, doctors trained in the various specialties, nurses, dietitians, technicians and hospitals completely equipped, even to the ambulance. The cost of such service varies from a few cents to twenty-eight or thirty dollars per employee per year.

Accidental injury is one of the recognized hazards of industry and is accepted as an item in the cost of production. Sickness, however, is not usually a hazard of industry. For this reason, general or unlimited medical service cannot be considered a legitimate item in the cost of production. A direct relation between sickness disability and occupation is the exception and not the rule. The loss on account of sickness disability, however, is a burden both on the employee and on the industry in which he is employed.

While there have been and are at the present time the two extremes in industrial medical service—the most meager and the most elaborate—it is believed that the generally accepted policy for the future will be a plan of cooperation by the individual, the industry and the community. While a company should not be asked to assume and should not accept the responsibility of furnishing free medical service to employees, or even undertake supervision of the care and treatment of sick employees, the importance of sickness disability as an economic problem for both the employee and the employer has convinced the thoughtful business manager that it is of mutual advantage to establish certain provisions which ordinarily can be expected to reduce the frequency and average length of disability and the economic loss due to sickness.

Of course it is understood that any disability which is primarily due to occupation is as much the responsibility of the industry as an industrial accident, but there are very few occupations which need to have a definite deleterious effect on the employee. With few exceptions, health hazards in industry can be removed. The industrial medical department of the future will not have assumed its full job until every condition in industry which is known to have a deleterious effect on health is under control or removed. This applies to general sanitation, ventilation, temperature, lighting, building and maintaining of adequate sanitary toilets, wash rooms, lockers, shower baths and elimination of harmful dust and fumes. Modern development in painting means a constant alertness on the part of the medical personnel to protect employees against the injurious effects of pigment dusts and solvents. The use of a new metal brings with it new problems, such as, for example, chromium plating. The ever increasing use of gasoline and oil engines makes it necessary to protect employees against carbon monoxide and other fumes. And so the list continues. The big job, the unescapable responsibility, lies in constant, aggressive effort to understand and control not only the hazards that are old and well known but the new ones which are constantly developing.

The next most important service of the medical department in industry is its personal relation to the employees. Unless the relation is right, unless there is a sympathetic understanding, a mutual desire for helpfulness in the solution of the various health problems, the medical department may fail in this very important function.

Applicants are examined for employment, not merely for the purpose of determining who shall be excluded for employment but to make sure that their physical ability is equal to the requirements of the job for which they are being hired. Statistics have shown that there are very few individuals who are physically perfect; in fact, most individuals have one or more relatively important physical defects. If these conditions are known and properly evaluated, fewer mistakes are made in placement in industry.

The man who has a major handicap, but who is well placed in industry, pays many times in the effort of placing him. He knows he has been well placed. He knows that it is difficult for him to get a job. He sticks to his job, he is a good workman, and he is a loyal employee. Don't just pass him up. Try to think of a place for him when you meet such a man, because it may make all the difference in the world to him and he may return many times the value of the time you have spent on him.

Likewise, the periodic physical examination is not intended to find out how many men should be dropped from employment, but to discover those things which lead to serious disability and to help the individual plan to prevent or cure these conditions. It happens not infrequently that a man who has worked steadily on some particular job for a number of years develops some organic disease of heart or kidney or some other organ which may mean the loss of his job, total disability and death unless something is done early in the development of the disease to retard or prevent its progress. The old human machine wears out after a while. In most individuals some organ wears out faster than the others, and the human machine, just as the inanimate machine, needs adjustments from time to time if we wish to keep the whole machine working.

The next important function of the medical service in industry is its relation to the community. I do not think it needs any argument to convince the average thinking man that it is a mistake for any industry or branch of industry to assume the normal medical functions of the community. A company hospital can never be as generally satisfactory to the average employee as a well-run community hospital. The company doctor cannot assume the functions of the ordinary community health department. He can, however, cooperate with the community health department with great benefit to both the community health department and the industry. The fact remains that industry cannot be separated from the community in which it exists. Cooperation between industry and the community is the logical relation. While this applies to all of the different contacts between industry and the community, it is especially true of the relation to the control of health problems and general health service.

There are no set rules or plans for medical service which apply to industrial groups of various sizes and variously situated. Generally speaking, the equipment of an industrial medical department must be compatible with the dignity of the service and the importance of privacy in the relation between the doctor and the individual employee. Medical service in industry had best not be undertaken unless it is good medical service—good in the sense that it must be modern and thorough. The industrial physician must be even more careful in guarding against mistakes than the average practitioner. He must use the ordinary equipment accepted as necessary in making diagnoses—where x-ray is indicated he must use x-ray; where blood examinations are indicated these must be made.

It is just too bad to have an employee go to a company physician for advice or direction, and then to have an inexcusable mistake made in the estimation of the case because the ordinary procedures were not followed in making the diagnosis. It might easily happen that this particular contact is the only important one that this individual

has had with the management of the company. He judges his company by the service he gets from this contact. If a mistake is made it is unforgivable.

The whole idea of an effective health service in industry is closely tied up with that of the community. Hence, it is particularly desirable that the staff of the medical department in an industrial establishment maintain its contacts with the community hospitals, the community health department, the community medical associations and other community health activities. In order to do this it seems very desirable that the doctors who are doing this work in industry should devote part of their time to their regular work in the community. In other words, the industrial physician should be employed on a part-time basis, maintaining his relation to the industry and also to the community.

The ideal medical service in industry, then, will assume those functions which definitely belong to industry and will actively cooperate with the community on general health problems.

The organization of the medical staff and the program of its work should include:

1. Examination of all new employees.
2. Periodic re-examination of all employees.
3. Regular inspection of all working conditions—ventilation, lighting, temperature variation, general sanitary conditions and cleanliness—and special supervision of all known conditions where there is a health hazard.
4. Consultation and advice for any employee on personal health problems.
5. Active cooperation in community health activities.

The cost of a well organized, competent medical department which can regularly and satisfactorily carry on all these functions will not be an impossible burden on industry. If industry does less it is not carrying its full share.

CHAIRMAN WINSLOW: The broad social importance of this problem has been very forcibly impressed on me lately in connection with the work on the Committee on the Cost of Medical Care. As you may know, that is a national committee of fifty physicians and laymen who have engaged in a five-year study of the economics of medicine. These studies have revealed astonishing lacks in our community machinery, and have revealed the fact that from a quarter, under the most favorable conditions, to 50 per cent, under the least favorable conditions of those needing medical care, receive no medical attention whatever; that those who do receive medical attention receive it often in an incoordinated and unsatisfactory way; that there are enormous wastes; that, for example, of the something like two billion and a half dollars spent for the care of sickness, between one-quarter and one-third is spent for drugs and medicines, nearly all of which are useless, and many of which are harmful, as contrasted with that in a well organized health service, where the cost of drugs and medicines falls to one per cent. Of course, that is an abnormal wage group, but there is considerable gap between one per cent and 25 and 50 per cent.

In one county in Indiana, the largest single item in the whole bill was 31 per cent for drugs and medicines, services of physicians coming next with 29 per cent.

Now, in studying the efforts that are being made to solve this problem, to provide adequate medical care for groups of people, we find two groups, the industrial groups and the university groups, standing out as the only groups in the community receiving really adequate medical care. Dr. Britton spoke of a few industries. We have found there are over 400 industries that are providing more or less complete medical care for employees and members of their families, and I think in the conclusions of the committee that the recommendation we shall make will be largely influenced and in part built on these remarkable developments of industrial medicine.

I want to ask Dr. Leake if he wants to open the discussion on this paper. The U. S. Public Health Service in the past years has made some of the contributions, not only to the technique of industrial hygiene, but also along the line of giving us information as to standard practices and procedures. After that, I hope very much that some one or more of the nurses who are here will say something about this from the standpoint of industrial nursing.

DR. J. P. LEAKE (Washington, D. C.): I have nothing but admiration for Dr. Britton's presentation. I am sure we all feel, from the way he talked and his modesty in speaking of the authority that he does have, that that authority is well imposed.

The matter, of course, of just how the care of the industrial community, as far as its health is concerned, should be managed is a thing on which my ideas, at least, are not at all crystallized. I have seen that in certain instances the practice, spoken of by Dr. Britton, of having part-time medical service has seemed to be an advantage. We all know other places where it is out of the question to use it with the same efficiency.

If I may be pardoned for digressing, I should like to speak for a moment on the subject that was touched on by Dr. Evans and Dr. Hayhurst—the matter of extending, as we all believe it should be extended to other than communicable diseases, our program for hygiene and health conservation. I just wish to sound one little word of warning, that we tread, if we can, on as certain ground as possible. We have felt, even in regard to infectious diseases, that many things are advocated which perhaps after ten years we may not be so sure of; and in these other fields, too, we may be asking our communities, our industries, and our individuals to do things, arrange for doing things, which perhaps after further light we may not be so sure of. I think we don't want to sell the public any patent medicines.

CHAIRMAN WINSLOW: I am glad Dr. Leake brought out that point. The Visiting Nurses' Association in New Haven last year undertook to make a little study of the things they were teaching in the field of personal hygiene, so they divided themselves up into groups and came to our library and worked very hard on it, one group on diet, another on fresh air, and so on. After about a month, one of them came to me and said, "You know, we are very much puzzled about this. We can trace out the same statements copied from one book to another, but we can't find any of the scientific evidence on which these things are based." And it took them about a month to find us out.

The fact is, Galen, in his six known natural laws, laid down the essentials of personal hygiene as well as we can name them today: food, fresh air, exercise and rest, sleeping and waking, repletion and evacuation, and the passions and phases of the mind. You can't improve on that list today as the basis of personal hygiene. Since Galen's time we have learned a lot about diet, but we don't know very much more about the other five than Galen did, and it does behoove us to be pretty careful. We can make guesses, but most of them are pretty empirical.

CAPTAIN G. R. G. FISHER (Illinois Manufacturers Association): Before Dr. Britton spoke, I was going to raise a question following Dr. Evans' paper, in regard to the small plants where the outstanding hazards are growingly in evidence. While big industry is able to do this and that and compel that this and that be done, what about the small industry where the employee is suffering ineffectually from some of these new things? Dr. Britton mentioned monoxide and chromium, and I want to mention cadmium. One of the great medical authorities has spoken of it as a sly poison. It is not what it is doing on the outside; it is what it is doing on the inside.

Usually these plants are run by a man or an organization that hasn't got the means of putting in the proper ventilation and the air ducts and the supplying other things to protect the men, and all the time these poor fellows are suffering from the results of working with these poisons. The compensation companies have been dropping a great many of the plants where these things are going on and nothing is being done to prevent them. For instance, in one concern not long ago, several girls had to be carried home. In going through the plant to make an investigation, they didn't find a man or woman who looked healthy. Every one was pale and showed evidence of the damning processes that are being carried out without anything to help them.

Now, that is a great problem and while big industry takes the lead because it has the right and power and wealth, what about the little plant where the poor laborer

or workman is suffering these things which ultimately are going to mean a breaking of health?

CHAIRMAN WINSLOW: That same problem exists with regard to industrial safety. We have to remember that the results along that line have been confined almost wholly to the large industries.

DR. W. H. PARKER (Richmond, Va.): I want to subscribe to what Dr. Britton has said, but the thought that has disturbed me for a long time is how far the industrial physician shall go. The American Tobacco Company in Richmond, a city of 200,000 population, has 4,000 employees or about two per cent of the total population of the city. If we give them full and complete medical service, including attention at home, are we overstepping our bounds? I am a general practitioner myself, receiving only part of my income from the company, and it is a very disturbing thought to me sometimes to know how far I am treading on the rights of the general practitioner in my city.

Take, for instance, the one item of the introduction of the use of toxin-antitoxin. In my city there were about 5,000 treatments last year. That means about 3,000 visits to the doctor or \$30,000 taken out of the pocket of the general practitioner. In my work, I have estimated that about 30 per cent of the work I am doing is the work of the general practitioner, and that thought is very disconcerting to me.

I would like very much to have that discussed today. I hope I am not striking a discordant note, but I would like to have Dr. Britton discuss it.

DR. R. P. KNAPP (South Manchester, Conn.): I am, in general, in accord with everything Dr. Britton advocates, but I would like to ask him, or anyone who has the answer, how far it is possible in an industry with a thousand employees or more to do a complete periodic physical examination on all the employees? We have been interested in periodic physical examinations for the past half dozen years, and I would like to find out how many have actually accomplished that in industry.

Personally, I find it impossible in an industry of 3,000 employees, even with a staff of two other doctors, to get over much more than the executives and foremen annually, giving each an hour for an actual physical examination and another hour for laboratory work.

I would also like to ask how far he believes it is physically possible—although I do approve of his idea—for a physician to be engaged part time in industry and part time in the community; that is, if he thinks the man would find time to do that?

CHAIRMAN WINSLOW: Those are very vital questions.

DR. W. R. REDDEN (New York City): I have come to the point where I look at my Medical Association card once in awhile and wonder if I belong to the Union. When I hear a medical man say that because he is doing group medical service in an industry he is taking the bread and butter out of the mouths of the general practitioners, or any other men in his community, I object to it.

The man who is practicing medicine, whether he is doing it with groups or in a community, has a certain amount of time, he has a certain amount of energy, and he can't take the living away from anybody. If he does a good day's work for his industry, he is doing the work of one man, with whatever assistance he has, and it doesn't make any difference whether he is paid by the company or paid by the individual in the community. I hope we as medical men will begin to get away from that idea, that a man is capable, because he is engaged in the practice of medicine in a big industry, of taking the living out of the hands and mouths of two or three general practitioners in the community less capable than he.

I am rather interested in the work of the telephone company in employing part-time men. You men know better than I do, perhaps, that the telephone company goes on the principle that a man who does his work out in the community is a better man for them to have. Pierson, of the Bell of Pennsylvania, who directs their medical department, is a professor. They consider that by getting part-time men of that type, who are maintaining their prominence in the community, they are getting a better

type of man in general than if they simply went out and got the ordinary practitioner to do that particular work. They have only two full-time men. One is Dr. Watson, whom you all know, and the other is Dr. Bristol who has just recently come with the company.

What I am driving at is this: whether or not an industry is to have a full-time medical group, to my mind, depends on the type of industry. It is perfectly obvious that if you have, say, 170,000 women working as telephone operators and at other work, and they are with the company a couple of years, which is usually what occurs, and there is no special hazard except falling on the level, the problem is a little different from that which you find in a foundry or some other industry or industrial occupation in which there is a definite hazard, where perhaps emergency treatment, immediate hospital service, may be required in order to save a life.

I think that in our work in this Section, we should consider first the type of hazard, the type of industry, which we are discussing, rather than simply take the whole field and say on the basis of whether you employ a hundred people or over, you should have a full-time medical service, because it is obviously an error in judgment to consider it that way.

CHAIRMAN WINSLOW: If Dr. Redden isn't careful, some day he may find he isn't getting his little card any more, but I do agree with his point of view.

DR. J. P. LEAKE (Washington, D. C.): I would like to suggest, as an answer to Dr. Knapp's question, that there is no such thing as a complete physical examination.

CHAIRMAN WINSLOW: We talk very casually about everybody having a physical examination every year. If everybody in the United States had that, every physician in the United States would have to do three a day, which would end the depression in the medical profession very nicely.

DR. R. P. KNAPP (South Manchester, Conn.): Is it actually true that the average industry that employs a thousand or over does offer an adequate medical service to examine its employees? Is that a matter of record? I thought I understood Dr. Britton to say something of the sort.

CHAIRMAN WINSLOW: He can explain what he means by adequate.

Part-time or full-time? How far shall the plant physician go in competing with the private practitioner? These ought to be fruitful subjects for discussion.

Occasionally there are signs of involution. It is interesting to note in the public health field that some cities, notably Detroit, have turned the diphtheria immunizations back to the general practitioners, have given up the clinics and are securing immunizations by physicians in their offices, the Health Department paying for the service. Of course, it is more expensive than for them to do it themselves, but they justify it on the grounds that they are educating people to go to the physician for other purposes.

DR. KNAPP: I would like to ask also if it is true that the larger the community, the less necessity there is for the industry to offer health service as well as accident service? In the smaller community, it is sometimes necessary to offer that service.

CHAIRMAN WINSLOW: Are there any further comments or questions? If not, Dr. Britton, will you close?

DR. J. A. BRITTON: To really discuss these questions properly requires a great deal of time. I think one of the most important points was the small plant service. When we consider the relative importance to the community, we find that the so-called large industries employ about 10 per cent of the workers in the country, and 90 per cent of the industrial employees in the country are employed in small plants of 200 or 300 or less.

Recently, one of the welfare organizations in the city sent a representative to me to ask what they could do to help solve the general problem of health in the community, particularly in the industrial community. I suggested that they get out literature which could be distributed to small plants, telling them just what the possibilities were. I shouldn't be surprised if there are lots of men who are running

little establishments of 100 employees or so, who haven't had time or occasion in their lives to think of health problems in relation to their employees. These men still have the old idea that health is an individual's own problem, that it has nothing to do with his job.

I think, to go a little farther, that one of the important things for this Section of the National Safety Council to give consideration to is extending health service in industry in such a way that it can be used by the little fellows. If it is going to involve 90 per cent of those employed, it ought to be worth while.

I have seen some doctors that hardly do anything, but on the other hand, I am amazed at how much certain other doctors can accomplish. I find time to do some private work. I find time to teach at the university, and yet I have a big bunch of men working for me, and they do bring me a lot of problems, but we get along somehow. I don't know whether we do a very good job or not.

I didn't mean to indicate that the full-time doctor was robbing somebody in the community of his just rewards. What I meant was that the part-time doctor in industry, on the average, will do a better job if he will retain his responsibilities to the community through private patients and through the community organizations, the hospitals and various other welfare agencies. I think the doctor who narrows himself down to only the work that he sees inside an industrial establishment is robbing himself of his natural development and he is robbing himself of possibilities of service to the community.

What was the other question?

Dr. KNAPP: I asked about what proportion of the plants could cover all of their employees in a complete periodic physical examination once a year.

Dr. BRITTON: Under ordinary conditions—I am not speaking about the present—we have about 30,000 employees in Chicago and in 1929 we examined about 20,000. Now, this is the way we figure: if a man comes in for employment during the current year, he has already been examined, so we let him go over to the next year. That leaves about 60 per cent of the average employees to be examined in one year.

Dr. KNAPP: How many physicians do the work and how long does the examination take, how complete is it?

Dr. BRITTON: Well now, someone remarked that an examination is never complete. I think this: if a group of people came to you as a private physician for a physical examination and you insisted on every one having a complete gastrointestinal x-ray, whether he had any symptoms of trouble there or not, and a few other frills we have developed in medical work, you would be wasting a lot of time. You have got to figure out in each case what you think is the particular need. One man requires an hour and a half; the next man you are through with in fifteen minutes. I can't give any definite time—Humans aren't built that way.

CHAIRMAN WISLAW: The third and last paper on the program has been prepared by Dr. James H. Greene, of the Studebaker Corporation. Dr. Greene is unable to be here but his paper is here and will be presented by his colleague, Dr. J. W. Hilbert.

The Importance of the Association of Industrial Relations and Health Work

By DR. JAMES H. GREENE

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As in any new field of thought, nomenclature in the field of human relations is not settled. In the personal opinion of the speaker, the proper relations between management and men in an industry is a result, not a condition, of the proper adjustment of many factors, some physical and some psychic. Hence, the term "personnel

or industrial relations" should be an inclusive one and include all of the activities which influence these factors.

To be more specific, I am inclined to quarrel with the topic which has been assigned to me on the ground that health work, properly speaking, is a part of the field and not merely "associated with" industrial relations. My own experience and personal observation lead me to the conclusion that, in companies where the best relationships exist between management and men, all of the departments which deal with activities of this nature are combined under one responsible head. I cannot see the logic of a medical, health or employment department and a so-called industrial relations department each working independently, even under the most cooperative conditions. I do not wish to be misunderstood as advocating in any way the surrender of any of the prerogatives or initiative of any of these important units. In our own organization, all of these various units are gathered together in one division which we call the Co-Operative Department.

Upon further consideration, I am not sure that I have strayed too far from the topic assigned me. I believe that fundamentally the association of industrial relations and health work is one of organization. In smaller plants it may be necessary to assign the administration of all of this work to some operating executive. In larger organizations it should be headed up by one individual who is given considerable responsibility by the management.

Now as to the pros and cons of such an organization plan, it may be argued that a well trained medical man cannot or will not work under a layman. This, of course, depends on the personal influence of the personnel manager or director of industrial relations. Just as the vice president in charge of manufacturing does not presume to meddle in the research activities of his engineering department, so will the manager of industrial relations leave to the medical director the details of his own technical field.

The topic of this paper properly presupposes that the success of any company necessitates the proper correlation and synchronization of all of the human relations activities and makes every member of the several departments involved familiar with the work of every other department and a booster of all of the activities which go to further the morale of the organization. It seems to me that the surest way of insuring such a condition is to organize in such a way that this spirit of cooperation naturally follows.

I do not intend to devote this entire paper to the matter of proper organization, but I cannot leave this part of it without adding one more point, namely, that such organization, as I have indicated, avoids passing the buck. I know of one company where there was an employees' mutual benefit association which employed a physician. At the same time the operating division of this company employed a surgeon to handle compensable cases. A reorganization of this company revealed the fact that there was constant warfare on the part of the mutual benefit doctor who was telling sick employees that their cases were compensable and referring them over to his colleague. The reorganization referred to placed all of the personnel activities of the company under one responsible head and did away with one doctor.

Program

Now as to the importance and scope of a health program. Under an organization plan, such as I have indicated, it seems to me that little need be said about the importance of the right sort of health service. I am informed that the National Metal Trades Association gathered data among its membership which shows conclusively that a health service has reduced absenteeism 50 6/10 per cent, accident frequency 43 6/10 per cent, the cost of compensation 28 7/10 per cent, and that the general death rate has fallen from 7 5/10 per thousand to 5 per thousand, thus adding five to seven years to the life of a wage earner and providing greater economic security. It seems

to me that little could be added to this impressive array of figures which could more concretely point out results to be obtained from systematic, scientific and tactful direction of the life habits of workers along proper health lines.

In discussing the scope of a health program, I consider that there are two types of situations. One, a small industrial community where the industry has practically made the community and fortunately or unfortunately must accept a great deal of responsibility for its proper maintenance and development. It may be necessary to make a health program for the entire community. This, on the face of it, while it may obtain gratifying results, has some bad features. In spite of all that has been written about the high cost of medical service and the well known fact that as yet we are only muddling through in some of our endeavors to safeguard the health of that vast army of workers who are neither indigent nor affluent, I am quite convinced that we are not ready to socialize medical service universally. During the economic period through which we have just passed, we have had to resort to many forms of paternalism. I am not at all sure many of the things, which we have done in the stress of an emergency, will not have far-reaching, ill effects. I believe that it is entirely possible to pauperize workers by free medical service. I believe that the management of many companies have been carried away by the gratifying results of a health program, which they administered and paid for, only to wake up to the realization that they had stifled the intelligence and initiative of their workers.

In larger communities, where the industry is only one of a number and the goodwill of trades-people and professional men is essential for success, companies have not been tempted to go to such extremes. What I have said with regard to a small industrial community should not be misinterpreted as an indictment of health work which goes beyond the treatment of compensable cases. Nor does it imply criticism of health programs which might be justified as to their scope on grounds of expediency. It is my personal opinion, however, that in the larger communities much can be done through the cooperative effort of the public health authorities and medical men in private practice.

In the case of our own company, we have been fairly successful in cleaning up hernia cases, which are not compensable, by loaning money for hospital bills and surgeons' fees. The sole purpose in thus differentiating between the small and large community problems is that I believe there is grave danger in assuming too much responsibility for a health program.

Now as to the individual items, which should go to make up a reasonable and rational health program in the plant, the first in importance, as well as logical order, is the one of physical examination. It should not require any lengthy argument to convince personnel workers of all types that this is the corner-stone, not alone of a sound health program, but of a general personnel program as well. Quite naturally, the most important phase of this topic is that of physical examination at the time of employment. During the past year, many companies, for good and sufficient social reasons, have employed workers on the basis of individual needs of the workers rather than their adaptability to specific jobs. Many social and economic adjustments must necessarily follow such a procedure. Even though workers with physical impairments have been employed, the record of physical examination is of great importance as it shows clearly where those individual problems of adjustment exist. Wherever possible, initial physical examinations should be followed by others periodically in order to preserve, with as much accuracy as is possible, a current picture of the health of each worker. The personnel of health departments may not be adequate to take care of such a situation. In our own case, we have had to be content with repeating examinations whenever a worker came to the employment department to be transferred.

I am wondering what attention companies generally have paid to the health of supervisors and executives? I must confess that, in our own case, it is a matter which

has only recently received attention. At the suggestion of our medical director, it was brought up at an executive staff meeting and met enthusiastic response from the plant superintendents. As a result, a letter went out to every foreman in our plant inviting them to make use of our medical department for physical examinations, suggesting that they make their arrangements through their respective superintendents. This is only the first step in a program which we believe will eventually include everyone in the organization.

One of the perplexing problems from an administrative viewpoint is the one of informal medical advice. It requires a great deal of tact for a medical director and his assistants to keep away from cases which should be handled in private practice. The hypochondriac and the malingerer are phases of the problem. It is extremely desirable to avoid any criticism that the medical director is not helpful and sympathetic.

There is, of course, a very close relationship between health work and safety work and, in our own case, we include health items in our general safety education program. It is beyond the scope of this paper to discuss all of the ways in which the health program can be put across. Without going into detail, I might state that it is part of our general organization philosophy that we must make our supervisors and foremen good trainers and we are, therefore, devoting a major portion of our effort along training lines to them. The medical director plays his part as a member of our training staff. We use a moderate amount of publicity on bulletin boards and through our plant paper, but believe we get the best results from what we do through our foremen.

The matter of assistance in mental adjustments is a field in itself and only its importance can be emphasized by a layman. In cases where personal interviews indicate the need for mental adjustments in domestic and working relations, the medical director, with a flair for this type of work, can be of great assistance. From the viewpoint of a layman, I am not at all sure that the proper kind of industrial medical director can do as much as the especially trained psychiatrist. After all, he will refer special cases to the psychiatrist if one is available.

Summary

In conclusion, let me leave with you the following points I have tried to make in this paper:

1. All industrial relations activities should be centralized under one responsible head who is capable of administering a sound personnel program approved by the management.
2. In the formulation of a health program care must be exercised to avoid paternalism. There must necessarily be a sharp differentiation between the health program of the small industrial community where one plant employs the entire working population and that of the plan which is one of several in a more diversified manufacturing community. In the latter, cooperation with public and private health agencies is the answer.
3. Physical examinations are the basis for an efficient personnel and sound subsequent personnel contacts. Initial examinations should be followed by periodic check-ups wherever possible.
4. Examinations of executives and supervisors should be included in the health program but such examinations must be inaugurated diplomatically.
5. The efficient medical director will diplomatically avoid interference with private practice and yet avoid a reputation for apathy and indifference. He should be a valuable part of the supervisory training staff. In cases of social and mental adjustments, a well-informed medical director may be of more value than a trained psychiatrist.

CHAIRMAN WINSLOW: I wonder if Dr. Knapp won't open the discussion on this paper. He asked some very pertinent questions the last time, but perhaps now he can answer some.

DR. R. P. KNAPP (South Manchester, Conn.): I don't know as I can answer any of those. I do believe what he said about the small community where the industry is the principal or only industry. What I tried to bring out in the discussion of Dr. Britton's paper was that perhaps we are bound to offer more health service in the large community, where more physicians are better equipped to make diagnosis, and they have better means at their disposal. I think the point he has brought out here is perfectly true, that the industry in the smaller community has a larger responsibility in the community in that respect than in the other.

DR. E. R. HAYHURST: I have had a thought on the small plant that has struck me of late. Probably the general average of loyalty and enthusiasm is greater in the small plant than in larger plants. I refer to the plant with from 100 employees down. They are very apt to work on special orders and try to get out those orders in a limited time so that they are usually on duty ten hours a day rather than eight hours a day, or a similar ratio, and they are apt to be on from twelve to twenty-four hours a day for weeks at a time, getting out those orders. Of course, they want to be healthy and avoid accidents, but everything and everybody is devoted to the task of getting out the product. Most of it is on a piece-work basis, as it is in the large plants, and their enthusiasm gets away with them and they have no thought of health or anything else until they are down in their tracks from over-fatigue.

The ordinary hazards of poisons or improper ventilation, which wouldn't affect the big plants where the employees are working eight hours a day under supervision, play havoc in these small plants.

I think Dr. Britton is wrong on the number of small plants unless it has changed within a few years. Dr. McCord, in the Detroit meeting in 1925, got together some statistics showing the number of plants employing less than 500, and I have had occasion to cite those a number of times. I think about 60 per cent of all industrial employees are in small plants under 500. While the big plants constitute only about one per cent of the number of plants in the country, they employ, however, about 40 per cent of the employees. Those figures may be changed now, of course.

CHAIRMAN WINSLOW: Dr. Gray, have you anything to add?

DR. A. S. GRAY (Hartford, Conn.): I wish there was somebody here who knew something about that method they have been trying out in Philadelphia for medical service in the small plants. I understand that they have a certain number of plants included in a group that have about 1,000 workers in them, and that there is one doctor and one nurse assigned to that number of plants. Of course, the plants have got to be fairly close together. I have read and heard papers on this work, but unfortunately, I haven't heard how the plan has really worked out. I believe it has been working for about four years and certainly in that time it would seem that it should have had some definite results which could be published.

I was interested in the statement by Dr. Britton concerning a considerable number of plants, large plants and medium sized plants, that had medical supervision. I think I could count on the fingers of two hands, and have a couple of fingers left over, the amount of actual medical supervision in plants in Connecticut, (except the very biggest ones and leaving out the railroads) and as for the medical supervision in the small plants, in the class of 500 or under, it practically doesn't exist.

I was interested in hearing him say that in the portion of the country where he is located, there is considerable amount of physical examination done in these plants. There is very little of it done in Connecticut, even in plants in which there is medical supervision, and I would say there is almost no reexamination except in the railroads.

Industry seems to realize that it is desirable to do that, but those industrialists to whom I have spoken about the desirability of physical examinations are fearful of putting it into practice because they feel that the individuals would object to it.

I know I am bringing up an old story again, but it is ever new. It is one of the things that is actually happening, and I say, as far as Connecticut is concerned, that even in those industries in which there are very definite hazardous processes employed, it is astounding to know the number of plants that don't examine the men that are put into those hazardous processes—the number of men that are engaged in either sand blasting or foundry work that have never had any physical examination.

It wouldn't seem to be necessary to have to sell this idea to industry, because in every compensation case that comes up, there is the question, "What was the condition of the man when he went into the hazardous process?" and they must realize that if they don't know his physical condition when putting him into the process or exposing him to some material that will affect his health, they are absolutely without defense. Yet, it is astounding how many fail to make an attempt to put forward a plan of examination even at the time of employment. Most of them seem to be rather content to sit down and say: Well, we are afraid to do it because it might cause trouble.

I think that the physical examination of individuals before they are employed, and particularly for hazardous processes, and periodically thereafter, and medical care in small industries, are two of the really vital things that should be made important points in discussion in this Section.

CHAIRMAN WINSLOW: As a Connecticut man, I am sorry I called on Dr. Gray, but I am afraid that outside of South Manchester and the public utility companies, we are one of the backward states.

DR. W. H. PARKER (Richmond, Va.): I want to rise to a point of personal privilege. The question I asked wasn't answered by Dr. Britton. The question I asked was, How far should the industrial physician go in industrial health work? In so far as the point is concerned that at least 60 per cent of the employees are employed in small plants, it is a distinct service to them in that they might not be able to pay, but we do have from 20 to 30 per cent who are fully able to pay for medical service, and that is the point I wanted Dr. Britton to discuss.

DR. J. A. BRITTON (International Harvester Co., Chicago): It always seems to me that assuming the responsibilities of the community function by any group, industrial or medical, or what not, is wrong; that the individuals of the community, the citizens of the community, the organizations of the community, should take care of that function.

The industrial doctor has certain specific industrial problems which he is bound to take care of, which is his real function. He knows that health is a very important aspect of the whole subject of employment. He must, therefore, be interested in health, and especially he must be interested in the health of the employees. He must organize a plan which will be the most far-reaching as far as the individual is concerned and as far as the community is concerned.

Now, if he gets so busy taking care of a job that isn't his, the first thing he knows he is swamped. Now, according to the remarks of Dr. Gray and of our worthy chairman, in spite of the proximity to Boston, here we find these horrible conditions down in the East. If you take a certain line of activity which properly belongs to the community, then the community will begin to let you do that work, and you will soon find yourself loaded up.

There are certain functions which you as a plant doctor can assume, do it easily, with no quarrelling points either inside the plant or outside of the plant. What are they? A man comes in to see you as the plant physician. He says, "I have been having certain pains in the pit of the stomach," and you listen to his story and you know from experience that he ought to have certain examinations made. Now you,

as a friend, as a fellow employee, as one he comes to for direction and advice, say, "Now, if I were you, this and this and this and this I would do. Such and such a doctor is particularly good on those stomach things. Such and such procedures are necessary for any doctor to follow in order to make a diagnosis." Therefore, you outline to him what the procedure is, that at such and such a hospital he can get such and such care which is within his means. Or, if he hasn't got the money, you tell him that such and such a hospital will take care of him on such and such a basis. You make the contact between him and the community.

Assume, if you will, the truth of the previous statement I made, that industrial medical service must be good. All right, if you don't limit the amount you do, you can't do good medical service. Suppose this same fellow comes to you and you say, "You must come to the hospital and we must do this for you." It might mean an expense of one or two or three hundred dollars for the company before you could get him taken care of. You might do that for a selected case, but to assume that as a whole responsibility for the company seems to me to be going too far.

On the other hand, if an industry assumes the entire responsibility of medical service which, to my way of thinking anyway, is a community responsibility, what is to hinder the man from saying some day, "By the way, why don't you put that amount of money in my pay envelope and let me pay my own doctor?" Isn't that what is apt to happen in this country? I think so.

CHAIRMAN WINSLOW: Dr. Gray asked about the work of the small plants in Philadelphia. I wonder if Dr. Bricker can give us any information as to how this plan of cooperative service to small plants is working out.

DR. ELIZABETH B. BRICKER (Harrisburg, Pa.): I haven't heard of it recently during this period of depression, but I think Dr. Gray outlined pretty distinctly what plan is followed. It is financed by the Tuberculosis Association of Philadelphia, from the sale of Christmas seals, largely, I understand. I think that some of those plants, quite a few of them, in which demonstration was made of the benefit of this work, have assumed their own financial responsibility for employing a physician.

The last time I heard of this plan was about a year ago. Now, whether the depression has caused those manufacturers to withdraw the service or give it up or lessen it in any way, I can't say, but personally, I think it is a very excellent procedure and one which about three or four years ago was being carried out very well in Philadelphia.

DR. R. P. KNAFF (South Manchester, Conn.): Touching once again on the periodic physical examination, or physical examination, specifically, I can conceive theoretically what the doctor meant when he said there is no such thing as a complete physical examination; but after all, that is only a half truth, hardly that. Wouldn't it be better to say, the physical examination may be as complete as you choose to make it; let your conscience be your guide?

DR. W. R. REEDER (New York City): I just want to call attention to the service now being given by the New York Tuberculosis and Health Association along the dental clinic line. I happened to get a notice the other day that they are ready to move in a machine, a worker, and so forth, and they will do everything up to the actual dental work. They give X-ray service at a cost of 50c for one tooth, or \$3.50 for the whole business, which is very much under the usual New York rate. They will refer you to one of two clinics in which you can get dental corrections from beginning to end at a very low price.

I think that is a step in the right direction. I think we may not be able to develop clinics in which we can have a physical examination of the worker at the clinic, but I think there is a nucleus of an idea in that thought, that possibly the yearly reexamination for your small industry might very well be handled by groups who take care of, say, 25 or 30 industries or a small number of employees at a normal cost, and it may be that medical service might be extended to smaller industries on a part-time basis.

CHAIRMAN WINSLOW: Is there any further discussion? If not, I will ask Dr. Hilbert if he has anything to say in closing.

DR. J. W. HILBERT (Studebaker Corp., South Bend, Ind.): I have nothing to say about the paper I just read, but I want to say just a word about physical examinations. Might we not be guided by the usual insurance forms as to the extent we go in making these examinations? If there are certain types of work which carry certain hazards, we might have to go beyond the usual insurance examination, but as a general rule, I think we would be safe in limiting the examination to just what the usual insurance form calls for.

DR. KNAFF: I disagree on the strength that it isn't complete enough.

CHAIRMAN WINSLOW: Our last business is the report of the Nominating Committee.

Report of the Nominating Committee

DR. V. S. CHERNEY (Chicago, Ill.): Mr. Chairman, your Nominating Committee submits the following report:

Chairman: DR. LEONARD GREENBURG, New Haven, Connecticut.

Vice Chairman: DR. T. LYLE HAZLETT, Pittsburgh, Pennsylvania.

Secretary: DR. C. O. SAPPINGTON, Chicago, Illinois.

CHAIRMAN WINSLOW: Are there any further nominations? If not, do I hear a motion in regard to the disposition of this report?

DR. PARKER: I move the nomination be closed and the secretary cast the ballot of this body for these candidates for our officers for the ensuing year.

(The motion was seconded, put to a vote and carried.)

ADJOURNMENT

Tuesday Afternoon Session

October 13, 1931

Joint Meeting of the Chemical and
Industrial Health Sections

JOHN ROACH, Chairman

Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.;
Vice-Chairman, Chemical Section, N. S. C.

The joint meeting of the Chemical and Industrial Health Sections was called to order by Mr. John Roach, vice-chairman, Chemical Section.

VICE-CHAIRMAN ROACH: The first number on the program this afternoon will be a paper written by the late Dr. Eugene L. Fisk, of the Life Extension Institute, Inc. It will be presented by Dr. Louis W. DesPrez, Medical Director, Life Extension Institute, Chicago.

The Care of the Older Employee

By DR. EUGENE L. FISK

Medical Director, Life Extension Institute, Inc.,
New York City

In my view, the health problem of the older employee does not differ materially from the health problem of the younger man, except perhaps in degree. Nor is the question of industrial health unique or unrelated to the question of the fundamental physical status of civilized man. The subject of this paper, however, limits consideration of the problem to the older man in industry, concerning whom so much solicitude is felt nowadays.

Perhaps I should say at the outset that I am not attempting here to offer a solution of this very important question but rather to offer a statement of fact, and a diagnosis of the ills to be treated.

The so-called older employee—the man over forty—is not a fixed quantity. We find him a certain type merely because certain average factors have assailed him in the course of his existence in a certain average degree. That the man over forty was born some forty years ago, according to the calendar, does not explain the man or why he is what he is. He is what he is—this man in early middle life—partly because of attributes passed on to him by his ancestors; partly because of the character of his nutrition not only from the hour of his birth but in his prenatal existence; partly because of infections that have assailed him from childhood on; partly because of suggestion absorbed from his environment—and so on and so on to include a vast number of factors which cannot be discussed within the compass of a brief paper.

I have expressed this otherwise—that we are not chased to the grave by an old man with a scythe and an hour-glass, but by ignorance, apathy, poison, infection and acute and chronic disease. The man of forty is what we find him because of the factors that have molded him in his lifetime.

Men in the age period 45 to 65 are never considered without some emotional bias. The verdict of military leaders is conclusive in this matter as applied to war service. Pershing has given us his views on the "softness" of the elderly military officer, and in the World War rigid lines were drawn in order to screen the older officers from service across the seas. Oftentimes this exclusion was practiced for

the good of the army on the general principle that there must be no physical liability carried to France, and undoubtedly such ruling was for the greatest good of the greatest number. There have been notable exceptions, however, even in this field, and Pershing himself, as well as Foch, Pétain, Clemenceau and Lloyd George are examples of aged men who have carried tremendous responsibilities with conspicuous success during the years of late middle life.

Military service, of course, is not completely comparable to industrial service. In the field of industry, however, the quality of health and physical fitness and the endurance to life strain spread over the years of early maturity and middle life are intrinsically bound up with the continuity of labor and the productivity of the worker.

What are these average conditions that we find in the average man over forty?

I am reminded of the remark made by a leader in industrial medicine a few years ago to the effect that it was unnecessary to examine men over the age of forty-five for employment because the game wasn't worth the candle. Too many were found physically incapacitated to warrant the expense and trouble! Such a conclusion could only be justifiable on the hypothesis that the source of workers is inexhaustible, and also that the average industry can secure enough physically fit men under age forty-five to run the works. This is by no means true.

While interest in war figures is not so keen at the present time as formerly, it is well for us not to forget the lessons that were drawn from those studies. We are all familiar with the fact that approximately one-third of the men between ages 18 and 31 examined in our own draft were declined for active service. This did not mean that those accepted were perfect. It merely meant that they had no disabilities which rendered the risk unduly heavy during the period of war service.

In Great Britain where the higher age groups were entered, more informing data were found as to the state of civilized man and his progression in deterioration with advancing years. For example, representative groups showed a rejection rate for ages 18 to 42 of 64 per cent. Estimates based on the examination of about two and one-half million men showed only 36 per cent acceptable in Grade 1 as eligible for full active military service; 22 per cent in Grade 2 in which grade men were grouped who were regarded as incapable of any physical exertion involving severe strain; 31 per cent in Grade 3 which was made up of those presenting marked physical disabilities; and 10 per cent in Grade 4 which group men judged to be totally and permanently unfit for any form of military service.

Important information and statistics bearing upon the physical status of industrial workers have been made available through the physical examination of large numbers of employees from the point of view either of eligibility for employment, or periodically, for the improvement of their health.

In more than one hundred plants, where periodic examinations of supposedly well employees were made by the Life Extension Institute, for the purpose of detecting early signs of physical impairments and offering counsel as to their correction, the following conditions were found in representative groups of more than 10,000 people actively engaged at work:

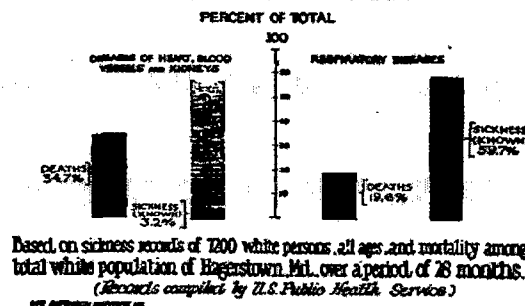
Average Age 34		Percent
Class 1.	No physical defects or errors in hygiene.....	0
Class 2.	Very minor defects requiring attention or observation.....	10
Class 3.	Minor defects requiring hygienic correction, or minor medical, surgical or dental attention.....	41
Class 4.	Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity.....	35
Class 5.	Advanced physical impairments requiring systematic medical or surgical attention.....	9
Class 6.	Serious physical condition requiring immediate medical or surgical attention.....	5

It should be noted that the average age of the groups studied was only 34! The testimony of the draft, which is supported by sickness surveys in industry and the general population, clearly indicates that a great opportunity exists for improving the vitality and productive power at the younger as well as the older ages. There is much evidence available to show that the average human being under forty is by no means a perfect physical specimen. The industrial worker does not, without previous physical impairment or ill health, suddenly, at a given age, become a liability on the plant.

A higher rate among the younger age groups has been shown in certain sickness surveys made, which is rather inconsistent with the testimony of other researches into the subject of disability and absenteeism in various age groups. The accompanying chart on what I have called "silent" sickness sheds some light upon this matter.

Comp. and ed. by M. 798

SILENT SICKNESS



This chart presents graphically the results of a sickness survey made at Hagerstown, Maryland, by the United States Public Health Service, which disclosed that while the sickness rate from respiratory diseases was 59.7 per cent, these diseases constituted only 19.6 per cent of the death rate. On the other hand, while only three per cent of the reportable sickness rate was contributed by diseases of the heart, blood vessels, and kidneys, these maladies contributed about 35 per cent of the death rate.

The outstanding feature characteristic of the man over forty is the prevalence in that age group of "silent" sickness—that is, chronic deterioration of the organic tissues of the body which does not manifest itself in disability until the organs fail in their function; in other words, sickness which may be present for many years without "speaking" in terms of disability or obvious illness. When I tell you that one authority has claimed that 50 per cent of the kidney tissue may be destroyed before the kidney function breaks down, you will readily appreciate the situation. Many of those who battle with this "silent" sickness over years of time may survive into the later ages and constitute the problem of the elderly employee, with which industry is so much concerned at the present time.

In my judgment, so-called industrial fatigue is closely related to this condition of underlying pathology. How much fatigue is really silent sickness? Can we charge up to mere work what is really due to infection or poisoning or frank physical de-

ficiency? How much of the fatigue problem would disappear if we could remove a major part of the 53 per cent of defective vision that exists, or the 85 per cent of focal infection, or the 13 per cent of overweight, to mention only a few of the physical impairments which periodic health examinations reveal in any industrial group? What is the part played by these chronic maladies in lessening the efficiency of the industrial worker and shortening his work cycle?

It is impossible to consider the question of fatigue without being at once led into the question of the longevity of the worker, his physical efficiency at the various decades of life, and therefore of the final problem of why the worker in industry is assumed to be more or less a liability at middle life and later. There is a certain naivete in so carefully discussing all of these fatigue states as a reflection of work itself.

We have not as yet secured satisfactory answers to two questions which seem to me fundamental and important:

Does the output fall because the worker is tired or because he is physically deficient?

Is the worker ill because he is tired or tired because he is ill?

The testimony of the periodic health examination in industry which reveals a high percentage of "silent" sickness among supposedly well people active at their work, is particularly important in considering the problem of the older employee. The fact should not be overlooked that workers reporting sick suffer mainly from minor disabilities. A large percentage of workers, especially those in the older age groups, with unquestioned chronic and progressive diseases, carry on, conscious of no need for medical attention.

It is often stated that men reach the peak of their efficiency and are considered to be in their prime between the ages of 35 to 40. The most elementary figure in vital statistics is the death rate, which finally answers the question as to the quality of any particular group. And it is a significant fact that for the past twenty years there has been a general trend in this country toward a higher death rate at middle life and later.

The loss in the expectation of life in the United States Registration States from age 37 onward is indicated in the following table:

Age	1921	1927	Loss
37.....	32.85	31.47	1.39 years
47.....	25.01	23.68	1.33 years
57.....	17.72	16.57	1.15 years
67.....	11.50	10.60	.90 years

What is the explanation of this sapping of vitality at the ages which are commonly looked upon as the most vital and productive in the life cycle? The problem is evidently one related to American civilization since we do not find this rising mortality in elderly life in any other civilized country.

There is no use saying that the man over forty-five is not adaptable to industrial employment, because he is there—millions of him—hard at work and doing good work. The peak in the age distribution in industry is between ages 25 and 45, where we have approximately fifteen millions among the gainfully employed.

In attempting to arrive at a solution of this problem we must have clearly in mind the standards by which we judge a man to be in his prime. If we are considering the physical state of his body, and the death rate which continues to increase decade by decade, he certainly is not in his prime at those ages. Nevertheless some of his deficiencies are compensatory in a measure. His waning vitality makes him more conservative. His training and experience count for a great deal, and he is more stable in his attitude toward employment than is the younger worker.

What shall we do with this man who does thirty-four per cent of the world's work? Surely we cannot lay him on the shelf at forty or forty-five even though we know that every day in every way he is *not* getting better and better.

DO EXAMINATIONS PROLONG LIFE?

A study of 6,000 policyholders of the Metropolitan Life Insurance Co. shows
18% REDUCTION IN MORTALITY
 among those examined from 1916 to 1924 by the

LIFE EXTENSION INSTITUTE

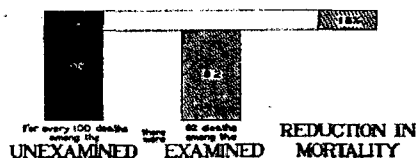


Chart Showing the Ultimate Results in Life-Saving Among Policyholders of the Metropolitan

In the course of periodic health examinations we find a systematic and orderly analysis of this human picture and coincidentally important evidence of the efficacy of such examinations in meeting these sociological deficiencies.

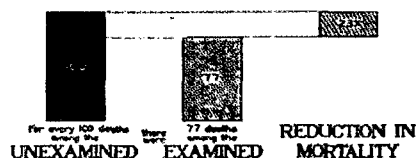
Confronted by this evidence, we are challenged by the question, Is this progression in deterioration according to a fixed law? Is there any escape from it? There are some people who hold to the view that the life cycles of living organisms are fixed. My claim is that this could only be done by supernatural edict and decision. I have disclosed my own philosophy as holding that a man's condition at any age period, his death rate, and his life cycle are governed by physical factors in his environment, and that as these are subject to modification and control, ergo his life cycle, his work cycle, and his health cycle are likewise subject to modification and control. Some proof of this is offered in the experiences in our own field of life extension.

Prolonging the lives of their policyholders is a matter of great interest to insurance companies both from the point of view of human service and economic

DO EXAMINATIONS PROLONG LIFE?

A study of 3163 policyholders of the Guardian Life Insurance Co. of America shows
23% REDUCTION IN MORTALITY*
 among those exposed from 1914 to 1925 by the

LIFE EXTENSION INSTITUTE



* Excluding extreme oil usage, the reduction was 26%.

Chart Showing the Ultimate Results in Life-Saving Among Policyholders of the Guardian Life

**STUDY OF GROUP OF 1000 INDUSTRIAL WORKERS
SHOWING GAIN IN GOOD HEALTH BY CORRECTION OF
DEFECTS NEEDING MEDICAL ATTENTION AS REVEALED IN
PERIODIC HEALTH EXAMINATIONS**

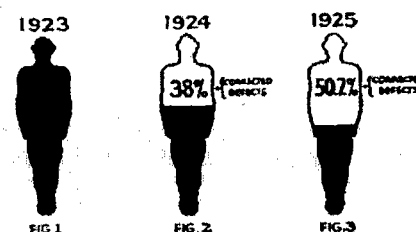


Fig.1 represents the total number of defects found in group on first examination. (Need for correction then impressed upon worker.)

Fig.2. Of these defects, 38% were corrected by the time of examination in 1924. (Attention again called to uncorrected defects.)

Fig. 3. A year later, 50.2% of defects had been corrected.

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gain. Direct testimony as to the dollars and cents value of these examinations in the insurance field has been made available in actuarial studies on large groups of policyholders examined by the Life Extension Institute for their insurance companies, with a view to prolonging their lives. These studies reveal savings in mortality of from 18 to 23 per cent on the groups as a whole; and—significantly in so far as this discussion is concerned—a saving of more than 50 per cent in the older age groups where the impairment rate and death rate are so high.

That this is not an accidental thing but the reflection of a scientific mechanism that works, is shown in another chart herewith reproduced, from which it will be observed that the impairment rate is cut in half in the course of three years under the influence of these examinations.

It is an interesting fact that study of a group taken at random from the industrial field where health examinations were made by the Institute shows exactly the same ratio of corrected disabilities.

At one end of the scale we have the mechanism at work; at the other, we have the product of the mechanism reflected in the lowered death rate.

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STUDY OF GROUP OF 1000 POLICYHOLDERS SHOWING GAIN IN GOOD HEALTH BY CORRECTION OF DEFECTS NEEDING MEDICAL ATTENTION AS REVEALED IN PERIODIC HEALTH EXAMINATIONS

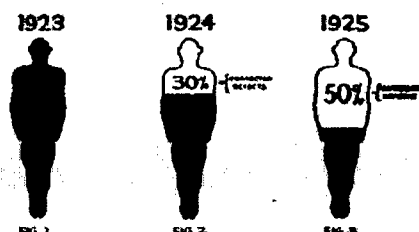


Fig. 1 represents the total number of defects found in group on first examination. (Need for correction then impressed upon worker.)

Fig. 2 Of these defects, 30% were corrected by the time of examination in 1924. (Attention again called to uncorrected defects.)

Fig. 3. A year later, 50% of defects had been corrected.

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What shall be done with this man over forty whom I have endeavored to picture? Obviously, the first and most elementary step toward decreasing the liability in this group, is to approach him early enough and keep him on this side of forty as long as possible—that is, this side of forty in a *physical* as distinguished from a *calendar* sense. This may be done by careful examination before employment—not so much with the idea of excluding a man from employment, as adapting him to employment within his powers—and by subsequent health examinations in order to protect him from the development of unsuspected latent silent sickness or other disability.

Dr. W. Irving Clark has shown that in groups accepted for employment, notwithstanding certain defects which in many plants are considered ground for rejection, the disability rate was lower than the general sickness rate. These men, knowing their disabilities and safeguarding themselves, reflected the principle laid down by Oliver Wendell Holmes that in order to live long one must acquire some incurable disease that will compel one to take care of one's health and keep out of danger. That is a philosophy which can easily be misapplied and misunderstood, but there

is a certain measure of truth in it. Certainly a man with undetected hernia taking reckless chances is in greater danger than a man with a known hernia who keeps away from unusual strain. In every unexamined group there will probably be at least three per cent of men with hernia. There are many conditions the correction of which will take men out of substandard jobs and fit them for standard jobs.

We have lately heard that there is no known reason why men in later life cannot show initiative and originality and the ability to learn. This theory has not yet been placed on a quantitative basis and it cannot be said whether such capacity is latent only in exceptionally endowed individuals or disseminated throughout the mass. Professor Edward L. Thorndike in his studies covering the learning ability of elderly students at Teachers' College has found the middle aged and elderly, superior in fact to the adolescent. However, it might be necessary to modify and relax these judgments when considering the mass of industrial workers and their adjustment to the work in hand.

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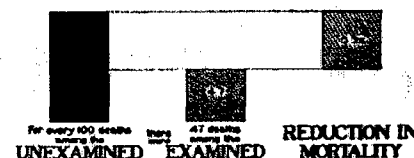
DO EXAMINATIONS PROLONG LIFE?

A study of policyholders of the Metropolitan Life Insurance Company having important impairments (substandard lives) shows

53% REDUCTION IN MORTALITY

among those examined from 1914 to 1920 by the

LIFE EXTENSION INSTITUTE



Whether or not there is found in the man over forty the same plasticity and learning ability as that found in younger men, may still be problematical so far as the mass of industrial workers are concerned. But that the working period of men in these later age groups can be prolonged by systematic health supervision, the early detection and correction of physical impairment and hygienic guidance in the matter of living habits, has been established beyond any doubt.

We should not, therefore, view the situation with discouragement but rather view ourselves with a degree of discouragement because of our failure to apply to the great masses of workers existing scientific knowledge which would unquestionably influence the ageing of the human body and the gradual impairment of its efficiency.

In the interest of increasing human power and satisfaction in living, the first step is the conservation of the health of the worker and the prolongation of his working period. In any constructive health program we must consider not only the man who appears on the sick list, but the man who, while reporting regularly for work, is in reality one-half sick or one-quarter sick or even one-tenth sick. As I have already pointed out, few people can be said to be in a condition of perfect health. They may be able to draw upon their resources and overcome certain disabilities for a certain length of time, but these disabilities are liabilities and their cumulative effect is what determine final physical incapacity and breakdown.

As suggested in the beginning of my remarks, it is no part of my thesis to offer

a final remedy or to enter into a discussion of the economic aspects of this question. However, having considered the extent of this liability, it may not be out of place to offer as a possible solution a combined health and thrift plan that will set the worker on his feet, protect his health so far as may be, and land him in old age, not the recipient of bounty from the state or from his employer, but rather a small capitalist, quite able to take care of himself.

Any program that compromises with the situation and consents to the adjustment of working conditions to men who are physically more or less incapacitated, is fundamentally unsound and without constructive merit. On the other hand, any program that seeks to aid the working man to detect the earliest signs of a bad physical trend and correct this trend, is wholly on the constructive side.

It may be said without exaggeration that a thorough-going program of prevention along the lines discussed here, especially one joined up to the mutual benefit association which brings the employee into partnership in the business that he serves, will produce infinitely better results than the segregation of sums of money from that business to a mere interest-bearing fund—whether the worker contributes to it or not.

Harold A. Ley, president of the Life Extension Institute, has for many years interested himself in this problem and has worked out the details of a plan, which may be of interest to some of you. I have here a small supply of one of Mr. Ley's addresses in pamphlet form which is available to any one who may be interested.

As in community hygiene, progress in the solution of the problem considered here today can only be made by courageously facing the facts. Knowing the movement of mortality in these older age groups, it is to be hoped that those sociologically conscious will be moved to act constructively in the matter of preventing the organic troubles which we know are increasing year by year and creating a special problem for the middle-aged man in industry.

VICE-CHAIRMAN RDACH: It seems to me this is an important subject, because industry is gradually accumulating a tremendous number of by-products in broken men. Somebody must care for them, either the state or private resources, and what is to become of them seems to be a good deal of a problem.

Most of us know that now that we are going through a period of intense industrial depression, many in the older group who are not altogether fit from the modern standpoint of production are being dropped. Someone must care for them, either society as a whole or private philanthropy. I thought someone here would like to discuss that phase of it.

STANLEY WARZALA (The Calco Chemical Co., Bound Brook, N. J.): Doctor, you mentioned the fact that there was a survey made in 100 plants of employees of 34 years of age. Have you the figures showing the number of employees that are involved?

DR. LOUIS W. DESPREZ: That study was taken from a group of 10,000 employees of the average age of 34.

WILLS MACLACHLAN (Consulting Electrical Engineer, Toronto, Ont.): In the public utility industries we have been interested in the periodic physical examination. In one public utility that I happened to have something to do with over a period of seven or eight years, instead of starting with the average employee we started with the senior executive and carried out that periodic examination every six months, with rather wonderful results in improving the health of those men.

In speaking as chairman of the Health Committee of the National Electric Light Association, I just wanted to advise that through the good work of Dr. Sappington and Dr. Hart E. Fisher, and other doctors, and some laymen, we have prepared a report dealing with building and conducting a health program, particularly with reference to the public utilities. We have also brought out a manual on health entitled "Your Health and Your Earning Power." I think at this time, to the employee, the fact that there is a very definite connection between his health and his earning power should be emphasized. This manual is just off the press, and it can

be obtained by writing to the National Electric Light Association, 420 Lexington Avenue, New York City.

DR. W. R. RUDEN (Cleanliness Institute, New York City): I don't like to hear diseases that occur in people after forty referred to as degenerative diseases.

Back in 1923 I reviewed all the cases of heart disease that came to the Massachusetts General Hospital that had been unfortunate enough to die and go to autopsy. I reviewed that for a textbook on heart disease which Dr. Richard Cabot published the following year. In checking through we found that at least 75 per cent of those fatal heart diseases had their origin in infection anywhere from five to twenty-five years prior to that time.

Anyone who has a notion that the heart, as such, just wears out has no conception of the ability of the heart muscles to continue, providing the individual goes along and lives a fairly normal, active, physical life. There is much more danger of degeneration of the heart when there is no work than there is when there is work. In other words, even among athletes it is considered there is no such thing as an athlete's heart. I base my statement on what a physiologist at Harvard said to me when I was writing an article on resuscitation.

This brings me to the very important matter of the correction of defects, many of which are due to infection. Take the teeth, for example. In the state of New Jersey they have cured a number of people of insanity. For a while it looked as though they were going to clean out the insane asylums, provided they did enough corrective work on teeth.

At a dental congress in Michigan, a notable dentist from New York City said one individual who had recently been married committed a theft for the first time in his life. Investigation outside of the court, and later revealed in the court, showed that he had an infected tooth, and the psychologist, dentist and medical officer indicated that the man stole because of a bad tooth. The situation was cleared up and the man went along for ten years without any showing of mental deviation from normal. Then he again stole. He had been forgiven the first time by both his employer and his wife, and had gone on happily. I say he stole a second time, and the same process of reasoning was carried through. The individual was released on parole, the defect cleared up, and the individual had gone on for at least eight years without any further stealing.

Yes, we laughed at it, but if just cleaning up a few teeth in the matter of focal infection will do that sort of thing in the correcting of a man's mind and his social attitude toward a community, what may it not do for ears, eyes, and brain in the prevention of mental deterioration, or that old arteriosclerosis that comes along and rings down the curtain long before its time?

I can assure you I have given this careful consideration, and the degenerative diseases as such, especially when a bit premature, are usually due to some underlying infection or something other than just simply the wearing out of the machine. Yes, you can lose half your kidney supply and still go on, and you can lose two-thirds of your liver and still go on and function satisfactorily without looking yellow to the rest of the community.

So, if we industrialists are interested in the welfare of the worker who, because of the length of his employment, becomes more valuable to us, we are going to be interested in the failures that have been shown here this afternoon. They are among the most important I have seen.

I asked Dr. Dublin in the Public Health Association meeting in Montreal last month how much time was lost due to actual industrial hazards as compared to the total time lost due to sickness, as such, and he said, "Infinite!; you can't measure it. But I will tell you one thing: the industrialist loses eight years of life, which is cut right off, as compared to the other fellow of the same age group throughout." Eight years of life somewhere! How does he lose it? I think if we conduct medical examinations at the beginning of employment and as many times as possible thereafter, we may after ten, fifteen or twenty-five years discover the elements that are

playing a part in the loss of eight years of life to the worker who is most important to industry.

VICE-CHAIRMAN ROACH: I agree with you perfectly. That is the kind of discussion that enlivens a meeting like this.

J. F. GREEN (Western Cartridge Co., East Alton, Ill.): Inasmuch as the gentleman at my right stressed infection of the teeth, I should like to have your opinion regarding 100 per cent examination of each employee.

DR. DESPREZ: That is a question that is rather hard to answer because comparatively few industries have gone so far as to even give them a physical examination.

We have one small group here in Chicago that we have had opportunity to study rather carefully because they have made the physical examination a condition of promotion. They do not compel anybody to be examined, but anyone who is eligible for promotion must first have a physical examination. This physical examination includes everything we can do physically, blood count, and X-ray examination of the teeth. From the X-rays of supposedly well people where they had no dental complaints, we found 63 per cent infection.

MR. WARZALA: When you speak of blood count and so forth in the examination, what would such an examination cost per employee?

DR. DESPREZ: A thing like that can only be worked out on a numerical basis. Obviously, the larger the group the less it will cost. We do about 100 examinations a year for this particular company, and they pay us 20 per cent less than the average individual would pay for that examination. This physical examination, which includes a specialist for the eyes, ears, nose and throat, X-ray examination of the teeth, blood test, and complete physical examination, costs the firm \$20 per capita.

HAROLD NULL (Kansas Electric Power Co., Lawrence, Kans.): I should like to know the experience of interesting employees in having examinations. That is a problem on our property. We have employees who need examinations. They have been examined when employed, but subsequently have not been examined. I should like to know what the experience has been in other concerns in getting them to come forward to be examined, and find out how other companies meet the matter of expense; whether the employee pays it, or whether the company pays part.

DR. W. J. McCONNELL (Metropolitan Life): I would say in 90 per cent of the industries the employer pays for the physical examination.

Regarding the examination itself, in Philadelphia some few years ago the Philadelphia Health Council undertook to make physical examinations of the employees in the smaller industries; that is, industries with employees numbering from 20 to 500. These examinations were made on a voluntary basis, and I think 95 per cent of the employees of these various industries volunteered for a physical examination. So I do not think it is any longer much of a problem to convince the employee of the necessity of a physical examination. I think if presented to them properly a large percentage of employees will voluntarily report for a physical examination.

MR. MACLACHLAN: In certain groups we have found it an advantage to start at the top and go down through the organization. We find the employees come forward more quickly that way for their examination if they know the boss got through.

VICE-CHAIRMAN ROACH: Do you find the employees are afraid that this examination will be used as a means of depriving them of their employment in case they are found to be defective in some way?

MR. MACLACHLAN: The medical department of the organization to which I referred has the same type of ethics regarding its employees that the family physician has with his patients. No information goes out from that medical department, and the employees know that, so there is no trouble in that respect.

DR. A. S. GRAY (Connecticut State Department of Health, Hartford, Conn.): Are those examinations voluntary?

MR. MACLACHLAN: Entrance examinations are compulsory, but periodic examinations afterward are voluntary.

VICE-CHAIRMAN ROACH: There are large groups opposed to physical examination of workers because they fear the examination will be a means of depriving workmen of the opportunity of obtaining employment, or of retaining it if they have it.

I am very much in favor of physical examinations properly conducted, with the idea of discovering physical defects and of correcting them and making the man a better and more competent man physically. If I didn't believe in that I wouldn't have taken advantage of the service this gentleman here has over in New York. It hasn't given me back my boyish figure, but I feel a lot better for knowing there are certain physical conditions that might affect me, but that don't.

The examinations must be made, and then, with a view to bettering the man, making the man a better and a more wholesome worker and citizen, and disabusing the mind of the public of the idea that it is going to be a medium of hardship for the worker. I feel rather strongly on this because we had a meeting in Harrisburg some months ago at which this matter was given a great deal of discussion. I took the position that physical examinations were good, while some of my associates at the convention were of the opinion that it was an infringement on the man's natural right to sanctity of person.

I think we will have the next paper, by Major General Harry L. Gilchrist, Chief of Chemical Warfare Service, War Department, Washington, D. C.

The Effects of Chemical Gases

By MAJOR GENERAL H. L. GILCHRIST

Chief of Chemical Warfare Service, War Department, Washington, D. C.

It is indeed a pleasure, a privilege and an honor to be permitted to take an active part in this important Congress, and I want to thank the Executives of this scientific body who made it possible for me to address you.

I have been asked to talk to you on the effects of chemical gases. Now, this is an extensive subject for a novice to attempt to discuss, especially when it is considered that there are over two hundred thousand chemical compounds, most of which exist in a gaseous state, and even if I were capable of undertaking such a gigantic task, to do so would require my time to be measured by the calendar instead of the clock.

Gas has occupied a strategic position in the study and the development of chemistry ever since the beginning of time, and I believe it can be said without fear of contradiction that much of the theory of chemistry has had its origin in the study of gases. One reason for this is the fact that gas is the most readily amenable to laboratory manipulation.

I believe, however, the real subject that you wish me to discuss today is the military and industrial application of some of the more important gases, together with their effects, and for that reason I will confine myself accordingly. During my talk I shall use illustrations when possible, for the reason I have found that the bringing into play of two of the special senses, that of sight as well as hearing, will better enable my listeners to comprehend the subject. Some of these illustrations were taken during the war—others since, and the statistical data to be presented are correct, having been taken from official government records.

Prior to the introduction of chemicals in the great war as weapons of offense, the average physician seldom encountered a case in which they were involved, unless he was closely associated with some chemical plant. But since that 22nd day of April, 1915, when five thousand cylinders, each containing one hundred pounds of liquid chlorine, were suddenly turned loose on the unprotected Allies, gases have gained a large amount of press notoriety which has continued up to the present.

As a result of the many misstatements concerning the action of gases, all sorts of ailments are being attributed to them, and for this reason they are being credited with more dire iniquities than have ever before been associated with any condition. It is true there are certain pathological changes which can be traced to the action of gases, but to what extent they should be held responsible for the great train of symptoms of which so many complain is still open to debate. Because of their questionable after effects, it is believed that many ex-service men and industrial workers are taking advantage of them and are endeavoring to attribute to gas every conceivable kind of ailment. Today there is scarcely a functioning organ of the body the disturbed action of which, either during or since exposure to gases, has not been laid at their door.

There is no doubt that a large number of persons who became incapacitated and who claim gas as responsible for their condition, were actually exposed at some time or other. But who is there in this room who has not faced the same condition? On the other hand, it must be remembered that a large percentage of these same individuals were also exposed to other conditions or circumstances, any of which could produce the same effects as gases.

A few words about the effects of gases in general. They may be very complex, and a number of different organs in the body may be simultaneously affected to degrees that vary with the concentration of the gas and the duration of the exposure. Frequently, however, their action tends to be specific in the sense that it is immediately limited to some particular part of the body, at least when its concentration is low. It is possible, therefore, to classify gases into four groups, according to the most prominent physiological effects they cause, but it must be remembered that many of them, to a certain extent, overlap one another.

First, there are what we may call true gases, for it is an anomaly of chemical warfare that many so-called poisonous gases are really liquids or solids. Chlorine and phosgene are typical of the first group and were the first chemical agents to make their appearance in war in quantity. They are actual gases at normal temperatures; they are poisonous when breathed but do not affect the skin and eyes in concentrations which might be deadly if drawn into the lungs, which are principally affected, and for that reason they are known as lung irritants.

All lung irritant gases cause, essentially, the same type of pathological effect, which is most pronounced in the air cells of the lungs and the smaller bronchial tubes, and the great danger to be feared is the onset of acute pulmonary edema or flooding of the lungs. It is, in the main, this condition which in the acute stage of poisoning endangers the life of the subject, for if abundant it causes death by asphyxiation, the patient, in fact, being drowned by his own exudation. The rate of onset and the degree of this edema are dependent on the particular gas and on its concentration, the length of exposure, and the body resistance of the individual so exposed.

The second group is the vesicant or blistering group. The principal gases here are mustard and Lewisite. These so-called gases are really liquids, the vapors of which are poisonous when breathed, and they produce severe burns and blisters wherever they come in contact with the skin. A drop of mustard on a man's clothing will penetrate through the cloth and cause a burn, the effects of which will last for several weeks. Because these gases evaporate slowly they are called persistent, and areas contaminated by them may be dangerous for two or three weeks.

As an example of the persistency of mustard gas, I might mention the following: During the war, I visited fifteen batteries of French Field Artillery, which had bivouaced overnight in a woods that had been bombed with mustard gas ten days before. Of the personnel of these batteries of artillery, 60 percent became casualties from this lingering gas.

Another dangerous feature of mustard gas is its lack of immediate effects. On exposure to the vapor, or even on contamination by the liquid, no signs or symptoms are apparent immediately. They only clue to contamination may be by detecting a

faint, characteristic odor, or by actually seeing the liquid or a stain. There is no pain or other sensation in the early stages; in fact, we could place a heavy concentration of mustard gas in this room and we could carry on for the next two or three hours without experiencing any inconvenience. However, after this period of time, signs of injury would appear. The eyes would first show signs of irritation; they would smart and water. The nose would commence to run, resembling very much the beginning of a cold in the head. Sneezing would develop and later the eyes would become reddened; then nausea and vomiting would appear, the voice become husky, and exposed surfaces of the skin would take on a reddish appearance, with a burning sensation.

One of the marked effects of this gas is on the upper respiratory tract, which becomes greatly inflamed, and in severe cases, the throat resembles very much one of a diphtheritic type.

The third group are the arsenical poisons, or sensory irritants, of which diphenylchlorarsine is typical. These gases have a very powerful irritant action on the mucous membranes of the eyes, nose and upper respiratory tract and they also produce painful blistering of exposed skin. They are dangerous for those working with them, since their vapors cause respiratory embarrassment, faintness, more or less paralysis of the lower limbs, together with marked anaesthesia.

After exposure their effects appear within a very few minutes and develop in rapid sequence; intense pain in the gums and jaws, aching pain in the eyes and severe frontal headache, tightness and burning sensation in the chest, nausea and vomiting, followed by loss of sensation over certain areas of the extremities. If the gas is absorbed in the circulation it causes destruction of the red blood corpuscles, the development of anaemia, jaundice and destruction of the liver and kidney cells.

A gas which might be considered with this group is hydrocyanic acid gas. The dangers from this gas in the open air have been greatly over-estimated. Of course, we are all familiar with its action in confined spaces. It was used extensively by the French throughout the war as an offensive gas known as "Vincennite," but it did not produce many casualties for the reason that concentrations sufficient to do so could not be built up in the open. Professor Barcroft, an eminent chemist of England, has proved by personal experiment that a concentration of one part of gas in two thousand would have to be obtained before much effect could be produced on troops in the field.

When death occurs from hydrocyanic acid gas, it is attributable mainly to the direct paralyzing effect on the respiratory center and the heart. The substance temporarily stops all oxidative processes in every cell of the body to which it has access, but the tissues may recover their full vitality if the circulation and respiration can be maintained. The poisonous substance is quickly eliminated.

Cyanogen chloride, a war gas, is so closely associated with hydrocyanic acid that it will be mentioned at this time. Until recently ships were fumigated with either sulphur dioxide or hydrocyanic acid, but both methods had numerous disadvantages. This led to the adoption, by the Public Health Service, of a gas now used, a mixture of hydrogen cyanide and cyanogen chloride. This cyanogen chloride is an excellent fumigant, combining as it does, the toxic effect of the hydrocyanic acid with the warning effect on operators of cyanogen chloride, which acts as follows: A very weak concentration causes lacrimation in a few minutes and a stronger concentration causes irritation of the throat and nose, in addition to lacrimation. Long exposure to low concentrations produces only slight conjunctivitis, hoarseness and occasional digestive disturbances.

The fourth group contains the so-called tear gases or lacrimators. They consist of a group of chemical agents which, in low concentrations, produce watering of the eyes, and in greater concentrations, they produce pain and smarting of the eyes, together with spasms of the lids so that it is impossible to keep the eyelids open. The consequent interference with vision is quite sufficient to put a man temporarily out of action.

As the concentration of the vapor increases, further effects show themselves. The irritant action of the respiratory passages and lungs is rendered evident by a burning sensation in the throat and a burning pain or discomfort in the chest, and unless the affected man can withdraw from the contaminated atmosphere, there may be retching, nausea and vomiting. Lacrimators seldom cause any serious effects, their striking feature being the rapidity with which patients recover soon after being removed from the contaminated atmosphere, and the symptoms of those who are more severely affected usually abate within eight or ten hours.

Tear gases or lacrimators are used today quite extensively by the police departments of the various cities for the purpose of dispersing mobs, quieting uprisings, etc., and the advantage of their use is that they accomplish the purpose without leaving widows and orphans.

Certain gases interfere with the respiratory properties of the blood. Carbon monoxide is an example. It is not a war gas and cannot be so classified, nevertheless during the war many casualties resulted from it. This gas formed in large volumes upon the detonation of explosions and was carried through the porous soil into the deep trenches and dugouts.

The great danger from carbon monoxide lies in the fact that it is colorless, odorless and non-irritant, and that the onset of symptoms is so insidious that very often the first effect of its presence is failure in the power of the limbs which often prevents retreating to safety. This gas owes its poisonous properties to the fact that it combines with the hemoglobin to form a dissociable compound.

Because of the importance of oxygen, its strategic value in the realm of nature, and the fact that many deaths attributed to the effects of carbon monoxide are directly due to a lack of oxygen, brief mention will be made of it at this time. It is quite common to attribute early deaths in connection with fire hazards to the effects of carbon monoxide; in fact, this point is so generally accepted by the medical profession that it is never doubted. As a result of research in connection with our activities, sufficient data have been obtained at our laboratories at Edgewood Arsenal to lead us to believe that many of these early deaths in connection with fire hazards are not due to carbon monoxide, but to a lack of oxygen.

This point was well brought out a few years ago when we investigated the cause of many deaths resulting from a fire and explosion accident which took place in a modern building in one of our large cities. In conducting this work, a replica was made of the building in which the explosion occurred and detailed attention was given to proportions. The fire and explosion resulted from the burning of 8,500 pounds of film stored in a room of 4,250 cubic feet capacity, or two pounds per cubic foot. This ratio of weight to volume was adopted as standard in all our group of experiments. Thus a sixteen pound charge of film was used in a two cubic foot chamber, and the gas and flame resulting from the combustion of this amount of film were thrown into a horizontal cylindrical steel tank adjoining containing 910 cubic feet for gas and animal study.

Animals were carefully examined before exposure to determine the percentage of hemoglobin in the blood as an index of the degree of lung edema developed. They were also examined to determine the degree of saturation of the blood with carbon monoxide.

After exposure they were again carefully examined and symptoms noted. In some instances animals which appeared normal were sacrificed and autopsied to be sure that no injury had been received. The organs of practically all of the animals dying or sacrificed were sectioned and examined microscopically.

As a result of these tests, it was found that the immediate deaths were due to three things: carbon monoxide, lack of oxygen and nitrous fumes. Animals that were brought out unconscious from carbon monoxide poisoning and revived, later developed lung edema from nitrous fumes.

A few words about helium gas. You have all heard of helium, that new non-combustible gas used for inflating dirigibles and balloons. The spectacular rise of helium

from a substance rarer than diamonds to a strategic source of peace and war forms an interesting chapter in the romance of chemistry. This gas has other values beside those mentioned. It is used for the purpose of preventing bends, that condition so prevalent among men who work at great depths, and who are compelled to breathe air several times its normal density, as a result of which it becomes dissolved in the blood. Heretofore, these workers, before coming back to normal atmosphere, were obliged to spend from two to four hours in decompression chambers; with helium much of this inconvenience is averted. The breathing of a mixture of oxygen with helium, in which the latter takes the place of nitrogen in the atmosphere, reduces this decompression period about 70 per cent.

Our Service has recently had its attention called to the alleged toxic effects of sulphur dioxide. While the general impression prevails that moderate concentrations of this chemical are more toxic for the botanical kingdom than for the zoologic world, there is nevertheless insufficient data for use to make positive statements. Our Medical Research Section at Edgewood is now engaged in trying to establish the actual facts concerning the toxicity of this material. We have only quite recently started this investigation; however, I can outline to you the nature of the problem and our plan of attacking it.

We intend to study the toxic action of this material when exposure is for a comparatively short period to comparatively high concentrations; also to investigate the effect of long continued exposure to low concentrations. By this I mean the daily exposure of animals for six or eight hours to minimum concentrations, far below that required to produce symptoms at a single thirty minute exposure.

We have started this experimental work and we believe that we are already justified in reporting that for single exposures to comparatively high concentrations the results appear to indicate that the animals are killed or make a complete recovery.

Thus far I have confined my talk to a discussion of the immediate effects of the more important gases and were I to stop here and say nothing about the after effects, or residuals of chemical gases, I would be doing the subject an injustice.

Because of the large number of ex-service men claiming disability as a result of having been exposed to gas during the war, a special board was appointed a few years ago to go into the subject and make a thorough study of the residual effects of these gases. This Board was composed of Chairman, Dr. Allen K. Krause, Associate Professor of Medicine, Johns Hopkins University, Dr. Philip B. Matz, Chief of the Medical Research Division of the Veterans Bureau, and the speaker. The problems confronting the Board were the following:

First: To establish whether any or all of the several gases used during the war left residua, either anatomical or functional, several years following exposure; and if such residua existed, to determine their nature and relative importance.

Second: To obtain the impressions formed by military men, sanitarians and others as to the after effects of warfare gassing.

Third: To conduct an analysis of the present disposition of those men who had war records of having been gassed in the service.

Fourth: To carry on an exhaustive analysis of the entire medical histories, including all "sick and wounded" cards, together with diagnosis tags, of a fair cross section of men disabled by the various gases, from the date of gassing, through all the various contacts with the Veterans Bureau since then, and up to the present time.

While a definite report has not been made by this Board, it was impressed with the following probabilities:

First: That ten years after gassing there was a small percentage of patients who were gassed and who exhibited definite residua, either anatomically or clinically, or both, that were due to either one or a combination of gases.

Second: That not infrequently there has been a complicating respiratory infection, which, as is well known, might potentially lead to the same effects.

Third: That chlorine gas, when used alone, is much less likely to leave residua than mustard or phosgene.

Fourth: That the most common organic residua as the result of gassing are pulmonary.

Fifth: That the most frequent pulmonary residuum is a bronchitis of varying degrees of severity, usually expressed more prominently clinically than anatomically, and prone to exhibit recurring and asthma-like features.

Sixth: That active pulmonary tuberculosis is not a prominent residuum of the effects of any of the gases.

In conclusion, the tendency to blame all sequelae on the effects of chemical gases is believed to be due to the confusion of sequence and causation. Many feel that they have a claim against the government, or a claim against industry, and it is very difficult for this claim-bound mental complex to make a recovery. No man is so hard to cure as the individual who is not sick. No man is so hard to cure as the man whose cure will react to his financial disfavor. No man is so hard to correctly diagnose as the man who has an axe to grind.

Possibly this gives us the best insight into the differentiation of chemical injury from certain constitutional conditions, and possibly more important, the differentiation of chemical gas injury from the so-called case of compensationitis. Chemical gas injuries have one characteristic that may be of great value in differentiating them from compensationitis. Chemical gas injuries tend to improve or get worse. They tend to be progressive, either toward a favorable or an unfavorable outcome.

Do not misunderstand me—I do not wish to leave you with the impression that chemical gases do not present a very serious and important problem. I do not believe any one has had a greater first-hand evidence of the fact that gases can and do produce casualties. However, since it is impossible for me to discuss the symptoms produced by the different gases and the varied disease process with which they are likely to be confused, I hope this general statement of this important differential factor will furnish you food for thought.

Discussion

MR. CHAIRMAN ROACH: We have been splendidly instructed and entertained by Major General Gilchrist. I was wondering if any of you had questions you would like to ask him.

DR. F. E. WILLSON (American Red Cross, Washington, D. C.): In medical work carbon monoxide is one of the big problems. You brought out quite well the value of bodily resistance in these other gases. Do we have any information on the value of bodily resistance in carbon monoxide poisoning, or does it have any effect?

MAJOR GENERAL GILCHRIST: I really don't know. I am sorry. I might say regarding the clinical changes due to carbon monoxide, we examine these animals very carefully to find if there is any sign of carbon monoxide, and then we examine later on. We took the weight of these animals beforehand, and made a very, very careful analysis. The animal was put down as dead and taken out for the effects of carbon monoxide. We examined the blood and found there was no sign of carbon monoxide. They died from lack of oxygen. Some of them died from nitrous fumes. We found a great many of the early deaths were due to nitrous fumes.

Carbon monoxide is a problem. We are not doing very much. It is not a war gas, but it is an important problem.

The Russians have an element to combine with carbon monoxide to hold it down, and if they do they have a wonderful weapon. We haven't gone into carbon monoxide very extensively. I don't see why bodily resistance wouldn't be of as much importance with carbon monoxide as with any other gas.

DR. W. D. McNALLY (Consulting Chemist, Chicago, Ill.): On the subject of carbon monoxide, I was interested in what Major Gilchrist said regarding the lack of oxygen; that a number of these deaths were due to lack of oxygen. Having examined many thousands of cases of people who had died of carbon monoxide where it was alleged there was a deficiency of oxygen, I found these people died of carbon mo-

noxide, (covering a period of about seventeen years in the coroner's office here in Chicago). So I do not believe it is a lack of oxygen.

With other gases, like carbon dioxide that we had a discussion on this morning, death occurs there due to a lack of oxygen, especially when the percentages of carbon dioxide are over 23 per cent.

ADJOURNMENT

Wednesday Luncheon Session

October 14, 1931

OPEN FORUM

What Is the Matter with Industrial Health?

DR. W. R. REDDEN, Chairman

Associate Health Director, Cleanliness Institute, New York City

The Luncheon session of the Industrial Health Section convened with Dr. W. R. Redden presiding.

CHAIRMAN REDDEN: We have, to my mind, one of the most important subjects to discuss this noonday which concerns the National Safety Council, as far as the Industrial Health Section is concerned, chiefly because practically everything in the matter of industrial health has something the matter with it. Of course, that is true of a lot of other things, but the Industrial Health Section of the National Safety Council is trying to sell the idea of full-time or part-time health and medical supervision to plants, nursing service and other types of service relating to industrial health.

The sanitary and safety engineer is concerned, the medical man is concerned, the insurance companies are concerned; as a matter of fact, we are all concerned, chiefly because health in industry, constructive health, is an attempt on the part of everybody concerned to hit into that 250,000,000 days of lost time per year, and as I said in one of the other meetings, the insurance people and statisticians are saying that only an infinitesimal amount of that is due to an actual industrial hazard.

Now, if we can get out of this meeting some simple statements to clarify "what is the matter with industrial health" the time spent here will be certainly worth while. The meeting is yours, and if I attempt to talk too much I hope you will just throw something at me, because I much prefer to have you do the talking. There are not going to be any hymn tunes in between to get you stirred up and emotional, you know.

Dr. Gray is going to tell us that the trouble with industrial health is because the Health Departments throughout the country have no departments of hygiene and sanitation and all the rest of it, and can't go into industry. He happens to be the only full-time doctor connected with a Health Department concerned with occupational diseases.

Dr. H. S. GRAY (Health Department, Hartford, Conn.): I think you might be interested in what we are doing in Connecticut. I feel that we all acknowledge that health must be affected by the environment of the individuals who are working in the various factories and industries in the country. The individual spends from a third to almost half his life there, and certainly if there is anything in that environment that affects health he is going to be affected. Realizing that fact, we started out with the idea that industrial hygiene generally was not a question of mere inspection, of going around and looking at the toilets and the house-cleaning and any particular type of washing facilities, but it meant something more than that. It meant the application of precise physical and chemical methods to determinations of work and environment, in order that we might know whether a hazard did exist, and to what extent that hazard did exist, and where that hazard existed. The only way you can do that is by using proper technical methods.

Take the question of silicosis and sand blasting. We do know fairly well in sand blasting, in exposure to free silica, the number of particles or the particular percentage of free silica that will in all probability cause silicosis. It is very important for us to know that. In other words, we know the threshold dose of free silica

fairly well, well enough to work out proper protective programs. But unless we are able to analyze thoroughly and definitely and precisely the actual exposure of the individual in industry we are not in a position to say whether any particular group of workmen is subjected to a hazard, and what might be done to take care of it.

We, in Connecticut, in the case of sand blasting don't go into a foundry where they are doing this and say, "Well, this looks pretty dusty to me. I don't think these men are properly protected." They may be interested in your opinion—and they probably are not.

I have found most foundries have a gentleman that they use very definitely, and from their viewpoint he is a very definite asset to their association. When you tell them that conditions look pretty bad there they bring him out. He is a great, big, "lanky" fellow, and they say, "He has been doing that for twenty years."

The fellow pats his chest and says, "Look at me. It has not hurt me." Well, his opinion is as good as yours.

But if you go in there as the Public Health Service, as we are doing at the various foundries in Connecticut, and actually make a dust determination of the exposure of that individual, with the knowledge of the amount of free silica there and a knowledge of the threshold dose of that material, you are in a definite position to give the industry facts. That is what the industry wants. If you can show them actually what the exposure is and you know what exposure will cause injury to health, then they are willing to listen very readily to possibilities of correction.

This same thing is true in whatever other hazardous material may be used, whether it is carbon disulphide or hydrogen sulphide or chromium plating—it matters not.

I was very much interested the other day in a study we made in a chromium plating plant. They knew they had a very good set-up. Why did they know that? Because their own plant engineer had designed it. Of course, he knew all about those things. They had not been content to do as ordinarily is done, put a ventilating slot on each side of the tank. They wanted to do a really good job, so they put a hood over the tank, and they thought if slots were good if they put a hood on it was better.

They had been having a little trouble. A man had had chronic acid sore nose and sore throat and occasional bleeding. They were wondering just what could be done to remedy it, so we made some determinations there. To cut a rather long story short we found the tank was very much better without the hood. The hood just pulled a sufficient amount of this material up above the surface of this tank to expose the worker to an amount that, particularly on hot, humid days, affected him. As a matter of fact, we were able to show them that they could have a better installation, with less expenditure of money and less expense in pulling air through the ducts, than they actually did have.

I think this absolute, definite knowledge of the facts and conditions is very necessary if you want to sell this idea to industry. Then they will acknowledge it. You can go to the executive and he will say, "Of course, it is desirable for us to have an environment that is healthful for the workers." But unless you can prove to him that his condition is undesirable, unless you can definitely show him facts, he is going to take the opinion of his foreman. If you can show him facts he will acknowledge that it is desirable. We have made several hundred surveys in Connecticut, and many, many studies, and we have yet to find a factory executive who was unwilling to listen when he had the absolute facts put before him of the amount of material to which the workmen are exposed compared with the actual threshold dose.

Just one other word. In a good many of these other substances we don't know the threshold dose, but in a good many conditions we do know where there is a good installation, and we figure with a material or process where we do not know the actual threshold dose it should be kept down to the amount that can be had practically in this good installation. We take some good installation, in a case of that

kind, and make that the example, suggesting to the industry that they keep their environment in such condition that their workers won't be affected by it, and thereby, of course, preserve efficiency, health, happiness and life.

CHAIRMAN REDDEN: Dr. Gray has said, in brief, that the trouble with industrial hygiene or health is that you don't know how to sell it to the management. They have got to keep production going. If you can't prove that it saves money you are out of luck.

Dr. Knapp, of the Cheney Company, is going to tell us that all the trouble with industrial health is that the doctors are no good. They don't know anything about industrial health and hygiene. All they want is to collect a little pin money on the side to pay automobile storage during the winter. Industry recognizes this and, therefore, won't employ the doctors. Dr. Knapp.

DR. R. P. KNAPP (Cheney Brothers, South Manchester, Conn.): I think it is very helpful on the part of the chairman to tell us just exactly what we are going to say. I didn't know before he spoke about it, but I think in general what he said is perfectly true.

While a great deal of public health or industrial health work is being attempted, and many things in that line are being undertaken, there is not really enough of it being done in as complete a manner as it should be. In fact, I should say that probably there is not more than fifty per cent of this work being done compared to the possible one hundred per cent which might be done.

In regard to the ability of the physician, I think that also varies to a very large extent. I think Dr. Redden will agree with me that the type of physician in industry has improved considerably in the past dozen years, and although there is probably still a very large chance for improvement I don't know that I can tell you concretely or definitely just exactly what is wrong with industrial health.

CHAIRMAN REDDEN: Dr. McConnell, of the Metropolitan Life Insurance Company, who did the original research work on industrial dermatosis while he was with the Public Health Service, is going to tell us how to sell health service to industry. He didn't know that, but he can talk about anything he wants to. I will assign you subjects and then you can do as you like.

DR. W. J. MCCONNELL (Metropolitan Life Insurance Company, New York, N. Y.): That subject is as good as any other. We do, as we all know, find it rather difficult at times to sell health to industry. It is usually, however, due to a misunderstanding on the part of industry as to the real purpose of this health service. I have had men tell me, when we recommended medical supervision and physical examinations, that they would not think of doing such a thing, that they had well-trained men, that there were very few of them that qualified for certain occupations, and it was just out of the question. Well, it was not due to the fact that it was out of the question, but it was due to the fact that they misunderstood what we mean by physical examinations.

They understand that a physical examination is made for the purpose of eliminating certain individuals. That, of course, is not the primary purpose of a physical examination. The primary purpose of a physical examination, of course, is temporarily to eliminate those with infectious diseases, which is no more than just to their fellow-workers. But the chief purpose of the physical examination, of course, is not to eliminate but to place properly the individual in industry according to his abilities and his physical conditions.

We know that this has been abused to a great extent. It has been used by some companies purposely to eliminate even employees who were not physically handicapped. Those of you who are doing industrial work know that. I know when I was doing some of that work I had the same proposition made to me, usually by the personnel director who has no particular reason for not hiring a certain man. He will usually approach you and ask you to eliminate that man on a physical condition. So it has been greatly abused in that respect.

If we will sell medical supervision and health examination on the fact that it is

for the purpose of placing the man properly in industry, and more or less taking him out of that subnormal standard class and placing him in the standard class, I think we will do a great deal toward selling the health work to the various industries.

CHAIRMAN REDDEN: The meeting is open. I am just calling off names because I am not going to waste a second of our valuable time. If you don't talk I am going to call on you. All right, Dr. Bricker is going to tell us her approach to this subject and what is the matter with industrial health.

DR. ELIZABETH B. BRICKER (Chief, Hygiene and Sanitation Section, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.): This is very close to my mind. I'd like to know how the medical service for the small plant can be managed not only in Pennsylvania, but in every other place. The larger plants usually have their good physicians and good personnel all through their medical service, but it is to the small plant, which employs the greater number of people, where the people are less carefully supervised than in the larger plants, that I feel we need to give the most care and thought. If anybody can solve that I think he will be doing a great thing, not only for the small plants, but it will react on the large plants, too.

CHAIRMAN REDDEN: Thank you, Dr. Bricker. I am going to ask somebody to talk from the layman's point of view. He is the fellow who knows all about a subject you are not supposed to know anything about. To the minister every one in the congregation is a layman; to the doctor the patient is a layman, and to the nurse even the doctor is a layman. Mr. MacLachlan, of Toronto.

WILLS MACLACHLAN (Toronto, Ont., Canada): Possibly one experience we had with a transmission line built through the northern territory, into which we had to send a considerable number of men to carry that out, might be of interest. The first thing we did was to do a physical examination, quite frankly for rejection. We were sending them into unsettled territory.

The next thing we did was to carry out an inoculation for typhoid fever. The next thing was to vaccinate them for small pox. We furnished a complete medical service through about one hundred and eighty miles of bush in a number of camps. The work was carried out through last winter and this summer, and the job was finished about September first with very excellent results. It is a difficult thing to carry out medical service way back in the bush, but we had no particular trouble, due to being organized.

There is one thing I would like to mention. I am not a doctor but I have doctors on my staff. The medical files are not available to anybody but the medical force, and when an employee is reported ill and off on sick leave, neither his foreman, department heads nor executives are advised why. The medical department says that man should not be at work. It is up to them to take that responsibility. In that way we have had no trouble getting it over to the men. They go to the medical department without any fear that anybody but the doctors and medical department will know anything about their situation. I think possibly that has been very prominent in other places and I think if that could be corrected you'd get over some of those troubles.

CHAIRMAN REDDEN: I see Mr. MacLachlan is not a medical man but he can probably tell any medical man in the audience the wherefores of electrical shock and other things of that nature. He has devoted a large part of his time to studying these problems and, like many laymen, is not overburdened with all sorts of titles that hold him down, so he is a free lance and can do a lot of things.

MR. MACLACHLAN: I will be glad to answer any questions if I can.

CHAIRMAN REDDEN: What Mr. MacLachlan has said is that there is a conflict between executives, who want to know what the trouble is, the medical profession who won't tell the trouble if they follow their professional ethics, and the worker who is afraid that the doctor will reveal to the executive what is the matter with him and he will lose his job because that is one of the extremely important things

from the labor department's point of view, and it is also extremely important all along the line.

R. B. WATSON (Chicago Tuberculosis Institute, Chicago, Ill.): I would like to raise one question, a question which affects our work particularly. Where does the responsibility of the average medical service of the typical industry for health education end and where does the responsibility of the health education program of a community organization, such as ours, begin? We are in the business of cooperating with the industries. Our service was established as a direct result of the request of the Chicago industries, and we cooperate with the industries. Should it include health education as a part of its medical service, or should it not? I'd like to have some discussion on that question.

DR. C. P. SEGARD (Third Avenue System, New York, N. Y.): I early established a principle in the company I am with. They had been selling all kinds of things, from potatoes to nuts, to the employees, and I thought that we were wrong in a public utility in taking the job of the retail man away from him, and I think the same thing with regard to health, so the axiom is never to do anything in industry that the community can do as well or better.

So I say to the Health Department, there are many things that the Health Department can do as well or better than industry, and at a much lower cost. There are many things that the Tuberculosis Association, American Public Health Association, and innumerable organizations which society has established within itself, can do better than I ever thought of doing them, and for that reason I make use of them to the fullest extent.

CHAIRMAN REEDEN: Thank you, Doctor. I feel tremors down there in the region of Dr. Sappington, but he is not the guilty man. Dr. Greenburg, come on. I told you what you were going to talk about.

DR. LEONARD GREENBURG (U. S. Public Health Service, Yale Medical School, New Haven, Conn.): I felt tempted to talk about the Cleanliness Institute, but I think perhaps you can do more and better justice to that than I can.

This old question of what is wrong with industrial health is a very interesting one, and I am sure there is no one single solution of the whole problem. As Dr. Gray pointed out, the object is to keep the worker up to a high health standard—preserve his health. Just how you are going to do that, I take it, is more or less the object, concisely stated, of this Industrial Health Conference.

How are you going to do it? In the first place, you have got to approach it from the personal point of view, namely, by physical examinations and, perhaps, treatment of some kind at the plant. The second thing to be done is to maintain a satisfactory environment, and Dr. Gray has clearly pointed out that there is only one real way of doing that, by the determination of acceptable standards for temperature and humidity and air motion and dust counts and ventilation and what-not. Once those standards have been obtained and put into force the environment will be satisfactory.

As I see it, the chief drawback to getting this final result which we are after is the fact that the employer is not convinced that this is a desirable thing to obtain under ordinary conditions. The big plants where they are sufficiently health conscious about problems of this kind realize that they would run into large losses if the health of the workers is not maintained. In smaller plants, where one-man control and management is often in force, the management is not aware of the fact that health is so important. If he has a man who is sick, well, it is only one man out of twenty, thirty or two hundred, and it does not make so much difference.

The third part of the problem, then, becomes educational, and I think, perhaps, that is where we have really fallen down. We have not sufficiently educated the managers of small plants that it is beneficial to keep the health of the workers at an operable point, and it seems to me that should be a very good point of attack for the next five or ten years, by demonstrations as to how much sickness costs and how

much lost time costs, both to worker and production and management. I think studies made along those lines will help in a large measure to convince small plant owners that the thing to do is to make some real efforts along these lines, in order to help solve the problem of efficient production at a lowered cost and a higher quality of human health in the workshop.

DR. SEGARD: I think one of our problems is the medical and physical rejects from industry, those whom we don't accept on account of medical and physical rejection, and I think the question ought to be studied to see if there is not some way we can accept those, within the next five or ten years.

Mrs. EL RENE HUBBARD (Chicago Tuberculosis Institute, Chicago, Ill.): For the past eighteen months I have been giving health talks in industries in Chicago, calling on 65 of the 70 listed with the Department of Commerce. I have called in the largest industries, down to the smallest, impartially, and I have found a tremendous health consciousness in the industries in Chicago. In fact, were I to attempt to give you an average figure you would not believe it. You would think I was trying to hand our organization or myself, personally, a bouquet. It is not so. The managers throughout the whole industrial world are keenly health conscious.

I believe one of the most effective ways of presenting health problems is through a definite educational campaign, either by the industries themselves or by some public organization, something that can be made practical in the employee's life. In getting up to give a talk to a group of people of average intelligence you can't give them the high-sounding technical things. You have to speak in their language and their terms. You have to give them something that they as individuals meet every day, and which is a part of their lives.

Yesterday at noon I spoke to several hundred women in a candy factory. This noon I gave a talk to a large group of men in a gas fixture factory. Tomorrow I will be with the Commonwealth Edison Company on an extensive program in the public utilities; the next day will be something else. There has been no end to it, and I believe the splendid reception of these health talks is traceable to the national safety program. Wherever I go I find that they are always quoting something from this organization.

DR. GRAY: Might I ask whether those talks are in relation largely to personal hygiene, and are they related to conditions you would find in the industry? For instance, in a foundry would you tell them the condition that might be expected in a foundry that was not properly run, that did not have the proper masks, the proper type of ventilation? Or would you tell them in a place using spray painting the difficulties that might be involved if they did not have sufficient ventilation? Or is your program largely a question of their own personal hygiene?

Mrs. HUBBARD: The talk is built around the value of the annual physical examination in picking up curable diseases at the curable stage, and the value of early diagnosis. It is also built around the value of mental and physical recreation, the daily living habits of twenty-four hours, and that sort of thing. I keep out of a local problem. If there were to be any criticism it certainly would not be given out to the employees. If there were some industrial hazard I'd be the first person to tell it to a group. I might talk with the management back in a corner, well sheltered, but I certainly would not stir up any antipathy against the employers among the employees themselves.

DR. GRAY: I think that is fine, but I do feel that there are two things in this health program. One is the education of the individual. I would not suggest for one moment or conceive it possible that you would talk to the workers about a thing of that sort, but I wondered whether there was an attempt, I hesitate to say to educate, but at least to inform the employees of the conditions that their processes or materials they are using might have on the health of the individuals in the plants. Certainly there is no question but that the education of the employee, as you are doing it, is a very desirable thing, but it is astounding to find the number of in-

dustries to which we go where the employer apparently does not know the very hazardous conditions under which many of his workers are being affected, and I think that there is an educational, or at least informative, program necessary in that particular instance, too.

LEWIS E. MACBRAYNE (Boston Safety Council): We have done some rather interesting work along this line. We have a very large Safety Council. We have a highly organized group of industrial women. Then we have a highly organized group of men in industry called the Engineering Section. They have a course of dinner lectures, both of which opened last week. We present at least five doctors each year on special topics directly relating to industry.

We find this interesting thing, that the women want to know how to prevent the thing from happening, so, for instance, we will have a talk on "Skin Diseases", illustrated with actual types of hazards of industry, represented in the group. We opened the Women's Course the other night with a woman from the Psychopathic Hospital. She talked on, "Cobwebs in the Worker's Mind." We had a meeting in the theater with twelve hundred employees, and they wanted to talk on "Infection." I rather upset the very able doctor by telling him his topic was, "Bugs Too Little to Step On."

We have in my territory the largest candy factory in the country. When they had been running a year I went over and looked at two things: first, their record of cases reported to the hospital. They have a beautiful organization, and when I saw the number of cases that came into that office I said, "You must have had an epidemic here. Let me look at your accident record." They had the lowest accident record of any candy factory of the group of twenty-five with which we are familiar. Then I discovered a part of their health instruction was to catch the girl whenever she sneezed and tell her to go up and see one of the nurses. The nurse, perhaps, passed her on to the doctor, who said to her, "You are all right," or "Go home and stay for one or two days."

Other industries during the last epidemic of influenza were losing people because everybody said, "Quit work and go home." In that factory they went right straight through every morning, and if a girl showed symptoms of a cold coming on they said to her, after the proper examination or inquiry, "You have not got the 'flu.' Work today and we will see you before you go out tonight." If it looked as though she was developing a hard cold they said, "Go home and stay in bed a couple of days and come back and you will be all right." Invariably she did come back all right, and they cut down their loss through that.

It seems to me the first problem is to make yourself so interesting in the industry that the worker, the manager and the president of the company will come down and inquire about it. Most of our professional men are so modest and so very busy that they don't dramatize their own good points, and they forget that these things, which to them are routine, are after all more or less of a mystery still to the general public, which includes the vice-president or the president of the corporation.

CHAIRMAN REDDEN: I am glad that they are so intelligent in Boston that they can distinguish between the "flu" and a common cold. I want to interject this statement about common colds, because there are more absentees because of common colds in schools as well as in industry than from any other disease, and in many of the finest schools, for example, Gary, Indiana, they are compelling children to stay home for two or three days when they have the "snuffles." I think that time is coming, and if we can build up somewhere in industry some place to take care of children and other individuals who need care while people are going to work we may get somewhere in the problem. Absenteeism during the process of getting rid of a cold is a mighty fine thing for the industry, just as in getting rid of an infection that is ready to spread over the whole place.

I want to tell one story. This is my last two minutes, anyway. There is a commission studying common colds. The commission found, taking a place up in Spits-

bergen where no people have come in contact with the community for over six months, a mail carrier who came over the snow on sleds had a common cold. He had not been in the community more than forty-eight hours before a definite epidemic of common colds appeared in the whole community. I did not know that was true of mail men but I knew it was true of ice men and people of that kind.

The point is this: common colds are passed on and are contagious. They are communicable. They did the same thing in a tropical island, where there had been no intercourse whatsoever with the outside world for a number of months. The idea was to get the variables eliminated as far as possible. Along came a sailing vessel with two people on board who had common colds. Within forty-eight hours all the people on the island had common colds. There is a sailor's life for you.

Many of us are still thinking that common colds are, after all, something mysterious. They are not. During the war they muzzled the people who came in contact with influenza cases, instead of muzzling the people who had the contagion. It was like putting shin guards on people to keep them from being bitten by mad dogs, instead of putting muzzles on the dogs.

If we think in terms of that kind I am sure we will be able to sell medical service to industry. We have got to think as medical people and hygienists, straight and in unison, before we can sell anything to the superintendents and managers who are responsible for production, who are responsible for cutting down overhead costs.

ADJOURNMENT

Wednesday Afternoon Session

October 14, 1931

DR. C. O. SAPPINGTON, Chairman

Director, Industrial Health Division, National Safety Council, Chicago

The final session of the Industrial Health Section convened with Dr. C. O. Sappington presiding.

CHAIRMAN SAPPINGTON: In the absence of our Vice-President for Health, Dr. C. E. A. Winslow, and in the absence of our General Chairman and our Vice-Chairman of the Section, and also because our General Chairman for next year is now giving a paper in another Section, it devolves upon the secretary of your Section, after exhausting all other possibilities, to fulfill the obligation which usually falls on the chairman of a meeting.

We are particularly fortunate in securing this afternoon some gentlemen who have had special experience in the general subject of the "Mental Aspects of Accidents." The first paper is by Dr. Ralph C. Hamill.

The Mental Causes of Accidents

By DR. RALPH C. HAMILL

President, Illinois Society for Mental Hygiene, Chicago, Ill.

A few years ago you were addressed by Dr. Harold Hulbert on this subject, and he gave a number of mental causes for accidents, taking them up under the general headings of "Respect and Self-Respect", "Morals and Character", "Happiness", "Anger", "Surprise", "Fatigue", "Criticism", "Fear", "Anxiety", "Fascination", "Comparisons", "Discipline or Obedience", and "Phantasy"—quite a spread and quite a number of mental characteristics that could be held somewhat accountable for the causation of accidents.

My point of approach is not a detailed one. I don't feel that I know enough about the details of what goes on in a man's mind to be sure of just what it is at any particular moment that leads him to some kind of misfortune or some kind of act that gets him into trouble. So I can only take it up from a general point of view.

My point of view is this: Every man and every woman, every worker, has a sense of his importance, has a yearning, an urge toward independence and individualism that is the normal heritage of the human being. I am sure that it is perfectly true that each one of us is the most important thing in the world to ourselves. Whether a man happens to be earning a dollar a day or a million dollars a day, he is the most important thing in the world to himself, and after all, it is himself that really counts, from his point of view; he is the most important thing in the world.

Well, what happens to men and women who work all day under the orders of other people, who have to fit themselves into an organization, who are the wage earners, who have no chance to give orders, have nothing to say about the conditions of labor? They have to take what is given them.

The large employer pats himself on the back and says, "I give these men work. They ought to be thankful." And in times like this, I guess they are. He is upheld in his idea. But what happens to the state of mind of the man himself who has to accept that giving to him of work?

Well, obviously he has a minimum of reason for assuming his importance so far as his job is concerned. I won't go into what may happen at home, where his wife may throw the rolling pin after him as he goes out the door, and where he has to meet the bills, and the kids are crying, and all those other irritations that certainly

don't contribute to a man's sense of importance. But on his job he has very little reason to feel his importance.

What does that do to people's minds? I am convinced that it develops a certain amount of resentment in the minds of men if they are any good; they are going to be resentful. If this development toward independence and individuality has attained any strength in them, they are going to be resentful against those conditions of life that take their sense of importance away from them.

I feel that we can learn from children more about mental conditions than we can from adults themselves, because in the first place we are adults, and we don't like to know too much about ourselves, especially along unfortunate or what we call bad lines. We don't like to know too much about ourselves. But we can see things in children, because they are not us, that we cannot see in ourselves, and it strikes me that whenever I see a child that is hurt, if it is not hurt too severely, there is much more resentment in its attitude than there is grief. The crying of a child that is hurt is almost always a resentful crying, and it loses no time in putting the blame on somebody else, if there is any chance to so shift the blame. The responsibility is somebody else's. "He hit me," "He pushed me," or "He got in the way," or "He tripped me up," or something like that is the inevitable reaction of a child to getting hurt.

In the second place, in regard to children, and perhaps we are not too old to remember it ourselves, children have a tendency to say to themselves, "Well, when I am dead, then they will all be sorry." In other words, they are resentful and they are willing to think of themselves as dead in order to think of the sorrow, the getting square with the other people, that their death is going to bring about; and that is a pleasurable idea to them, in the sense that it gives them satisfaction. Their importance is sufficiently great so that when they are hurt they make other people sorry, or when they are dead everybody is going to be sorry. That is, I think, clearly enough seen in children.

I have never put that to an adult who was under thirty-five or forty who could not remember when he or she thought that same thing. I think one might say that is a rather universal quality of mankind when it is young.

From adults we can learn something along the same lines, namely, in intensive psychiatric work such as is done in psychoanalysis we find inevitably in every case that we work with conditions that we call Sadism and Masochism, which are words of various origins, but what they mean is an interest in suffering—Sadism, the forcing of suffering onto others, and Masochism, the bearing of suffering in one's self. We find that in all grown-ups there is some curious kind of feeling that you might speak of as fascination that has to do with suffering.

You can think of a crowd gathering around an accident. Why do people gather around an accident? Somebody is hurt. Why are they all so interested? There is something the matter. That interest is not purely sympathetic. It is an interest in the suffering that is going on.

Why is there this interest in suffering? Well, I can't go very far into it in the time allotted to me, but I feel convinced that one of the sources of this interest has to do with the inevitable sense of guilt that is developed in all children in their bringing-up. I say "inevitable sense of guilt." I imagine if a couple of policemen came in that door, apparently looking for somebody, that every one of us would feel a little easier when they went out. We all have a little sense of guilt hanging around some place. Anybody that has not done wrong—well, I guess He was crucified two thousand years ago. I don't know of anybody now that has not done wrong and has not been tremendously corrected and has not been, as we say, "well brought up" by a careful father and mother, with all the corrections that this implies, corrections that inevitably bring about a sense of wrong-doing or guilt in our childhood.

What happens to a sense of guilt? One of the things that it does is to bring into our minds the idea that punishment expiates the guilt, that punishment satisfies that which is angry at us because we feel guilty because we have done wrong. Self-in-

flicted punishment is common enough among children who blame themselves for this, that or the other thing. Self-inflicted guilt is also very common among adults, but we don't recognize it as such. We call it melancholia or some other fancy name and get away from the idea that it is self-inflicted guilt or self-inflicted punishment, which is an attempt to satisfy the powers that be or something of the kind, and let us feel that we have suffered and, therefore, we are not going to be punished any more.

It seems to me that is obvious enough if one thinks of the Christian martyrs of one thousand years ago. If they suffered they felt they were that much holier, and the person who could stand the most suffering was the holiest.

Well, what do we do today? That is not the fashion. That is not rational behavior today, but we have our melancholics, and are they not doing exactly the same thing, inflicting punishment upon themselves? That, of course, is a rather special and exaggerated type of reaction, but all these special and exaggerated types are present in everybody all the time in some degree.

I have tried to lay the foundation for the idea that in the thwarted sense of independence or self-importance of the wage-earner there can be and there can develop resentment against employers, against anybody that is over them, and that resentment can lead to all kinds of unfortunate thinking—thinking that is suffering, thinking that is related to suffering, and in that kind of thinking, slipping into some kind of situation where injury is inevitable—is very easy.

For instance, a friend of mine is running a concern down in Indianapolis. He has worked for twenty years—I remember seeing him once and he was almost crying. He said, "My God! I have worked for seventeen years with these people and they are trying to raise my pay again." He runs this concern that runs itself. There is a Factory Committee and an Office Committee, and they decide all questions of labor, pay, salaries, etc., and they now have the profits of the concern. He has managed to turn over to them the whole concern. He has worked hard for about twenty-five years to bring this about. He is a very idealistic person. I need not say that, I suppose.

It occurred to me that it might be interesting to find out what their accident roll was, and so I wrote him, and this is the reply: "I find on investigation that we have no figures of accidents. This is because we have practically no accidents, and have not had any for a good many years. It is the opinion of some of my associates who have been with the company for many years that before we established our new program we had some accidents, but that is merely an opinion and cannot be supported by any book records. I don't know whether the testimony of the State Inspector of Canning Plants will be helpful to you, but he has told us many times that we take very much greater precaution to avoid accidents than any other canning plant in the state, and that we are always willing to cooperate with him in any suggestions he may make; whereas, other canning plants always try to avoid following any suggestion which may cause additional expense."

I think he tells me the truth, because as I have known him, he has been closer to telling the truth than any man I have ever met; I am pretty sure they don't have accidents if he says so. I think the reason they don't is because they run themselves, and every one feels his own importance. They don't have to feel that they are resentful against somebody because that fellow can tell them just what to do and what not to do and can dictate to them as if they were slaves.

Of course, this is not Russia, but it seems to me that to meet this mental situation in regard to accidents some such general fundamental basis as this has to be what we build on. I think it would be tremendously interesting to find out how many accidents there are under a brutal foreman as against a foreman who is a friend of the men under him, what that sort of thing amounts to in industry, and with the lessened hours of labor there might be more meetings and more discussion of grievances and an attempt to bring the men themselves into some kind of sense of their importance in the situation rather than merely feeling that they are slaves. Then, of course, there is the question of any participation in earnings, and I think this is a very im-

portant side of the whole damage question, this compensation matter. I am perfectly sure that I have seen many an injured person who wanted to get square, to whom the giving of damages meant that that was an acknowledgment of his importance rather than that he was going to live on those damages for the rest of his life. If he is important enough he is given something for his hurt feelings; if he is not important he is not given anything, and that, of course, is not complimentary to him.

CHAIRMAN SAPPINGTON: A discussion of these papers will be reserved until the final one has been given, as that is the way the program has been arranged; so please keep your questions and your comments and we will be glad to hear them a little later.

Our second speaker this afternoon is Dr. H. Douglas Singer.

The Mental Effects of Accidents

By DR. H. DOUGLAS SINGER

Professor of Psychiatry, University of Illinois Medical School, Chicago, Ill.

The subject of the mental consequences that follow accidents rather startled me when I was asked to speak about it, largely because I have a very strong conviction that much of what is put down as being the mental consequence of an accident is really a consequence of something else, in which the accident plays a somewhat secondary role.

In thinking over the various ways in which one can attack this problem it seemed to me that, first of all, one should divide up into various categories the kinds of consequences of a mental sort that may follow as the result of injuries. In medicine we are in the habit of dividing these into two large groups, the first of which would be those that result from an actual structural damage—let's say an interference with the actual structure of the brain itself.

The second large group is a group that we technically speak of as being functional. What is meant by that term is that there is for some reason a disturbance in the function performed by the organ, in this instance the nervous system, which means the function of the whole body, but without any detectable interference with its structure. That is to say that, if one were to examine the nervous system, for instance, of a person who has had a functional disorder, one would find no evidences of any actual damage having occurred to it.

Many people, of course, will say and do say that this does not mean that some damage has not been done. It merely means that you have not been able to find it. Of course, that criticism is one that cannot be met. That is obviously true.

I am going to take first for consideration those forms of damage that, perhaps, are the most obvious, those which are structural in character, and, as I said, what I mean by that is that there has been actual damage done to the brain. There are certain things that it is important to realize in connection with the way in which the brain is actually built up which are of importance here.

The brain is probably less liable to damage than any other organ in the body. It is enclosed, as you know, within a very strong, well-built, bony box, and not only that, but it is also floating in a bed of fluid, liquid, which serves to diffuse any shocks that may be applied to the skull. It must be realized even further that injuries applied to the skull that may actually fracture the bones need not necessarily damage the brain at all, as far as methods of examination can tell.

Now, if one consults actual experience with regard to the results of injuries you may be somewhat startled to hear the statement that as far as the most severe forms of mental damage are concerned, those which most of you think of as insanity, accidental injury is a very rare cause. I say it in that way for this reason, that when one takes a history of the friends of some patient suffering with a form of mental illness of that kind, it is quite common to have them relate that there has been an injury to the head at some time in the patient's life. Yet, if we will look at the actual

statistics of hospitals for mental diseases, we will find that this injury as a cause of mental illness plays a very small part, indeed.

The last figures that I have for the state of Illinois are those of 1929. In that year, using all the state hospitals of Illinois, among people who were admitted to a state hospital for the first time in their lives, only four out of each thousand were said to have any connection with injury. My own experience would tend to make me believe that even that figure is too high.

I was interested this morning to receive some statistics from the state of New York, this time for the year 1930. There were somewhat over 9,000 first admissions to the state hospitals of New York in that year, and the total number that were ascribed to an injury was only 92, about 10 per thousand, so that one cannot think that this cause is a very large one.

There is one answer that could immediately be made to that situation, and that is that any injury that is sufficiently severe to damage the brain badly is liable to result in immediate death or death in a very short time. There would not be time for the development of the mental consequences that otherwise might follow.

There are unquestionably, also, a number of lesser degrees of damage which do not result in the necessity for sending a patient afterward to a state hospital. I have no statistics with regard to their frequency, but I can say that from personal experience with patients one comes upon them only occasionally.

There are certain features in regard to this particular group which are, I think, of interest to a body of this kind. There has been quite a good deal of study given to such damage, and one of the striking elements that has appeared in the last few years—it is quite recent work—has been the discovery that in cases of this kind one can demonstrate in the patient the fact that the brain has undergone shrinking, or, as we speak of it technically, has undergone atrophy. Certain particular methods of investigation by means of the X-ray enable one to visualize these changes.

That has led to a further study as to how this comes about. It is not a local damage to the brain at all. It is an atrophy taking place more or less all over its surface, and the answer that seems, at least, to have come out of the investigation is that this atrophy is in all probability due to the fact that when the brain gets injured at all it undergoes certain swelling, just like a bruise anywhere else on any other part of the body will result in swelling. Being shut up inside this bony box there is not the same room for the swelling to take place as there is elsewhere, with the consequence that the pressure inside actually causes the brain itself to become eaten away or to fade away.

This has a practical angle in the situation, for this reason: there is today in methods of treatment a possibility of helping Nature in taking care of that swelling by reducing the pressure. The fluid, for instance, in which the brain is held can be reduced in various ways, so that it is extremely important that immediately after severe head injuries the treatment that is applied should be done under adequate supervision. I say, I don't know the proportion of cases of that kind that there are, but I am satisfied from my own experience that they are not extremely common.

Another group that is often considered as belonging in this category is what has been considered the possibility of injuries giving rise to epilepsy. Again one must say that the influence of injury in the causation of epilepsy is very small. There are certain cases, due to an actual local damage to the brain in certain regions, which will result in particular kinds of epilepsy, not the ordinary general epilepsy. It may be of interest to you to know that studies that have been made of men who had severe head injuries during the World War practically never developed epilepsy. There have been reported a certain number of cases, and it is said that in those instances there have been other causes for the epilepsy; for instance, that epilepsy was present in the family of the man who was injured; but the total number out of all the head injuries in the war, as far as they have been studied and they have been studied extensively, has been extremely small.

If, now, we turn to the functional group we enter a field which is perhaps much

more controversial, and I say that for the reason that there is a difference of opinion as to whether or not what is called concussion of the brain, of which all of you have heard, really means that there has been an actual damage to the brain itself. In this connection, experience in the war is one of the most instructive elements that one can possibly have.

As you probably know, one of the greatest, if not the greatest, causes of disability among the soldiers in the armies (all the armies) was what was called at one stage in the situation shell shock, and it is interesting to know a little about how this view came about. Some examinations were made of the brains of soldiers who had died as the result of the explosion of a shell, but on whom there was no outside evidence that they had been wounded at all; in other words, they died apparently as the result of the shock, the force of the explosion itself. In some such cases there were found in the brain certain very minute bleedings or other changes scattered more or less indiscriminately throughout the brain. The conclusion was immediately drawn that in many instances a shock of this kind, which is not sufficiently severe to cause death, might nevertheless result in changes in the brain which might account for symptoms that appeared later.

Further experience tended to show that this conclusion in the vast majority of instances, at least, was not true. We began to know that what was called shell shock, with its particular grouping symptoms, occurred in men who had never been anywhere near where a shell was fired.

For instance, during the early stages of our entrance into the war I was, myself, able to show a patient to a class of army surgeons here in the city, presenting typical shell shock, who had never been out of Chicago at all.

We also began to realize very clearly that what is called shell shock differs in no way, except in the using of the war and war experiences, from the functional disorders that one observes in ordinary civilian life.

Another very striking observation worth remembering is that soldiers who had been captured by the enemy and placed in an enemy camp for the rest of the war never developed shell shock. Those observations were made by American army surgeons of allied prisoners in German camps, and it made no difference whether the man had been, perhaps, very severely injured by shell explosions or wounds of various kinds—he never developed shell shock.

Now, the answer to this situation was this: that this condition that had been called shell shock meant something more than just merely an accident. It meant that it was serving some definite purpose, not necessarily that the man knew what that purpose was or thought about it in any way at all, but you realize that the man who is interned in a prison camp is out of the war for good. The man who was injured and remained with his own troops had to return to duty as soon as he got well. Many of them did not get well for that reason, and I say again—and I want this clearly understood—not because he thought that out at all, not consciously, but nevertheless that was the mechanism that was at work.

In civilian life, apart altogether from injuries or accidents, we have to deal with an enormous amount of functional illness, the illness that is not based on any structural disease anywhere that you can find. In every instance this functional illness serves a purpose in the patient's life. It is a way of meeting something, and to use again our war experiences as an illustration, that seems utterly unbearable; it is a way out. In the army life, of course, this situation that was unbearable was fairly obvious. In civilian life it is often not obvious at all, and one may have to dig down deep in order to find out what the trouble is.

It is just as true in civilian life as it was in the army work that the vast majority of people adopting such a way of acting did so unconsciously. I imagine there are very few of us in this room or anywhere else who don't adopt unconsciously some way of meeting situations that we find hard to deal with, which is a way of shelving the necessity for actually handling them directly, and it becomes a very important element in illness generally.

When one comes to deal with the functional disorders that occur in very large numbers, subsequent to accidents, there are certain other factors, of course, which enter into the situation. In the first place, we have one possibility that the accident or injury actually did do some damage to this man's nervous system.

Secondly, we have the possibility of unbearable situations that the man is trying to get out of, or something that is not connected with his work at all, but which interprets the accident merely as a convenient way of meeting the difficulties that he is up against.

There has been another suggestion offered which occasionally holds true, and that is that this illness is assumed consciously, with a purpose of extorting damage or compensation for damage, and some people have spoken of these forms of neuroses, as we call them technically, as being compensation neuroses. I say that occasionally that is true. It occasionally was true in the army that a man shammed being sick, perhaps even injured himself voluntarily in order to escape service, but those occasions were rare and they are rare, I think, in industry.

It is a fact which I have observed a number of times that even a satisfactory adjustment of claims, apparently satisfactory adjustment of claims for compensation, does not mean by any means that the person is going to get well. I think that this in itself, while it helps to wipe away the suggestion that it was the claim for compensation that was causing the trouble, also has another feature; if one can eliminate the question of actual damage to the brain, and I think with our methods of examination today that can very largely be done, it means something more. It means that the reason back of adopting this way of meeting things, of being sick in this way, has a cause which is still operative, which is still there.

I cannot begin even to outline the nature of these intolerable situations. They are very, very commonly in the home and not in the work at all, all sorts of intolerable things existing in the home. There may be other factors in regard to situations in the work itself, conditions under which the people have to work. My own experience in most instances is that the trouble usually goes back into the more personal and private life of the individual himself, so that you will gather from what I have said thus far that I am not impressed with the magnitude of the mental effects of accidents.

Personally, I believe very much more strongly that mental troubles are more liable to cause accidents than the other way around. The field that appeals to me as a result of going over this situation in this way is that the major interest that a body of this kind would have in this problem—I mean the problem of taking care of the effects—is that of seeing that adequate care is given right from the start. One can say that in dealing with functional disabilities, which are emotional, after all, the earlier they are taken care of the more likely you are to get good results. That is only another way of saying that the more one practices a certain way of acting, the more habitual it becomes and the more difficult it is to break.

I would point out, first of all, there are certain things in the care of the actual damage to the brain, the structural conditions, and those are very important. In regard to the functional element of the situation, it is extremely important that that be handled early and by people who have some understanding of what they are driving at. It is very easy without intent at all for lawyers, relatives, even physicians, too, who don't appreciate the situation, to start one of these neuroses going by suggestions that there has been serious injury, and so on, sometimes, I am afraid, with more or less avaricious intent on the part of the advisor.

Those are factors that it seems to me are of extreme importance if one is to do anything in trying to get away from this great army of neuroses that are said to be the result of trauma, trauma meaning the actual accident or injury, but which really are making use of that to serve some other end.

CHAIRMAN SAMPSON: The third presentation this afternoon will be by Dr. Hart E. Fisher.

Reaction Time—A Factor in Causation of Accidents

By DR. HART E. FISHER

Chief Surgeon, Chicago Rapid Transit Co., Chicago, Ill.

Dr. Hamill first stated that he did not know the causes of accidents from a mental standpoint, and in my little contribution this afternoon I want to parallel that statement to some extent. What I shall have to say about our experience and about our various testings and various methods of trying to determine the accident-prone man will show that we are just as far off today as we were quite a number of years ago; incidentally, we really don't know what causes the usually safe individual to do something unusual in an interval of mental instability or lapse of memory.

In order to give you a little better idea of what I have to say, it will be necessary to go back about twenty years ago here in Chicago, taking the Chicago Elevated Railroads as an example. At that time the holdings were four distinct properties and had been operated by different managements. They were brought together, and after the organization it was found that there were many different types of accidents occurring, many different work practices, many different operating rules, and in fact, these all had to be coordinated to bring out working conditions and practices that would permit of safe operation.

About the same time, knowing that we had these employees from four different companies, it was essential that we adopt what was known as an Employee Health Conservation policy. Every employee was examined—this was twenty years ago.

At that time we found a considerable number of physical defects. We drew these defects up into a chart, and then each year afterward, with our regular periodic survey, which has been done every year during these twenty years, we compared one chart with the other as far as physical defects were concerned.

We found defective eyesight, defective color sense, defective hearing, defective heart conditions and various other physical types of disease, which had a ratio of accidents in proportion to them. After these had been corrected and all new men taken into the company under a stipulated medical standard, there was a decided reduction as far as man-failure was concerned.

The safety organization of our properties did a commendable piece of work in their reduction of the frequency and the severity rate of accidents through improving working conditions, and at the same time in the safeguarding of all machinery and moving hazards that existed before.

We found that despite the medical improvement of the employee and despite our safe practices accidents did continue. While not so frequent and not so severe, still they were frequent enough and severe enough to produce a good deal of concern.

About this time, a man who passed on a number of years ago, Mr. John Mallin, who, while not a psychologist—he was a superintendent of transportation on our properties at that time—had quite an insight into human life, and he studied this matter.

I might cite an example of the relation between the person's work and what we found mentally and physically in this group. There was a group of 75 agents who for one reason or another were constantly up on what was called the "carpet." They were going to sleep on duty; they were permitting passengers to pass through their stations without accepting fares from them; they were making clerical errors, both in their daily reports and in the making of change.

Mr. Mallin, on account of his humanitarian attitude, figured there must be something physically or mentally wrong with people that were habitually making these mistakes. So in cooperation with him I took care of the medical side of it, and we detected certain physical defects. It is interesting to consider what we found.

For instance, discourtesy to the traveling public was due in many cases to defective hearing on the part of the employee. The mistakes in clerical work and in making change were due to defective eyesight. As to those who fell asleep and were sluggish in their work, we found such things as a large percentage of sugar in the urine and we found nephritic cases. Some of them we referred to the neurological specialists and they found mental conditions that were conducive to their type of behavior while at their work.

Shortly after that we took up what was known as the coasting clock experiment from a medical standpoint. The coasting clock is a device on our cars which shows the amount of current consumed by the individual motorman in his motor car in his day's work. The peak is taken of the amount of power used at certain intervals and from that they make up the cost of power over the period of the year, so that if there is a lot of power wasted, there is, of course, a lot of electricity being paid for which is not used economically in service to the public.

Some of these coasting clock records were brought in and we studied each one individually, and we did the same thing with the physical records and so-called mental records which we had been able to gather at that time. It was surprising to find that the average man who had a good coasting record, a good power-saving record, was also a perfectly healthy man. We found, where there were defects due to certain portions of the body in the physical senses, that there also was a lack of concentration on the work at hand, and there was an increase in the physical defects of those men who were wasting power in car operation.

We found out a little later when absenteeism from work occurred, where men were away from their positions or jobs at regular intervals, they bore investigation. In three cases, it was very interesting to know that these three men stayed home on the days that they had their attacks of epilepsy or epileptic fits, and then would resume work, so that in investigating the absenteeism of employees we found conditions that were very serious as compared to the length of time they were off; a man with epilepsy or any man that faints or has any periods of unconsciousness has no place on the front end of a high-speed train carrying a large number of people daily.

As time went on we noticed that more and more of these conditions were due to what we thought were mental states. In other words, we figured that some accidents were due to the fact that men could not visualize the possibility of an accident. We meant by that they could operate day in and day out and know a safe practice and see the same thing each day, and still not be able to perceive the accident possibility there. For instance, a man in a motor coach passing a given intersection day in and day out without anything abstracting his view. On the next trip he finds a pile of brick or lumber along the parkway. Never retarding his speed he approaches this pile of lumber and a child steps out from behind it and is struck. He did not have the power of visualizing an accident at that time, the possibility of something occurring.

We kept in mind the idea that the possibility of visualizing an accident was ingrained in most of us, but a few, a small proportion, did not have that power, or else they were not educated enough to the powers of unsafe practices.

The ability to foresee an accident and put the prevention into operation before the accident occurs is really a safety man's best asset. It is better to detect before than to correct the condition later on.

We then saw some accidents that we attributed to what we call lack of judgment of distance, or poor estimation of space, or poor estimation of the speed of a moving vehicle, such as a motorman coming up behind another train, approaching from the rear, and not retarding the speed of his car in time to prevent an accident.

Some of these accidents, while due to physical causes, such as slippery rails and things of that kind, are of sufficient importance to make us realize that there are people who don't have the proper estimation of distance, and a defect in eyesight has a tendency, of course, to increase this possibility.

Our next thought in regard to this accident prone individual was the man who saw

an accident and did not know how to take care of it when he was in the midst of it. He might have seen the accident in the distance and before he could bring his muscles into play to retard his train he was in the accident, and that brought in the question of reaction time.

Now, we knew nothing about reaction time as the psychologists know it, because we were not trained in that; but we did know that we could take, through suggestions of psychologists, the simpler processes of getting reaction time on a large body of men; and with that in mind we started out two years ago to cover some three thousand employees in train service on just the simple reactions—auditory stimulus of sound, the visual stimulus of using green and red colors, and the tactile or the pressure stimulus.

This was placed in the hands of a few young people, who were schooled in technique and had some knowledge of the fundamentals, to determine what reaction time or what norms we could get.

Instead of picking up the man who had the accident and comparing him with the man whose reaction time was slow, we divided the men into units—one group of from twenty years to thirty-nine years, another from forty years to fifty-nine years, and from sixty to seventy-nine years. We took all these men in those various groups and then computed the reaction time for the individuals, and strange to say the second unit, between the ages of forty to fifty-nine, seemed to be the most stable in reaction time.

That caused quite a little interest to be developed in the subject, and we started to apply this knowledge to what we called the "unusual occurrence rate", or such things as collisions, bumpings, automobile contacts on the highway with our railroad cars.

We classified that group, and, strange to say, that forty to fifty-nine group, or the second unit, had fewer of these unusual occurrences or unusual accidents than the other groups.

Men receiving personal injuries were also fewer in that second group than in the younger or the older group. The same thing held good in the investigation as far as physical condition was concerned. While the number of men in the second group having physical defects was larger, still a majority of them were of such nature as could be corrected, such as defects with glasses and the wearing of supports for ruptures, men that had portions of fingers off or defects of that nature; and while the number of men having such things was larger, the most severe and most serious defects were found with the younger and the older groups, or the first unit and the third unit.

When we approached the question of length of service, of course our second group was the longest in service. When we approached the question of absenteeism on account of sickness we were surprised to find that this same second group or middle-aged group was again the most constant in attendance.

Therefore, on the basis of our superficial tests of reaction time we figured there must be some reason for the fact that in all of these groups of different activities the same middle group was receiving practically first place. There must be some correlation between reaction time, physical health and the age group.

We went further into that. We found that the man that had the accidents individually had a normal reaction time, except in one or two instances.

We considered again the fact that the man who had a serious physical defect, such as above two hundred systolic blood pressure, might account for it; we wanted to see if his reaction time was any different; but it was not, and that was true in a great many of the different physical defects. But we did find a difference in reaction time of men who had color defects, men who had defects in vision and hearing, and in some nervous conditions there was a difference in reaction time.

We are new in this work. We are trying to detect the accident-prone man. There is nothing that we call strictly scientific in it. It is just business common sense that

we are trying to use in plugging along to discover if there is such a thing as determining a man's proneness to accident.

I believe personally, and I know my brother officials of the Rapid Transit Lines agree with me, that by education of a properly selected employee who in the beginning is physically fit, and then a periodical medical inspection of that man without usurping his personal liberty, and then a frequent practice such as trying to attempt some mental analysis, we can say of that individual with some certainty that accidents will be fewer than they had been before.

I have the greatest respect for the psychiatrists and the neurological men, as they have been of great assistance in many cases. For instance, there was a family of boys who were having accidents, one after the other. The neurologist examining one of these boys, who had been injured five or six times, found that he enjoyed being injured. In other words, the report came back that he was the type of man that liked to experience pain. In all external aspects this man looked normal, so without the neurologist we would not have been able to discover this particular individual's weakness. So with the repeaters, those that have a tendency to have a chronic attitude toward accidents, it is a good policy to see if the psychologists, the psychiatrists, and men who have to do with mental diseases, cannot have more contact with industry, as in many of these cases by constant observation and from personal contact by those skilled in detecting these conditions you will be able to reduce some of your accidents before they occur.

Discussion

CHAIRMAN SAFFINGTON: These papers are now open for general discussion and also for questions. This is a subject that is occupying a great deal of prominence and one that will probably continue to figure more prominently in analyses of accidents in the future. Dr. Redden, would you not like to say something?

DR. W. R. REDDEN (Cleanliness Institute, New York, N. Y.): I was particularly interested in this discussion on what happens to the mind after the accident. I suppose, outside of war-time experience, I have had more experience with mental attitudes after accidents than any one here; for instance, in such calamities as hurricanes and tornadoes and that type of thing. I have seen as many as 2500 people injured in one hour or less in hurricanes; add to that 850 in this midwestern tornado, and about 2600 deaths in the Florida hurricane, and then the Mississippi hurricane.

One of the most striking things I think I ever saw was in Murphysboro, Illinois, after that tornado. They were gathered there, practically all the people of the community, for a memorial service to the dead. There were five or six ministers and others to conduct the service. As I mixed among the groups, many of whom I had known for three or four days, and had seen what had happened, there was not a tear shed in the whole group. There was no weeping, no wailing, and the director of the Disaster League for the Red Cross, who handled over 250 such disasters, said to me, "Doctor, what do you think about that situation? What do you think about the shock of this type of thing? How long does it last? How many people does it affect?"

My feeling, as I gradually worked along with these people and followed them through for over two years to get them back on their feet, was that probably every person who had lost any member of a family or who had had injuries among members of the family—the families had been separated and the people had been sent off to hospitals in distant cities—was completely shocked beyond tears. But at the end of two or three months, when these families began to come together again with mothers, brothers, sisters and fathers sitting around tables where there were empty chairs, the tears began to flow and the feelings began to give way, and all this shock and numbness that came with the disaster began to wear off.

What I am trying to say is that mentally after an accident—the loss of an arm

or a severe injury—for a time you get a numbness just the same as you get a numbness if you strike your hand terrifically against a solid substance. You may not even feel pain. I had my nose broken so that you could look down through it and I never felt any pain. I was quite a hero because I did not weep. I had nothing to weep over. The injury had numbed the nerves. I had no pain whatsoever.

Mentally, I think people are numbed by an accident. They are shocked. I think that is a definite sequence or consequence of an accident.

Now, what happens later on? The individual begins to get over the first shock, and possibly, we will say, there is the realization that he is going to get ten dollars a week less in his pay envelope for the rest of his life, and yet must carry on. There is a mental twitch or continuation of something that has happened there in the shop. I am not a psychiatrist but I do believe there is something that comes after accidents that leaves a definite mental condition which may be only functional.

When you have said functional what do you mean? What difference does it make whether it is functional or an actual physical injury? The result is just the same. What are you going to do about it? You have got to get the person back into a normal condition.

How did we do it in this disaster work? I think the *modus operandi* is just the same with industry as it is in disaster work. As a specific illustration, I was called in to see a woman whose family I had not seen before. This was two months following the disaster. The woman was weeping; the children were all huddled around her and the scene was most pathetic. I tried to find out if anybody was injured, but all she could say was that all the property was gone, that she had lost her husband some time before and there was no hope of getting back her home or taking care of or educating her children. The sum and substance of it was that the Red Cross had not come in and given her some sort of award to assure her of keeping the family together and going on. I was able to say to her, "The Red Cross is going to give you that award tomorrow. A trust fund will be set up for the children so they can receive an education and you are going to be independent as far as finances are concerned." That was the end of the case.

If we can in industry bring to bear, first, all the medical and psychiatric knowledge we have, and do it immediately, we can help to offset this type of condition, this shock which comes after injury, and before the numbness, so to speak, has worn off we can already indicate to that individual that we are going to give every possible assistance to which he is entitled. Then if we can follow through on the case and try to be sympathetic, try to be understanding and do the generous thing, rather than just try to do the smallest, meanest, narrowest type of thing, I believe we can bring back the individual who is mentally shocked, even though he does not know it is only a functional thing, bring him back into industry, and he will be with us for the rest of the time.

I'd like to ask Dr. Fisher if he does not feel, for instance, in the younger group where there is less experience, less judgment and so on, that the delay in reaction time may be due to a hesitancy about the right thing to do; whereas with the older group, those who are from forty to fifty-nine in age, the difference in reaction time depends on channels and avenues which have been built up through experience, so that the individual automatically reacts more rapidly because he acts more certainly because of experience in doing a certain thing?

CHAIRMAN SAFFINGTON: Would you like to answer that now, Dr. Fisher?

DR. FISHER: I agree with the doctor.

CHAIRMAN SAFFINGTON: Are there any further comments or are there any questions?

DR. R. P. KRAFT (Cheney Brothers, South Manchester, Conn.): I would like to ask Dr. Singer about the effect of shell shock. There are lesser degrees of shell shock. Does it possibly follow that though a person can be killed by shell shock with no external sign of injury there might be lesser degrees of pathology? Are there in those cases any lesser pathological conditions?

DR. H. DOUGLAS SINGER (University of Illinois Medical School, Chicago, Ill.): I don't think anybody can answer that question for the reason that he does not die right away. Consequently, in cases of that kind, there are no observations of any damage done at all. I might say further that there has been a great deal of experimental work done with animals in regard to effects of shocks without establishing that there is any change as far as we know. There are things suggested, but they are only suggested.

DR. KNAPP: In cases that would kill is there any pathology?

DR. SINGER: There were minute points of bleeding, which is one of the striking things, and there were certain other changes that were a little bit more technical in the cell structure of the brain itself, but there was no explanation in what was seen. There were very minute bleedings from which I think presumably a person might recover.

DR. W. R. REDDEN (Cleanliness Institute, New York, N. Y.): You spoke of the brain shrinking later on after increased pressure. I think that is rather significant. We know in carbon monoxide poisoning you get a wet brain. The headache a man gets is due to the pressure he gets. That is really a pressure atrophy?

DR. SINGER: That seems to be the only logical explanation. You know, following a head injury that there is the same sort of condition of wet brain. You know in those cases the pressure is removed.

DR. REDDEN: Through spinal puncture?

DR. SINGER: There are other ways, although that is one way. There are other chemical ways, by administering salt which extracts fluid from the body, which are more convenient and less dangerous. That does get results, but the number yet is not large enough to say very much about it. It is an apparently recent rather accidental discovery.

DR. REDDEN: We get that in delirium tremens.

DR. SINGER: A lot of it.

DR. REDDEN: That might be particularly interesting. It is frequently used to put them to sleep, by doing a spinal puncture to relieve that pressure, but it is not anything special.

DR. W. F. NORRIS (American Telephone and Telegraph Co., Long Island): After a number of serious accidents we have not only found the injured person shocked but those who have been associated with him. Sometimes in a motor vehicle accident a man has been seriously injured and others in the machine with him, although not receiving the injury, have also been in such a state that when we have tried to query them they have given us all sorts of information, very erroneous and not given with any intent to deceive, but because of their mental shock, it seemed to us. Possibly the Doctor could give us some idea of the reaction taking place and the effect it might have on those concerned in the accident.

DR. SINGER: I am not taking into account the "immediate horrors" of the situation of persons who have not been injured at all. I think you will find it is true that any form of excitement, it does not matter what it is, is going to interfere with the reactions that a person shows at the moment, call it shock or what you will, under certain circumstances.

For instance, in various psychology classes various exciting scenes have been staged without any warning to those in the room. There are a number of people who are students of psychology, who are presumably able to handle themselves a little better than the average person under those circumstances, in making a report of what is transpiring. A can comes in and fires a gun and runs out of the room and every student is asked to write down what happened. You get the most fantastic accounts of what happened, and hardly any two of them agree.

We must realize that every form of emotion produces a reaction. Sometimes hearing very happy news produces disastrous results. Sometimes receiving good news affects an organism that is not acting very well itself. In any form of excitement there is always a change in the way in which the body is working. That is

what emotion means. People who have been studying the effects of emotion—and quite a large volume of work has been done on the subject by Harvard University—have compared a person in any state of emotion with a nation at war. Everything is given up to deal with the situation and the ordinary peaceful order of things is stopped. For instance, if you have a good meal inside you digesting very comfortably and you get in a state of excitement, digestion stops. It is not imagination; it does stop. Everything else in the body undergoes a complete change.

There are two different phases or forms of our nervous system. Perhaps people don't stop to realize that very fully. There is one form which is spoken of as being the sympathetic system of the body, which is the most primitive of all. When a person gets into a state of emotion his body is taken over and controlled by this sympathetic system.

The other nervous system is that which has to do with our thinking or reasoning reactions that follow from a consideration of what it is all about. That is what controls in the ordinary peaceful times of life. When in a state of emotion the whole thing is taken over by the most primitive form of reaction which overcomes our ability to think and reason and remember. Fear is one of our common realizations. A person acting in a panic or horror or anything of the sort is not using his higher, more recently developed nervous system. In any accident in which there is a great deal of horrible emotion stirred up you are bound to get temporarily a great deal of change.

It is true that those concerned in such an experience can develop a neurosis, as well as the man who has the injury, whereas they have not suffered an injury at all, directly. But something happened which scared and shocked them. I don't necessarily think that it is correct to say that the horror causes neurosis. Maybe it was a factor that entered into it from the beginning. With regard to these people who got into the horrible situation who took two or three months to yield, if adequate consideration were given they would be all right. Tears do come back and they resume their normal living once more. Those are the elements in the situation to be considered.

DR. REDDEN: If that is automatic can you reverse that type of neurosis? That is rather important.

DR. SINGER: I would not say it reverses itself. Here is an instructive illustration that was given to me by Dr. Salmon. Dr. Salmon said that there were three soldiers who had been unconscious in the trenches without any injury or anything at all. For more than twenty-four hours they had been unable to evacuate them because of the shelling going on around them, but there came a time in the evening one day later when they could load them in an ambulance and get them out of the way. They were loaded in the ambulance in a completely unconscious condition. After they had gone some little distance the shells began falling around the ambulance. These three men all got out and ran away.

DR. O. E. STEWART (Crystal City, Mo.): I would like to ask a question with reference to that emotion from a sense of fear or horror. Possibly that is a perfectly normal emotion, and I believe almost invariably precedes any action on the part of the individual in emergency. Without a sense of fear I don't think he can react to protect himself. The shock stimulates him. In other words, he is in a position where some demand is made upon him, for instance, when he is cold. He is not capable of putting forth his best effort when he is cold. He has not time to react to a sense of fear.

Another point I wish to emphasize is this question of psychosis with reference to employment, one in which the individual feels that his occupation—this comes under the question of occupational diseases—has raised his condition, regardless of what it is. It is real to him. I believe that unless that is met in a logical sort of way that when he returns to that occupation he still has that sense of fear in reference to it. In other words, he is not oriented with reference to the condition that he has and his occupation, which still leaves him where he will not protect himself against injury.

because he feels that particular occupation has been responsible for the condition from which he is suffering. It is quite interesting when you speculate on the question of fear.

J. F. HATTMAN (Standard Steel Spring Company): I would like to ask if there have been any experiments or determinations made which would indicate that some particular type of individual is more prone to accident than some other type of individual, for instance, blonde, brunette, etc?

CHAIRMAN SAPPINGTON: Is there any one here who would like to answer that question? Dr. Fisher?

DR. FISHER: I think he was asking with regard to whether it is blonde or brunette. I am not in a position to state.

DR. A. R. LAUER (Iowa State College, Ames, Iowa): Psychologists have been unable to determine anything from experiments carried on regarding blondes and brunettes. That is all newspaper propaganda. I can say that a superficial analysis of the color of the hair or eyes would be discredited.

G. H. McCLAIN (Jones & Laughlin Steel Corp.): There is a problem comes to us sometimes in the rehabilitation of a man after a rather serious injury, loss of a foot or something of that nature, or possibly a badly crushed limb. The man makes up his mind that he is perfectly happy on his compensation and he says to himself, "I will never be able to work again." He almost gets away with it. In times like this it is hard to get that man started again for his own good. I was wondering if anybody else had had any experience in doing that. I might say this is a little bit more true of our colored workers. They seem to require some social distinction in being able to live without a job at times. I have been accused of being pretty brutal in forcing those fellows to get started again. I wonder whether I am on the right track or not.

CHAIRMAN SAPPINGTON: Is there any one here who wants to talk about this real fear of work?—Evidently it has not been settled.

MR. McCLAIN: I may continue my own methods then, I take it.

CHAIRMAN SAPPINGTON: Are there any further comments?

WILLS MACLACHLAN (Toronto, Ont., Canada): A man who is in a hospital for sixty days or more is probably more difficult to get back to work than the man who has not had such a long time in the hospital. If the psychiatrists or psychologists would give us some idea of what to do with the man during his earlier hospital period to cut it down, it would be very valuable, whether it would be wise to bring back to him some of the jobs that he was doing, or whether giving him any kind of work would be of assistance. This tendency has come to be called hospitalitis.

CHAIRMAN SAPPINGTON: Is there any way of reducing the number of days of hospitalization?

DR. REDDEN: I was laid up for two years with an illness that kept me chiefly on my back. While it was not interesting one of my big problems was to rehabilitate myself. I did it by going to a good physician who could do it. In other words, there I was, faced with the problem of starting life all over again as far as making a living was concerned, and a whole lot of other things. This very good man, Dr. Richard C. Cabot, of Boston, said, "Redden, there is one thing that will bring you back where you belong. That is to go ahead and do something. Go to work. Never mind the salary. It doesn't make any difference whether it is one thousand or five hundred dollars a year. Go back to work. Try to enjoy the work and the first thing you know out you will come." And I did. I won't tell you how much I got but it didn't pay for the toothpicks—if I used them.

I do know this, that within two months after I started on the job in the Red Cross first aid car going over the country I got so interested in the job I forgot myself and I was rolling up my sleeves and going to work.

I believe the true psychological approach to the man who has to be rehabilitated mentally is to put him back on the job and cut down all the days of hospitalization and convalescence you can. The more quickly you can get him busy doing some-

thing physically as well as mentally the more quickly you will get him back on the job, and that is the only type of rehabilitation that is going to do any good to industry.

CHAIRMAN SAPPINGTON: Are there any other questions or comments?

A. T. KLINE (Spang Chalfant & Co.): Referring to Mr. McClain's question I can talk it over because Mr. McClain is a next-door neighbor of ours. I think personal contact has a lot to do with each injured employee. We had an experience at our plant where some painters were painting from a scaffold. The scaffold came down and a man suffered a compound fracture of the leg, and we put him in the hospital and got him fixed up. Later I saw this fellow when he thought nobody was watching, standing on his feet waiting for a street car. A few days later I saw the man out for a morning walk, with no cane.

When the man did come back to work I asked the doctor one day, "Doctor, when do you expect to get this man off from compensation?"

The doctor said, "I believe I will have that man off his crutches about next week, about Tuesday."

When the man came down to see the doctor he always came with his crutches. When the man came back I called him into the office. He happened to be a Greek boss painter. He had a cane in one hand and a bucket in the other. He had been working for two days with a cane. I was assured by the doctor that the fracture was completely healed and that everything was sound and that a very good job had been done. I asked him, "Why are you using this cane?"

He said, "I have trouble."

I knew that I had to throw a scare into that fellow, and the doctor had assured me that it would not break in that place again, but that another fracture would break some place else, if such a thing ever happened. I said, "Lay down your cane when you come to work or else tomorrow you will be hunting another job." The man is still working for us and he has never since used a cane.

CHAIRMAN SAPPINGTON: Has any one else any comment or question? Have you any closing remarks, Dr. Singer?

DR. SINGER: Just one remark in answer to a question asked here as to whether fear is necessary. I'd say that one of the worst handicaps the world has to face today is fear. Fear is the most primitive reaction we have, and I think more accidents are caused by fear than fear caused by accidents.

CHAIRMAN SAPPINGTON: Dr. Fisher, have you any closing remarks?

DR. FISHER: In personal injury cases, if you keep in contact with the patient from the first, show you are interested and want him to get well, and do everything you can in the way of encouraging him to get well, and don't skimp on medical attention or X-ray pictures and things like that, you will find a lot of these people will go back to work and will be more willing to go back to work. Every day you let a man stay away without anything to do, gives him that much more time for his mind to be occupied, with things against the company or the people who have injured him. He also is in contact with people who are erratic or radical in the large hospital wards, all reciting their grievances. I believe more damage and harm is done through the so-called neglect of personal contact, both to the employee when he is injured, and to the customer injured in a public liability accidents. It is just a question, to my mind, of being on the job and trying to contact those people and doing the best you can for them. I think a lot of good can be done in that way.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Industrial Nursing Section

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Chairman, Miss GRACE M. HEIDEL, R. N., Supervisory Nurse, New York Central Railroad Company, Albany, N. Y.
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Thursday Afternoon Session October 15, 1931

MISS GRACE M. HEIDEL, R. N., Chairman
New York Central Railway Company, Albany, N. Y.

The meeting of the Industrial Nursing Section convened with Miss Grace M. Heidel, R. N., New York Central Railway Company, Albany, N. Y., presiding.

CHAIRMAN HEIDEL: Most chairmen, when they introduce Dr. Winslow, say "how fortunate we are to have him with us this afternoon." You all know how fortunate you are, so I will leave that. Indeed, we look to Dr. Winslow for the inspiring finish as well as the inspiring beginning of most of our nursing efforts. It gives me great pleasure to introduce Dr. Winslow, Professor of Health Education at Yale University, as our first speaker.

Educational Qualifications of the Industrial Nurse

By DR. C.-E. A. WINSLOW

Professor of Public Health, Yale University, New Haven, Conn.

The health program in industry began, as most programs do, with the attempt to meet a concrete emergency. This emergency presented itself in the form of an injured employee. When our states began to pass Workmen's Compensation Acts twenty years ago it became clear that it was cheaper to employ a physician and a nurse to render first aid than to pay the heavy costs of infected wounds and improperly set fractures.

As soon as the physician and the nurse entered the industrial plant the field for their activities began to widen. It was found that the prompt treatment of minor non-compensable illnesses often paid for itself in reduction of absenteeism in increased working efficiency. In many industries medical examination of new employees and their assignment to the tasks for which they were physically and mentally best fitted, proved its value. Both physician and nurse came to play a part in the study of the

physical conditions under which industry is carried on to secure the most ideal environmental opportunities for effective work. Finally, it became clear that these experts in healthy living could perform perhaps their most important function in aiding the employee to maintain physical and mental balance by teaching the laws of personal hygiene. The worker at the bench is, after all, the basic factor in production and the object of industrial medicine is to maintain this worker at the point of highest efficiency and maximum contentment.

It is of particular interest to members of the National Safety Council to note how the same tendency to focus on the individual employee has manifested itself in the field of accident prevention. The safety movement began with major emphasis on the mechanical factors in safety—on machinery guarding and factory housekeeping. Today, with the attainment of reasonably safe physical conditions in the larger industries, it is recognized that the accident-prone employee is a major problem of the future. We cannot have safe factories without safe workers; and the industrial physician and the industrial nurse—experts on the human machine—must join hands with the safety engineer if the results we desire are to be attained.

Precisely, what part does the industrial nurse play in this program for promoting the efficiency of the individual worker? We must know what we may expect her to do if we are to determine the educational qualifications which will properly fit her for her duties.

First of all, the primary task of dealing with maladjustments which have already developed is basic in the nurse's work. She must aid the physician in his treatments, she must render first aid (under his standing orders) in his absence, and she must see that the treatments prescribed are followed up and that the re-dressings required are properly done.

Even more important than the mechanical performance of such prescribed duties is the health teaching which should accompany them. The most favorable time to teach the laws of healthy living is when the failure to follow those laws has brought disastrous results. When a worker has been injured, the nurse has an unique opportunity to make an impression in regard to safe practices which will be remembered when leaflets and posters are forgotten. When a worker is ill, the importance of diet, and other elements in personal hygiene, the ways by which germ diseases can be avoided, or the importance of right mental attitudes can be inculcated as at no other time. It is difficult to exaggerate the importance of contentment and emotional balance as factors in production. If she has been trained in mental hygiene, the nurse can play a powerful part in promoting such balance and contentment by sound counsel to the worker. Furthermore, home health problems, sickness of wife or child, often function as all worries do, to promote accidents and inefficiency. The industrial nurse should consider it part of her duty to discover such problems and to aid in their solution.

It is for services of this uniquely important type that a nurse who has received the full basic hospital training is of such value. The woman who has not enjoyed such advantages may perform a manual routine with faithfulness. She may have an attractive personality. She cannot, except in the rarest instances, have the basic knowledge of physiology and bacteriology, of hygiene and sanitation, which makes her a helpful teacher of healthy living. The untrained nurse is sometimes called a "practical" nurse. This is a silly phrase. It is practical as well as scientific to use for a special purpose a tool designed for that purpose. It is as impractical to employ an inadequately trained industrial nurse as to use a badly designed machine for a delicate manufacturing operation.

The good industrial nurse must, however, be much more than a nurse with an ordinary sound hospital training—just as a true industrial physician must be much more than a doctor who practices for a few hours a day in a plant hospital. Industrial medicine and industrial nursing should involve an intimate knowledge of the plant

and its processes, if the best adjustment of the worker to his job is to result. The nurse should know each workroom, its lighting and its ventilation, the special health hazards involved and the conditions of the job from the standpoint of the fatigue factors involved. She should be familiar with the general sanitary conditions of the plant, the toilet facilities and the conditions under which the workers eat their lunch. She should understand the general administrative set-up of the plant and the objectives of its safety program. It takes a woman of natural capacity and of training and experience to fill such a position adequately.

Furthermore, the workers in a given factory and their families are units in the community in which they live. If the industrial nurse is to counsel wisely she must know that community, its hospitals and dispensaries and other medical resources, its public health regulations, its reconstructive social agencies. Except in small communities where the industrial nurse herself does general public health nursing in the homes, she must work in close harmony with the existing community public health nursing organization. The plant program is in essence a part of the general community health program and the industrial nurse must have an intelligent comprehension of community health needs and community health machinery. The worker who comes to her for her opinion in regard to a toxin-antitoxin immunization campaign in the town, who seeks advice in regard to prenatal care for his wife, who wants to get his daughter into a tuberculosis sanatorium, should receive the same sound advice and the same intelligent aid which he would receive from the visiting nurse in the home. If these two authorities differ, the progress of public health will be hindered and the prestige of the industrial nurse will suffer.

For these reasons, the industrial nurse should be not only a basically trained registered nurse but should also have the postgraduate training required of the public health nurse and, if possible, actual experience in the public health nursing field. Miss Faville will tell you something of the content of such post-graduate training. It is necessary at this point only to emphasize its importance for the soundest type of nursing service in industry.

The properly qualified industrial nurse is indeed nothing else but a public health nurse devoting her efforts to a particular group of industrial workers. She must not only have the same qualifications as her professional sisters outside the factory but she must also work in closest cooperation with them if maximum results are to be attained. There are at least three different types of relationship between industrial and community nursing which may prove profitable under differing circumstances. With a relatively large plant in a semi-rural area the factory nurse may actually do the community nursing, including home visiting for the care of the sick and the teaching of hygiene to the families of employees. At the other extreme, a small factory in a large community may find it highly profitable to purchase from the local visiting nurse association the industrial nursing service which it needs. This is frequently the only way in which nursing service of high quality and properly supervised can be obtained by the small plant and the system is susceptible of wide extension.

Between these two extremes lies the more common situation in which the factory employs a nurse to serve the employees within its walls and relies on the local public health nursing organization for home visitation. It is in this case that close and intimate correlation is essential.

The member of a visiting nurse staff has the inestimable advantage of the supervision and leadership of more experienced members of her profession. The industrial nurse works more or less alone. Her task is often undefined. She is sometimes asked to render medical services which should be rendered only by a physician. She is sometimes used for clerical duties, for the management of welfare activities or for disciplinary personnel duties for which she is not fitted and which interfere with the discharge of her own proper tasks. If she is to function efficiently she must keep in

close touch with the standards of her professional group. She must attend meetings of the local industrial nurses' club if one exists, and state and, when possible, national meetings of public health nurses. She must have access to the *Public Health Nurse* as well as the *American Journal of Nursing*. She must, in other words, supplement her basic training by a constant process of continuing education.

The nurse who begins her work with sound fundamental qualifications and who keeps up with the march of progress in her profession is an invaluable asset to industry. She helps to keep the essential human machinery of production in smooth working order. Her labors pay for themselves many times over in the dollars and cents which measure industrial efficiency. In times of economic stress when a maximum of efficiency is essential, her service is indispensable.

CHAIRMAN HEINEL: In order that there will be no interruption in the continuity of these two papers, "The Need for Educational Standards" and "Post Graduate Preparation," I am going to ask Miss Katherine Faville of the Department of Nursing Education of the College of the City of Detroit to present her paper at this time.

Post Graduate Preparation

By KATHARINE FAVILLE

Director, Department of Nursing Education, College of the City of Detroit

For over thirty years the number of public health nurses in the United States has been steadily increasing. Begun as a means of giving nursing care to the sick poor in their homes, the rapid advances of the medical and social sciences have brought ever increasing opportunities to the public health nursing profession, and today the nurse is utilized in urban and rural districts, in homes, schools and factories, as the best means of changing the practices of daily living of the people of this country to conform to the most advanced knowledge of medical research. Employed at first by the privately supported agency—the visiting nurse association—her work soon became recognized as worthy of public support, as a good investment of public funds, saving the community money.

Rapidly there arose a vast number of specialized agencies employing nurses to deal with special age groups or diseases—infant welfare nurses, school nurses, tuberculosis nurses—many of whom ministered to different individuals in the same families, with resulting confusion and added community expense. The last few years have seen a change in this, however, due to need for greater economy of administration on one hand, and on the other to an increased conception of the fact that all that concerns the health of one member of the family concerns all members of that family. Today we find public health workers all over the country trying to think in terms of community rather than of specialized group needs, to study the health needs of the community as a whole and how each agency can best contribute to it—with the result that the number of agencies is being reduced, work coordinated, and nurses employed to work with families as a unit under expert supervision rather than with the special problems of infancy, childhood or adult life as such. Today we look upon all public health nurses, no matter by whom employed, as belonging to this great group working for the larger purpose of community health.

If you ask how this concerns the industrial nurse, my answer is that professionally we no longer recognize her as a person apart from the rest of us. The ultimate objectives of all public health nurses are the same whether at work in home, school or factory, as are also the underlying principles which guide their work. Practically we all differ only to the extent that it is necessary to adapt our methods of work to the environment in which we find ourselves employed—the community nurse adapting her work to the home and clinic, the school nurse to home and school, the industrial nurse to home and plant. Moreover, none of us can give her best service

without coordinating her work with that rendered by all the others in her community; so that it is only as we recognize our common purpose that we can attain our common goal.

So the industrial nurse must view her work among the wage earners of the community, not as something concerning only those enclosed within the four walls of the factory, but as part of that public health effort which the community is expending so that all of family life within that community may be lived at a higher level. She must know how to relate her work to that of the department of health, the schools, the private health and social agencies. As in world affairs isolation is being made more and more impossible, so in professional spheres it is being broken through. The rest of us envy the industrial nurse her chance to gain the attention of the wage earner—all powerful in his family—who is usually absent when the community nurse visits the home. The visiting nurse, the board of health nurse, the school nurse—all will find themselves accomplishing much more effective work, when once the industrial nurse sees her relation to the rest and each helps the other for the good of the family group.

This evolution of the conception of every public health nurse as a person who is at heart a generalist—interested in all that affects the health of each member of every family in her community—has resulted in changes being necessary in the preparation for her work. Employed in the early days, as we have said, as a nurse to give bedside care to the sick poor in their homes, the connection between what she was taught in the training school and what she did in the district was close; she took care of sick people in both instances. Then each nurse was taught by the apprenticeship method, visiting nurse associations taking students and developing teaching programs, nurses being trained largely at community expense.

But with the great advances of preventive medicine in the last few years, with the development of our conception of health as comprising mental as well as physical well-being, there has come a rapidly widening gap between the knowledge of the care of the sick as learned in hospital wards and the knowledge necessary to teach people how to keep well. There seemed a limit, also, to the amount of money which service agencies could properly spend on the education of nurses for work in communities other than their own. Gradually these educational programs have been turned over to colleges as fast as receptive institutions could be found, and today thirteen schools, well distributed over the United States, offer post graduate courses in public health nursing which meet the standards set by the N. O. P. H. N.

Gradually, too, with increasing years of experience behind us, we have been arriving at some uniformity of thought as to what constitutes the best preparation for public health nurses; and at present in most public health agencies in which policies for the employment of nurses are controlled by nurses, the following standards, set by a joint committee of the National Organization for Public Health Nursing and the American Public Health Association, are recognized.

First, all public health nurses should be high school graduates. In the old days this was not of such primary importance, as a high school education was not as universally available as it now is. But today it is unnecessary for training schools to admit students without this preparation and for such nurses there is little professional future.

Second, a public health nurse should be graduated from a training school connected with a hospital which has a daily average of at least fifty patients; for the very small hospital does not afford enough variety in clinical experience to make a good practice field for student nurses. It must be remembered that the public health nurse, no matter how much she has developed into a health teacher, is in this country still fundamentally a nurse, and should be a good one—the best obtainable. Legally she should also be eligible for registration in the state in which she works.

As yet there are not enough public health nurses with postgraduate training to fill all the staff positions available, so that health agencies employing large numbers of

nurses find it economical to set up introductory teaching programs of six to eight weeks' duration for their new nurses, and to continue with carefully planned programs of staff education for the older group. Such educational programs are not usually available for the nurse who works alone or on a small staff, so that for these positions the standard now set is a minimum of two years' experience on a well supervised staff having such a program, or a postgraduate course in public health nursing. For all supervisory or administrative positions postgraduate study is almost always required.

These standards are becoming so universally accepted among community health agencies that they are the common knowledge of most public health nurses. The increasing attendance at public health nursing courses attests the fact that nurses realize that to gain much professional advancement such study is necessary.

The only field which has not generally accepted these standards is the industrial one. This does not mean that the industrial nurse has a much simpler job, and that it is unnecessary for her to know as much as other public health nurses, for her work certainly involves need of all the knowledge and skill that she can muster; but it is rather to be accounted for by the fact that most industrial nurses are employed by lay people who have no knowledge of nursing educational standards, the industrial group being practically the only one where employment is not largely under the direction of the nurses themselves. If the industrial nurse group is to remedy this and to accept standards of professional fitness equal to those of the profession as a whole, special effort will have to be made by them in two directions.

First, each nurse will have to take the initiative for remedying her own educational deficiencies, for at present few industrial nurses are fortunate enough to work where modern staff education programs are provided, as is done for the community nurse. Moreover, she does not have the pressure exerted on her by her superiors urging her on to better preparation, so that it will largely come through her own interest and desire. This preparation may take the form of postgraduate study; or in large cities it might well mean getting staff education programs under way on a community rather than an agency basis, to which she will have the same access as other community workers. The present system, whereby each agency sets up its own educational program, is a costly one when you consider that it is community money which in the end is paying for it all; and there is no reason why such programs should not be coordinated and opened to the industrial nurse if she will make the effort to request access to them.

Secondly, the public health nursing profession as a whole must educate the industrial employer to an appreciation of the difference between a well trained and poorly equipped nurse. The average layman's knowledge of nurses is largely confined to experiences with them at time of family illness, and his knowledge of nursing education standards is lacking because we have neglected as a profession to enlighten him. It is our responsibility as a group to make him see that if community agencies can no longer afford to employ the totally untrained person, surely industry can not, so long as better prepared people are available.

If, however, we are to recommend postgraduate study to the industrial nurse, she must be assured that the work she is given is worth the sacrifice entailed in the getting of it. What do the courses give their students which will be of value to her? What can she logically expect in return for the expenditure of her time and savings?

First, and fundamentally important from a practical point of view, the courses all attempt to make clear the role of the public health nurse in the field of preventive medicine and public health; which in this case means concretely the relationship and contribution of the nurse to the industrial health and safety program, whose primary objective is that of prevention.

Second, they attempt to break down the feeling of professional isolation which develops in each of us who lives so close to the details of our work that we fail to "see the woods for the trees." If the industrial nurse is to view her work as a

conscious part of the community as well as of the industrial health program, she herself must have a comprehension of the public health nursing profession as a whole, its development and evolution, the problems which have arisen and the solutions which have seemed wise, the relationship of her professional group to that of the allied ones of medicine, social work, and education. She as an individual must be able to build her work on the past, profiting by group experience, not duplicating mistakes which come through substituting trial and error for education.

Third, postgraduate study should teach her what resources communities must provide to keep their people well, so that she can guide her own industrial community groups wisely in the development of such facilities; and on the other hand she must learn how best to use them, once established, for the good of the individuals for whom they are planned—how the various health and social agencies are related to each other and to the whole field of public health nursing.

Fourth, since the work of any public health nurse is largely that of teaching, she must be taught how to teach more effectively, for we have long ago exploded the theory that good teachers are "born" so.

Fifth, the work of the public health nurse concerns itself always with people—attempting to change their habits to conform to the knowledge of science—and this means that she must understand and like them if she is to be successful. She needs to be helped to a better understanding of them, and of herself as one of them—psychology and mental hygiene contributing much to her increased effectiveness.

Sixth, but perhaps most important of all, a postgraduate period of study offers opportunity to practice in the field the work which the nurse will later be called upon to do, but under the guidance of nurses who are themselves experienced in the arts of their profession, thus gaining proficiency without some group being exploited in the process. Approximately half of the time of the postgraduate course is devoted to this, in an attempt to furnish experience not only in the student's prospective field, but in all the various types of service open to the public health nursing profession—so that besides gaining proficiency in her own work she will have an understanding of the responsibilities of the various community nursing groups with whom she will later develop a close cooperative relationship. Too much importance cannot be placed upon the value of this field work under supervision; for skill in any profession dealing with people cannot be learned merely by reading about it, it takes practice and much of it to give proficiency.

For the nurse who knows definitely that she is to enter some specialized field, such as school or industrial nursing, the postgraduate courses try to give opportunity to study the problems peculiar to those fields. In the case of the nurse entering industry she should have time for the study of industrial hygiene, safety, and sanitation, and for consideration of such problems as those of industrial relations. In this fashion she is trained not as a specialist, seeing only her little field, who if her position is suddenly closed to her is fitted for nothing else, but as a member of an ever enlarging profession, able to seize whatever opportunity for service best presents itself. Education becomes then not a luxury, a superimposed accessory, but a part of life itself.

No one claims for a minute that postgraduate study is a cure-all. It cannot create a strikingly successful public health nurse out of a person who lacks adequate elementary education, or who dislikes working with people. Because such types, unsuccessful wherever they work, often crowd the college class room in vain effort to better themselves, colleges are often judged as of little value. But given a person with a fair personality, sufficient preliminary education, and a real desire to be of service to people with whom she genuinely enjoys working, we do claim that postgraduate study will prove a short cut to professional attainment, in the long run economical to both employer and nurse. The time is past when any industry can afford to take on untrained personnel and educate them at company expense since trained personnel can be secured for the same money. Mistakes are too expensive, unproductive work too costly. In most instances the well prepared nurse would

ask no higher salary than that which industry is already paying; at least such industrial salaries as have come to my attention have compared very favorably with those offered by community health organizations.

The employer who thinks that he has too few employees to warrant the salary of a well prepared nurse often compromises by taking an untrained person whom he considers less expensive, or he puts her at work part time out in other departments of the plant, or, most commonly, in the end goes without public health nursing service altogether. Far better than that of satisfying oneself with makeshifts is the plan sponsored by the N. O. P. H. N., whereby small industries buy service at an hourly rate from the community public health agency. For then they buy not only the hours of work arranged for, but in addition, if the agency is a good one, they secure qualified nurses properly trained and constantly supervised, who bring to their work besides their nursing skill, knowledge of the community, its health needs and plans, who can fit the needs of the wage earning group into the picture of community and family health.

In conclusion, let me say that in this stage of evolution of the constantly changing public health nursing profession no industry can afford to employ any but the best trained nurse obtainable; and no nurse who desires to enter industry can allow herself the luxury of going untrained, if she values that sense of professional integrity which gets its satisfaction from knowledge of work well done, of service rendered to the best of one's innate ability.

CHAIRMAN HEIDEL: I hope you will all ask questions. Are there any employers or nurses here who would like to ask about post graduate courses?

DR. W. R. REDDEN (New York City): I am not a nurse, but I should like to enter into this discussion. It is a curious thing that nurses in their training are taught to do nothing except under medical supervision and yet nurses expect to come out of that training and go into industry and handle emergency and first aid cases without any medical supervision. I was talking to the supervisor of nurses in the Massachusetts General Hospital and I asked her how much first aid training they gave their nurses, and she said, "We are not going to teach our nurses first aid; we haven't time to do it. It isn't part of the hospital work."

I said, "All right, but when they get out of the hospital and are up against the problem, they will know less about giving first aid treatment than a lot of laymen who are hired by the Telephone Company, and they are certainly going to be up against it."

I want to add to the training you have suggested, a definite, thorough, standardized first aid course. The best one I know of is the one given by the American National Red Cross. They have a standard textbook which is the bible of first aid, and if you follow that you can't go wrong; and out of that you can develop other things, because you must certainly know how to meet emergencies.

Point 2: You are not supposed to give pills without the doctor's standing orders. Nevertheless, when you go into industry, you immediately become a pill peddler. You have been taught to give pills under medical supervision, as you have been taught to do a lot of things, and instinctively you say, "This is the thing. I am not a doctor—mental, moral, or spiritual—therefore, I will give this pill for a headache, and I will give another pill for something else, and I have done my job."

Now, unless you, as nurses, can get away from that idea and begin to realize you are an individual entity and at least have the privileges of a mother toward your group of children in industry, and get your doctor to give orders for you to follow—yes, to follow routinely, as Miss Jacobson does in our organization—you will not be doing all you can. When you are able, not only to cut down your pill giving to the minimum, but to increase your spiritual and moral advice to the maximum, then you will begin to become a good industrial nurse.

Dr. Winslow has gone much farther than most people would go in the matter of telling the industrial nurse to get out into the factory and discover faulty ventila-

tion and discover the things that cause the difficulties you get as end results in the dispensary. I was talking recently with the full-time industrial physician in charge of the medical department in a rubber plant employing 15,000 people. He had been assistant health officer in Cleveland for a while. I said to him, "What do you do for a living here?"

He said, "We have people come here from the plant and they are taken care of and that is the end of it."

"Don't you go out into the plant?"

"Oh, no, I never go out in the plant."

"What if you get a lead case?"

"If we get a lead case, we call the engineer in on the carpet, and that is the end of it; we don't have any more lead cases."

Now, I am not talking about a small industry employing twenty people. I am talking about one of the most prominent rubber plants in the rubber industry.

If that is the attitude of the full-time medical men in big industries of that kind, where are the poor nurses going to get off? It is going to be pretty difficult for the nurse to snoop around and find out about the bad lighting and ventilation, about the dust and muck and all the rest of it, that is injuring the people who are working in the industry, and which the industry expects you people to clear up in order to reduce absenteeism and increase the efficiency of the individuals. I would like to ask Dr. Winslow how he gets that way, if he will accept that as a good English phrase. I would like to know if that type of thing can be done in industry, as far as his experience goes.

The industrial nurse today is up against it. It is the most poorly organized group of nursing in the country. At the State Health Department meeting at Saratoga Springs, we had scheduled an industrial nurses' meeting, and there were not enough there to have a meeting. I was invited to talk before a group of industrial nurses for the state of New Jersey and there were seven people there, and in the city of Newark where the meeting was held, there are over 700 important industries. Now, if you are ever going to get anywhere in your development and education in industrial nursing, you have got to get together every once in awhile, as Dr. Winslow said, and have meetings and discussions, and see whether you have white mice or black cats. You have got to bring your problems out on the table.

CHAIRMAN HEIDEL: I think it is especially unfortunate that the nurses are so poorly informed. It was the point of our first two papers that the nurses should be informed. After she becomes established in an industry, she loses contact with her organizations. It may be her alumni organization; it may be the district or state or national organization. At the present time there is a national membership enrollment drive to bring into the fold nurses who have backslid for some reason or other, and the new members who have not had presented to them at their training schools the importance of membership in their organizations.

Mrs. Hodgson, who is a member of Headquarters staff, is with us. She has really done more single handed than any other one person to advance the educational standards of nurses, and I am going to ask Mrs. Hodgson to give us a little talk on the importance of membership in the organization and taking a subscription to the magazine.

Mrs. Violet H. Hodgson: It just happens that I am a member of the executive staff of the National Organization for Public Health Nursing and one of its major activities is the promotion of industrial nursing; and as any staff member has jobs assigned to her, industrial nursing was assigned to me. I can say with great emphasis that there is back of the industrial nursing group the National Organization for Public Health Nursing, and that is a far greater thing than any one or all of its staff members. Its staff members come and go, but the N. O. P. H. N. goes on forever.

Never since the World War has public health nursing been faced with the test that confronts it today. More and more demands are being made for health service

in the community. Staffs are being reduced, which makes it obvious to you that we have a very difficult situation. But the way in which public nursing is responding to this demand should be a source of pride to all of us.

Back of public health nurses everywhere is the united strength of the membership which comprises the N. O. P. H. N., the people at Headquarters, the working staff of N. O. P. H. N., the organization itself, the combined strength of its individual and corporate membership. This is a particularly difficult time for industrial nurses, as well as other nurses. They, too, are faced with adjustments and retrenchments which are necessary. Back of the effort of all public health nurses is the N. O. P. H. N., with its services which are always being increased day by day because of increased demands for field service.

Now, the ways in which the N. O. P. H. N. rather specifically tries to develop and enhance the welfare of the industrial working groups, very briefly, are these: In the first place, there is provided this Industrial Nursing Section. The executive committee are members from the industrial nursing field. That provides the opportunity which was just called to our attention, for the getting together and discussing the industrial nurse's problems. The Section meets each year, as you know, and it is now the Industrial Nursing Section of the National Safety Council, and meets with that Council. On each alternate year, it meets with the Biennial Convention of the N. O. P. H. N.

Secondly, the N. O. P. H. N. has recognized the need for goals in industrial nursing, as it has in other branches of public health nursing. Where are we headed for? How do we know when we have arrived? And as a means of coordinating the activities and the interests of industrial nurses, the functions and objectives of public health nursing have been clearly stated in our magazine, *Public Health Nursing*.

Third, there is also the recognition of the need for better prepared nurses in the industrial, as in other fields of public health nursing. It is aiming to meet these needs in this way: First, through the minimum requirements which Miss Faville has stated in detail; second, through outlining and suggesting a desirable content for post graduate courses to meet the needs of the industrial nurse; third, it has prepared bibliographies of the available reading material on industrial nursing. These are available free from the National office. Fourth, there is available for a loan for a period of three weeks, a folder of industrial record forms which has proven to be very much appreciated by the nurses who are at a loss to determine what the content of their record should be; and fifth, it publishes in the magazine articles of particular interest to the industrial nurse, as well as other public health nurses, and no doubt many of you remember the special February number which was devoted exclusively to industrial nursing.

And then a fourth specific service we try to render is that of placement. This is a service to management and to the nurse: to management in that we try to find the right person for the right job, and to the nurse in that we try to place her in a job where she will be most productive.

Fifth, through correspondence there is available an advisory and consultation service. Now, this is nothing more or less than sharing the experiences and problems of industrial nurses all over the country with the individual nurse, and it is only a national office that can gather and accumulate and make available this kind of information to each individual nurse, no matter in what far corner of the country she may be.

Sixth, there is the Manual on Public Health Nursing, and I don't believe that is a premature announcement to make at this time. It is now in preparation.

Seventh, we recognize perfectly well that the nurse can't buy all the books on health which she should be acquainted with. Provision is made for this through a loan service from the National Health Library. Any member of the N. O. P. H. N. can borrow any book in that library for a period of three weeks. The only cost in connection with it is transportation charges both ways.

Eighth, the N. O. P. H. N. is in a position to make studies in industrial nursing throughout the country. Such a study has been made recently and you are undoubtedly acquainted with it. The results of these studies indicate trends, and they also point the way for development in the future.

What the N. O. P. H. N. can mean to the industrial nurse is not dependent so much upon these things that we can get, these things that we can put our fingers on, but rather on what use the industrial nurse makes of them in application to her particular field, and the final result that is measured from such activities is the health that results to the worker and to his family. That is the sort of thing that the N. O. P. H. N. tries to do.

Each individual nurse that contributes to its support secures in return, not only these tangible things, but she secures the strength and support of a movement that alone can take place when large groups are united. The National Safety Council is an outstanding example of such organization.

CHAIRMAN HEIDEL: Has anyone anything she would like to say in regard to Mrs. Hodgson's little talk? Dr. Winslow, have you anything to say in that connection?

DR. C.-E. A. WINSLOW: Not in that connection, but I would like to say that I thoroughly appreciate the significance of what Dr. Redden said. He is quite right; there are an enormous number of physicians who do nothing but practice medicine or surgery within the walls of the factory; and a great many industrial nurses have a similar limited vision. I am inclined to think that perhaps there is more hope for the nurses than the doctors.

Miss Hudson, I think, said that when an automobile was broken down, we had to doctor it up, but when it was not quite broken down, we could nurse it along and prevent its going to smash. I think there is a good deal that can be done in a preventive way. I can't answer Dr. Redden's specific question, but I wish Mrs. Hodgson would give some examples of nurses who are doing real preventive work in factories, and studying the actual situation.

Of course, I don't underestimate the difficulties at all. It is perfectly true that in an enormous number of factories, somebody in executive authority has heard somebody else say it would be a nice thing to have a factory nurse, so he says, "Let's have a factory nurse," and he hasn't any more idea what the qualifications of such a nurse should be, than an authority on Greek grammar. But he says, "Oh, yes, wasn't that a nice motherly old lady that took care of Jennie when she had the measles. I'll see if I can't get ahold of her and ask her to come down to the plant and take charge," and that is what happens.

I am not sure but one of the favorable results of the present depression may be the elimination of such industrial medical service. It is not grounded in the consciousness of what they are about and will only lead to misfortune.

I think there are two parties in fault here, as clearly pointed out. The industrial nurses themselves are at fault. I remember attending a meeting of some industrial nurses' organization—I think it had some national name—at which every speaker, or nearly every speaker, emphasized the fact that the industrial nurse was not a public health nurse and had nothing to do with public health nursing at all. But the remedy at that end, the things the nurses can do, are very clearly pointed out.

The major problem, the lack of comprehension on the part of management, is persistently the reason for the organization and existence of this Section—this thing Dr. Sappington and I have had in mind from the beginning. This seems to be the one way in which it may be possible to break down the wall of misunderstanding. It is difficult of course, and only a few people representing management come to these meetings, but I think the officers of this Section next year ought to consider very seriously any ways of widening this educational influence. It occurred to me as I was sitting here that it might be well worth while for the N. O. P. H. N. to have a booth in the Exhibit next year; it needn't be large, but have a few striking charts and diagrams illustrating what the work of the industrial nurse might be.

I think it might be quite illuminating, and it might be one way of reaching the larger membership.

DR. AUGUSTUS BAKER (Western Cartridge Company): We employ two industrial nurses. We are very well pleased with them. They have been very satisfactory. Of course, they have been in the work for twenty years and have had a lot of experience, but for one I am going to stick up for the industrial nurse. I am going to champion the cause.

CHAIRMAN HEIDEL: Mrs. Hodgson, have you any concrete cases you would like to present at this time?

MRS. HODGSON: That is in reply to Dr. Redden? If I understand Dr. Winslow rightly, he had in mind the preventive aspects of the nurse's job as related to the workers' environment. Now, that is simply the adaptation of a fundamental principle of public health nursing. For example, in the home it is in a measure productive, if we limit our service exclusively to the individual, but that service can bring far greater returns if we try to see that the individual lives in the proper environment.

Now, among the outstanding things in a healthy environment, of course, are ventilation and light, and more directly applied to industry, low heels to prevent fatigue, and proper diet, and so on.

The most strategic time to teach, of course, is when you are wrapping up a finger. That is the psychological moment. The worker is in a frame of mind to listen. Obviously, if the worker is suffering from malnutrition, that is the time to get him talking about that. We can do that and be perfectly ethical because we can talk about the fundamental principles of good food without violating any of our ethical relationships with the plant physician, no matter what type of plant physician we may have.

Then, I think there are situations where the workman is in a poor location as far as light is concerned. He is suffering from eye strain which obviously produces a physical condition that interferes with production, and I don't believe it is a violation of ethical relationships to just point that out to the proper person, the personnel man in the plant, or if it is a very small plant, maybe the manager himself. Simply offer the suggestion that the condition be remedied. Whether he acts or not is up to him, after all. The nurse doesn't go to the administrator with a hammer and tongs and say the change has to be made.

If she sees the worker sitting on a bench that isn't suitable, that may cause undue fatigue, I think it is entirely within the province of the nurse to call it to the attention of the person who might do something about it. Now, when she has called it to his attention, and if she has done it effectively, if she has sold him the idea—and he still doesn't do anything about it, then her duty as a health worker is discharged because she can't do anything about the engineering arrangement in the plant.

Then, I think, too, if the nurse has an understanding of the engineer's program and the safety man's program, she can cooperate with them and integrate her services with the services of those individuals, and ultimately industrial nursing will not be set off in a corner by itself in a plant, but will be a vital part, a cog in that whole plant machinery. She should do that, just as she expects them to send workers to her who show signs of physical, mental, or emotional maladjustments. It is a proper relationship, and in that sense I do think it is fundamental for her to have some understanding of plant hygiene.

DR. REDDEN: That doesn't answer the question. I am trying to debunk a lot of this stuff, not oppose it. God bless them, I think the industrial nurse is a pioneer in the field, just as the public health nurse has been a pioneer in that field. A lot of nurses who are not public health nurses think that when a person becomes a public health nurse, she is stepping down a few steps. I happen to be with a national organization in which that feeling was strong at one time. Oftentimes the industrial nurse has to take care of emergency cases under proper supervision, so-called,

and more or less independently as the doctor is coming in and out from time to time as needed.

What I am trying to work out is this: no nurse, as an industrial nurse, has the right to do just dispensary service when there are problems out in the shop she must know about and in some way coordinate her efforts with the things that are causing the difficulties, and she isn't doing her job unless she does that. She ought to be something more than a pill peddler and a finger wrapper, and all the rest. I grant you that when she is wrapping a finger she can look in the eyes of the individual and say sweet things and the pain will probably disappear. You can give health advice, yes, but you are going to do a lot more for your industry if you get aloof of the personnel man or the manager and say, "I have had five people come to me with awful headaches and awful backaches. Let's go out and look at the situation."

The Metropolitan Life Insurance Company have been doing some nice posture work and gotten rid of a lot of backaches. Dr. Stevens of the Jordan Marsh Company found that 70 per cent of the people standing around in department stores had difficulty with their feet because they were wearing high heels, and he put them in lower heeled shoes and cleared up a lot of backaches.

That is information you must have. You must have that knowledge, and then you must be able to take the fellow by the arm, no matter how cranky he may be, even if he is not married, and go around the shop with him. What I mean is, you must be able to get along with people, and then find out what the trouble is, and if you can do that, you will be doing more to forward industrial nursing than with all the teaching you might get, even in the finest schools of public health nursing.

CHAIRMAN HEIDEL: Our time is escaping and we must pass quickly on to the next paper. However, we can reopen this discussion later.

The next paper tells us where to look for health in current literature, and will be presented by Miss Flora A. Dutcher.

Where in Current Literature Shall We Look for Help in Industrial Nursing?

By FLORA ALICE DUTCHER, R. N.

Educational Secretary, Marion County Tuberculosis Association,
Indianapolis, Ind.

If you have never been anything more than a splinter-picking, finger-bandaging, industrial nurse, you have missed a great opportunity. If you are employed in industry, you are standing at an open port which leads to a sea of folks few others can possibly reach with a health service program. To reach this group with a generalized public health nursing service you must keep yourself abreast of the times in every way possible, especially through the reading of current literature. Keep in touch with the progress that is being made through experiments in scientific and medical research. Keep informed of the activities of doctors and nurses who are "blazing the trail" in industrial work. Seek suggestions, help, patterns for work, and advice from leaders among our own professional women.

Where shall the industrial nurses look for help in current literature?

1. Shall we look to professional and scientific magazines?
2. Shall we look to publications from local, county and state health officials and social agencies?
3. Shall we look to universities and colleges?
4. Shall we look to standard magazines?
5. Shall we look to the transactions of meetings such as this, which are published annually?
6. Shall we look to reports of the Metropolitan Life Insurance Company, the National Safety Council, the American Association of Industrial Physicians

and Surgeons, the Industrial Hygiene Division of the United States Public Health Service, the Conference Board of Physicians in Industry, the National Tuberculosis Association, the Department of Labor of our own and other states?

1. Let us consider together the professional and scientific magazines.

Read—read scientific and professional magazines. "Study, to show thyself approved a workman..... that needeth not to be ashamed." Read month after month the *American Journal of Public Health*. Near the end of this magazine is an Industrial Hygiene Section, where excerpts from papers and talks by leading men and women in the field of industry are published. This section is edited by Dr. Emory Hayhurst and Dr. Leonard Greenburg, who present the last word in industrial health and research: discussing surveys that have been made in large and small plants, dealing with all types of industrial problems from the cotton mills of the South to the steel mills of the North; giving reports from the Sight Conservation Committee, Industrial Dental Service, the Council following a seven-year experiment of compulsory examination of the eyes of employees, clinics in industry, occupational skin diseases, tuberculosis in industry, industrial diseases and compensation, outbursts of carbon dioxide in mines, and many other interesting and valuable discussions.

Don't fail to read the *Industrial Health Digest*, formerly the "Stethoscope," published monthly as the news-letter of the Industrial Health Division of the National Safety Council and edited by Dr. C. O. Sappington, director of this division. This is distributed gratis to physicians, nurses, safety directors and others interested. As the name signifies it is a digest of experiences, procedures and abstracts of the literature in the field of industrial health and nursing. At present 700 nurses doing industrial work receive this publication regularly. Don't leave this meeting without asking Dr. Sappington to put you on the mailing list for *Industrial Health Digest*.

Every issue of *The Public Health Nurse* in 1930 carried an article of special interest to the industrial nurse and the entire number for February, 1931, was devoted to industrial nursing.

W. W. Bauer in his "Knocking at Your Door", published in the December, 1930, issue of *Hygeia*, states, in speaking of the industrial nurse: "Her whole reason for being is that she is an educator. Everything she does, though it may seem like service, is done with the educational motive." Dr. Wm. A. Sawyer of the Eastman Kodak Company, in an article in the May, 1931, issue of the *Public Health Nurse*, speaking of the nurses' position in industry, states: "It is an educational and confidential adviser's job." Statements such as these cause us to realize that the industrial nurse's position is one of great responsibility. In order to teach effectively or to give valuable confidential advice one must be well informed. Not only informed as a first aid worker in how to prevent infection but also the industrial nurse should acquaint herself with the most recent developments in her field through the magazines and chronicles previously referred to in this paper and also through such professional reports as are published by the National Society for the Prevention of Blindness, Mental Hygiene bulletins, articles published in the *American Junior Social Hygiene Magazine*, those printed by the National Tuberculosis Association, the Society for the Control of Cancer, Heart Disease and other publications.

Dr. C. O. Sappington, in the February, 1931, issue of the *Public Health Nurse*, states, "The nurse in industry will succeed in direct ratio to the extent to which she informs herself and finally critically analyzes the factors responsible for minor social conflicts and assists in the discovery of methods by which such conflicts can be successfully overcome."

2. Shall we look to publications by local, county, and state Health and Social Agencies?

The industrial nurse who is doing a generalized piece of public health work must have help or she must know how to cooperate with outside agencies. Unless she familiarizes herself with local conditions she cannot refer the individual to the proper source for immediate help.

At the biennial nurses' meeting at Milwaukee we learned that every nurse is a communicable and social disease nurse. She must know the local laws covering these diseases and the ways to check their spread. Every industrial nurse who holds her position as an educator, or the post of advisor, should know when and where every clinic is conducted: the tuberculosis clinics, pre-natal, pre-school, heart, ear, nose and throat, skin clinic, general medicine and baby clinic, and should know the type of individual accepted there for treatment.

She should know the Visiting and Public Health Nursing Organizations and their plan of work and have the latest information concerning the City Hospital, the Tuberculosis Association, the county and state Tuberculosis sanatoria, Family Welfare Society, Jewish and Colored Community Centers, Foreign Settlements, and should be familiar with the county and state boards of health, their laboratories and how to use them. This and other necessary information can be secured through publications dealing with this type of work.

3. Let us consider looking to colleges and universities for help.

Through their regular day and night classes, leaders in the field of sociology, psychology and psychiatry are daily discussing the problems that puzzle every industrial leader. Large numbers in every plant need psychiatric advice. There was a splendid article in the February, 1931, issue of the *Public Health Nurse* on "The Mental Hygiene Aspects of the Industrial Nurse's Job." Daily there is need of psychological and social adjustments with the individual employee or his family. Nothing would help the nurse recognize the factors responsible for minor social conflict and assist in the discovery of methods by which such conflicts can be successfully overcome (as referred to previously in this paper) more than scientific training and keeping abreast of the advancements in these fields through current literature. This scientific training can be secured by those employed during the day through extension night classes of most universities. Every industrial nurse should first be a public health nurse with scientific training and practical experience.

4. Shall we look to standard magazines?

The June, 1930, issue of the *Atlantic Monthly* contained a splendid article on "How Necessary is Illness?"—for those of us who are interested in industrial health. In the January, 1929, issue of *Harpers Magazine* is a good article on "Fatigue." There is no better magazine than the *Survey* to get a slant on the economic and social status of the industrially employed. *Hygeia* magazine contains splendid articles written usually by professional people for the layman. These will help the industrial nurse relate health lessons to the lay employee.

5. Shall we consider reading material presented at meetings such as this one?

Those of you who have heard the papers and discussions in the various departments of the National Safety Congress this year, and previous ones, will answer that question affirmatively without further discussion.

6. Shall we look to reports of the National Safety Council, the Metropolitan Life Insurance Company, the American Association of Industrial Physicians and Surgeons, the Industrial Hygiene Division of the United States Public Health Service, the Conference Board of Physicians in Industry, the Department of Labor of our own and other states, the National Tuberculosis Association, etc., familiarizing ourselves with the results of the pioneer service and the advancement in the field of industry?

In addition to these the nurse should acquaint herself with the safety program of her plant; the insurance plan of her particular industry, the objectives of the Compensation Insurance, Mutual Benefit Association, the Industrial Commission, the Workman's Compensation Laws and be prepared at all times to cooperate and interpret in an understanding manner to the poorly informed employee and thus promote an "area of good feeling" among her workers.

In the July, 1931, *Public Health Nurse*, a pattern—an outline—was set up by the National Organization for Public Health Nursing in an article entitled, "Objectives

and Functions of Public Health Nursing in Industrial Nursing Service." These objectives are worth striving for. It is an outline for work and it would be impossible to make a more accurate pattern to meet the need of the industrial nurse. Industries are like Will Rogers' description of the Ford. After doing repair work on the thousandth Ford, Rogers said, "I've fixed over a thousand of them things and I ain't ever found the same thing the matter with no two of 'em."

Industries are so different in size, kind of work, technicalities, that the nurse must make the pattern fit the industry into which she has been inducted. Only the well-read, well-trained, experienced nurse can do this.

Matthew Arnold said: "One who sees life steadily, sees it whole."

For the industrial nurse who does her work well, grasps the opportunity before her, must see her job steadily—see it whole—outline a pattern to fit her industry, build slowly and constructively.

Even though year after year we fail to complete the pattern we should not be discouraged. Our Eastern friends, in their attempt to make the Persian rug, spend years in completing one pattern. When it is done it is a most valuable piece of work.

The industrial nurse can outline her pattern after much reading, after scientific training and experience. Then after preparation she can get out of her work exactly what she puts into it: like the woman who took her small son to church, and who, when the collection basket was passed, put one penny in it, then left the services complaining about the sermon, objecting to the quartet. The child looked into his mother's face and said, "You got a penny's worth, didn't you, mamma?"

The industrial nurse who plays solitaire, embroiders handkerchiefs, makes needle point in her first aid room, arrives late to work, leaves early—needless to say, hates her work. It is obviously dull, uninteresting, monotonous.

While the industrial nurse who keeps herself well informed through current literature of the possibilities for service, gives that service constructively day after day, helping to correct the social, mental and economic evils among her people, responds to their keen appreciation for her help and forgets pay day—is building a monument to health in industry. In so doing she is experiencing more real joy in her work than she has ever known, even though she weaves her pattern slowly and makes mistakes.

CHAIRMAN HEDEL: The next paper was prepared by Miss Julia A. Weder, Director of Safety and Welfare of the Giant Portland Cement Company, Egypt, Pa., but as she is unable to be with us, it will be read by Miss Elizabeth Emery of the American Museum of Natural History, New York City.

What Meetings, Conventions, Clinics, and Conferences Have to Offer

By JULIA A. WEDER, R. N.

Director of Safety and Welfare, Giant Portland Cement Company, Egypt, Pa.

The general subject of our meeting, "Educational Standards in Industrial Nursing", is an ever important one. It was stressed as the primary object for organization in 1920 when a group of nurses working in industry held a meeting to form the Industrial Nursing Section of the National Organization for Public Health Nursing at the convention held in Atlanta, Georgia.

Since that time much progress has been made in industrial nursing in spite of the fact that very few public health nursing courses have offered specialized study to the nurse whose interest was primarily in the field of industry. Meetings, conventions, clinics, and conferences have played a very important part in the development of this type of work. Because of these meetings, whereby nurses with similar interests have gotten together, discussed their work and their problems, their relationship with their co-workers, employers and other agencies, in short pooled

their experiences, we have been able to develop certain standards for ourselves. Not only have we been stimulated and inspired, but we have been kept informed of the progress made in our own and in allied fields.

The policy behind all our nursing organizations, be they national, state, or local, is the continuous education of the nurse, the development and maintenance of standards, a constant striving for the highest ideals of service, loyalty, and cooperation. To accomplish their purpose, our three national bodies, The Graduate Nurse's Association, The League for Nursing Education, and the National Organization for Public Health Nursing, sponsor the national and state conventions. The ever increasing number of industrial nurses attending these conventions indicates that they are getting real practical help.

The demands made upon the industrial nurse have increased far more rapidly than the opportunities for her preparation even through post-graduate work. Not only must she keep abreast of developments in the field of industry and industrial medicine but she must know the trend of the entire public health movement. Because of the great variety of subjects presented by leaders in their respective fields these National and State conventions are of inestimable educational value.

In looking back over biennial convention programs we see the gradual shifting of emphasis, not only from remedial to preventive measures, but from the point where the nurse and the medical department were isolated units, to the present situation where they have a very definite relationship with most other departments. The medical department in its early days was the place to which an employee went to have an injury given attention. Its function was to minimize expenses caused by industrial accidents. Today, the employee goes to the medical department for all kinds of medical attention and advice, for physical examination, often for medical, dental, and social treatment. Who can say just where the function of a present day medical department begins or ends? There is a very definite tie-up between it, the safety, and the personnel departments.

This interdependence was recognized by the National Safety Council. For some years at their annual meetings they had a session on Industrial Health. In 1929, with the cooperation of the National Organization for Public Health Nursing, a session on Industrial Nursing was added. Through these annual meetings much should be accomplished. It is our only opportunity to meet with a national body whose interest is in the workers in industry. This is an ideal occasion to learn something of our mutual functions, objectives and problems.

The national meetings of 1930 showed a new trend. The need of the small industry was recognized. Since the average small plant has been slow to work out a plan applicable to its own needs, two different plans have been evolved by outside health agencies.

The National Organization for Public Health Nursing, in their "Listening In" of March, 1930, called our attention to the startling facts that less than 1 per cent of small plants have adequate medical service, that over 60 per cent of wage earners are employed in plants of less than 500 workers, and that 99 per cent of all plants fall within this group. The problem confronting such plants is that of securing the part time service of a nurse where the particular nature of the manufacturing process does not involve any special industrial hazard, and where the number of employees does not warrant the employment of a nurse on full time. How communities are meeting this problem by means of local, private, and community health organizations, was described by two speakers.

At the Biennial Convention held last June, Miss Erna Kowalke, of the Milwaukee Visiting Nurse Association, read a very interesting paper on "Intra-mural Industrial Nursing Service Provided by a Local Public Health Organization." This type of industrial nursing service is being given by various visiting nurse associations. It supplies a real need and offers certain advantages to both the employer and the nurse. The industry is assured of an experienced public health nurse, who recognizes

The next process is stemming which is done by machine; cleanliness is emphasized here, particularly in regard to floor conditions.

Next, the tobacco is placed in the cigar making machines, all processes being done without the aid of hands. Machines are cleaned four times daily and refuse receptacles are provided to hold the leftover material.

After special processes of finishing, comes examination and packing. It is necessary to have good eyes for the examination and all imperfect products are discarded.

Machines are also used for putting the finished product into a clean, individual, moisture-proof envelope which insures its reaching the consumer in a clean condition.

The product is now ready for the labeling division of the shipping department in which the same general orderliness, neatness, and cleanliness is carried out.

We now come to the second important part of our cleanliness program, which takes both the personal and environmental phases into consideration.

We began by engaging an efficient housekeeper and a staff of cleaners and matrons. This group were trained for the work on the general principles of personal and environmental cleanliness. Each housekeeper was given a list of supplies, soaps, disinfectants, and others, which she may use in cleaning. This is all done from a standard list.

One of the first steps was to scrape off old paint, scrub walls, ceilings, pipes, conduits, and other fixtures. A shade of gray was used on walls and pillars up to about four feet, and from there they were painted white. Ceilings were done in white and larger pipes and conduits in blue. Sprinkler systems were done in red, of course.

Windows were cleaned and supplied with two sets each of curtains so that soiled ones were taken down immediately and fresh clean ones hung.

Several of the floors were wooden; these were scrubbed and lightly surfaced with oil, which helps to keep the dust down.

The method of sweeping the floors was interesting: sweepers were taught to push ahead all the time and never raise the brush from the floor, to minimize the amount of dust. Since we had a cold washed air and humidifying system prevailing the year around, this also helped the atmospheric condition.

It keeps a constant force busy doing all of these things, but the company feels that it is well repaid for this expense, because of the psychological effect of appearances on the employees, encouraging them to keep their surroundings clean and also to keep clean personally.

It would be expected that since the environment of our employees has been given such consideration, that this would present a good example for personal cleanliness. This is exactly what happened. At first there was some surprise manifested, and in certain cases there was derision; but always there was interest, which meant that the psychology of example was working.

We succeeded in posting signs which helped to carry the message personal cleanliness: "Your Body is a Machine, Keep It Clean"—"Shake and Often with Soap"—"Wash Your Hands Before Eating"—"Drink Plenty of Water."

We found also that if we provided clean uniforms, such as smocks and band-aids, this gave an incentive to pride in personal appearance.

Locker space for outside clothing was also provided, each girl having her own metal locker and her own key. A matron was on duty in these locker rooms to see that various regulations were properly carried out. It was also discovered that such regulations were applicable to the lavatory and the toilet rooms.

Another very important arm of our service has been in the establishment of our first aid station under the guidance of a physician and a registered nurse. As an accessory to this service, each employee when applying for work is given a physical examination and employees are examined twice yearly as a check on their physical conditions.

A diningroom is provided for employees where clean wholesome food is served at a very nominal fee. Relaxation and rest rooms where some can listen to music or read are also maintained. From time to time entertainments are given and each Christmas there is a special party for the employees.

Finally, our company feels that this is justified because of the returns, among which may be mentioned: the costly turnover of labor has been greatly lessened; less absenteeism has been experienced; accidents are fewer under such a regime; production of course has increased because of the cutting down of these various forms of waste.

And also, the morale of employees has been greatly strengthened and loyalty to the organization definitely increased; perhaps this is the best result of all.

CHAIRMAN HEIDEL: Is Dr. Sappington in the room? We can't close a meeting without hearing from you, Dr. Sappington.

DR. C. O. SAPPINGTON (National Safety Council): We appreciate very keenly that this is the twin sister of industrial health work, and the more perfectly that physicians, nurses, and safety engineers can work together, the better will be the results accomplished.

CHAIRMAN HEIDEL: Is there any member present who would like to ask any questions or bring up any further comments before this meeting is adjourned?

To me, it has been a very inspiring meeting. The papers, as you have noticed, have followed an outline right down through. They were well thought out. The arrangements for the speakers and the program were made at the N. O. P. H. N. Headquarters. It all has to do with the educational standards. I don't like to have that stressed too much because nurses go back to their employers and say, "Oh, we are being found fault with because we are not educated highly enough." The right kind of a nurse, of course, wouldn't say that sort of thing. But, for progressive education, you must beware of the changing picture that is presented to you now and don't be found in the position of a nurse whom I approached several years ago about doing some active piece of work and taking a post graduate course that was available to her, and she said, "I don't need it." Just last week she came to me and said, "Miss Heidel, I am very sorry I didn't take that course. My position has been abolished. In fact, first aid has been removed from the plant. The management of the plant said it wasn't necessary to keep it any longer. They found they could get their entire service through the doctor, and I really believe I am at fault there." And now she has subscribed to the course that is being given in New York State, an extension course from Columbia University.

So, don't find yourself in the position of that nurse but be aware of the changing picture that is before you.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Community Safety

Thursday Morning Session
October 15, 1931

JOHN E. LONG, Chairman
Vice-President for Division of Safety Councils, National Safety Council

The Community Safety Session convened with John E. Long, vice-president for the Division of Safety Councils, National Safety Council, presiding.

CHAIRMAN LONG: I would like to take this opportunity of welcoming you to the first Community Safety conference of this kind that has ever been held. We hope that from this meeting you will go to your home cities, prepared to start organized community safety efforts.

Our first speaker this morning is the president of the Cleveland Safety Council who is to give us what we might call a bare outline of community safety work. I take great pleasure in presenting Judge Lee E. Skeel of the Court of Common Pleas, Cleveland.

Essentials of a Community Safety Program

By JUDGE LEE E. SKEEL
Court of Common Pleas, Cleveland, O.

One of the greatest needs of the safety movement is to coordinate its activities. It is impossible to reach the maximum of effectiveness until all those who are doing active safety work in a particular field give assistance to the general activity outside of their own particular scope.

I need not bring to your attention the fact that the safety movement has been developed, for the most part at least, within the ranks of industry. Many of our most enthusiastic supporters have felt that if they do all they can do to teach safety and to encourage safe practices in their respective organizations they should not be called on to participate in community safety work.

The injury that is felt by the community generally because of accidents knows no boundary lines. It is not confined to any particular field or activity, and the loss is equally great, whether the accident takes place in industry, in the home, or upon our streets or highways.

The safety movement therefore must by preventive measures include all activities, industrial and non-industrial; the safety man must be interested in preventing accidents no matter when or where the danger may be. We must enlarge our field of endeavor, because we believe in this truth: That accidents are a tax on every gain-

fully employed person, upon every industrial activity, upon society generally—a tax that can be reduced only in proportion to our ability to reduce accidents; a tax that can be reduced only in proportion to our ability to properly meet the accident problem by education; a tax that can be reduced to the extent that we, as a safety organization, counterbalance by safety education all of the hazards to which the community in all of its activities is exposed.

As a safety organization we therefore believe in the community safety program—a united safety effort that reaches into every social activity, that bridges the gaps between, and coordinates our individual programs, thereby presenting a solid front in our attack upon accidents and that keeps in progress a well balanced effort to eliminate them.

Our community safety program therefore contemplates the coordination of all safety workers—official, civic, educational, industrial and commercial into a group enterprise to reduce all accidents without special regard to the place or time of occurrence. Such a program should be and is undoubtedly most effective if it be sponsored by the safety council or safety committee composed of representatives of all civic, official, and industrial groups who are in a more or less active way engaged in or sympathetic toward safety work.

Such an organization though composed of representatives from these groups must function independently, acting as a clearing house for the securing and dissemination of safety material. It must not attempt to take the place of or do the work of the groups of whose representatives it is composed.

The Place of the Safety Council

The place of the safety council or safety committee is to encourage and assist its members in their work so that they will be more effective. Such an organization furnishes a convenient place where public, official, civic, and commercial leaders engaged either directly or indirectly in safety work can meet, discuss, and agree upon needed remedies. Perhaps the most effective part of the community safety program is that of conducting a constant campaign of public education—a campaign which reaches all classes and groups, adults and children, drivers and pedestrians, employers and employees, encouraging them all to accept individual responsibility for personal carefulness keeping them ever mindful of their obligation to support the safety efforts of their schools, their employers and the community generally. It is here that much work must be done without which all other safety activities will be far less effective. It is here that the combined energy of all safety workers is needed. It is here that our most difficult task awaits us. This is the most important part of the community safety program.

It is a rather sad commentary upon the general nature of this civilization, and yet I believe it to be true, that it is a most difficult thing to arouse people to give serious attention to the needs of safety. We as a people are not acquainted with the facts and haven't for the most part sufficient interest to find out what they are, or knowing the facts can see no direct relation between them and our own personal obligations to uphold the moral and physical strength of the community. We live too closely within the circle of our own endeavors; our struggle to keep up with the economic demands of our times has the effect of overemphasizing our personal needs, of emphasizing self before all else and of encouraging forgetfulness of the common good.

We as a people need to be told the facts about safety, facts that if known and understood would do much to uphold the social order and to impress upon us all the proper relationship between self and the community. We would also learn that permanent personal achievement cannot transcend the general character and good of the community and that a strong community spirit is the foundation of all success. The essentials of the community safety program must therefore include an active medium of broadcasting the facts about safety in an attractive and appealing way.

The medium through which this can be done depends for the most part upon how the community is otherwise organized and whose leadership has received the greatest response. Parents-teachers associations, mothers' clubs, business men's luncheon groups, religious and civic bodies all present a fertile field of endeavor if properly approached. The safety council or committee should train good speakers to meet this need. The public press and the radio can be effectively used if proper material, attractively presented is given to them. Many other effective avenues are at hand if we will but seek them out and give proper thought and energy to the need of broadcasting the facts.

I have said that the essentials of the community safety program are first to link all of the forces actively or indirectly interested or engaged in safety work into an effective harmonious group, and second to have such organized groups set about the task of broadcasting the facts about safety to make more effective the efforts of the individual safety workers in the group.

To Encourage and Promote Harmony

The ultimate purpose of course in this program is to secure an enthusiastic response to the demands for the use of safe practices by everyone in all his social contacts, in other words to encourage and promote harmony in the contact of the individual with his community. Without such harmony the social order cannot long endure. The disasters that have come to us because of the lack of harmony in our social contacts with each other are too well known to this group to need repeating; 100,000 met a violent death and millions were injured in the short space of a year because of thoughtlessness or ignorance of the dangers that surround the act about to be performed. Such a picture is a challenge that cannot be side-stepped and which we must meet with ever increasing energy.

Our last and final step in the community safety program therefore is the creation of a strong public sentiment for safe practices through the agencies I have suggested. Safety in its final analysis can only be achieved through inducing all persons to act safely and safely in their social contacts. We are dependent for the success of our program upon every man, woman and child in the community becoming an active part in the safety movement, sincerely striving to achieve safety-mindedness.

This part of our program requires leadership. It is not an easy matter to influence human behavior. The underlying causes that motivate human conduct are not easily understood and until the causes can be analyzed progress will be slow and laborious. It is not my purpose to enter into a psychological discussion of this important subject. I refer to it only by way of suggesting some of the kinds of people in whom we must awaken a response to the safety movement.

There is the social slacker who takes all and gives nothing and takes a malicious pride in the fact that he shares no part in the burden of community betterment. There is the individualist who still lives in the days of the Puritan, standing upon his personal rights, and demanding complete liberty of action to the fullest extent of the law, without equity for anybody. There is the fast thinker who becomes impatient when his path is crossed by the slow thinker; the chance taker and many others all of whom must be induced to harmonize their conduct with those about them; all must be induced to respond to the call of safety.

This as I see it is the field in which community safety work must be done.

This then is the problem of the community safety program. It is our purpose to go out into the community and by the dissemination of proper information, by instilling in the minds of those with whom we meet the need for care in social conduct, to reduce and bring to a minimum the disasters of the age.

CHAIRMAN LONG: Our next speaker is Mr. C. L. Rice president of the Chicago Safety Council and operating manager of the Western Electric Company's plant.

What a Community Safety Program Can Do for Industry

By C. L. RICE

Vice-President, Hawthorne Works, Western Electric Company, Chicago

I was delighted to be put on the program for this talk. I do not believe that anybody in the safety movement has ever grasped the full significance of the job he has taken hold of but when a morning session is devoted to community safety, I believe the National Safety Council is beginning to grasp the full significance of its job and maybe the industrialists who are listening to this discussion are beginning to grasp the fact that they have a much broader job than they ever thought of.

I have done some talking on public safety and in my talks I have felt that the industrial man who gets himself into public safety has to approach it from the same point of view that he approaches safety in his own institution. He has to talk to his people straight from the shoulder and make them see that each one of them has an individual responsibility for safety in his community. And in talking to you this morning, I am going to adopt a good deal of that tone, because I feel that my audience here today is perhaps a part of my own community. The community is pretty widespread, but after all this is the United States, and the United States is a country and the National Safety Council is making its record of public accidents based on the country, so we are all part of the same community when we all have part of the same job to do.

When I think about this public safety job from an industrialist's point of view, I have to remember that twenty years ago a safety effort was born in this country. Twenty years ago the public at large handed to the industrialist the fact that he was too careless and too reckless in the operation of his industry, and made laws to control him. That control largely was from a dollar standpoint, and while the safety work of the industrialist in this country has become to a large extent humanitarian, it started off pretty nearly one hundred percent utilitarian; so I say that in twenty years the point of view of industry toward safety has changed. It has changed from an economic point to a moral point. The moral values are being considered much more liberally and more earnestly now than last year or the year before.

I do not discount for a minute the fact that there is a real economic point of view in the safety job and no manager or safety man or industrialist in these times trying to cut corners, can forget the fact that there are dollars to be saved by practicing safety. After all is said and done, you can measure the economic values in dollars and you can get statistics that present to you pretty well the economic situation you face in your safety efforts. But who can measure the moral values of safety? Who can present any valuation of lives lost, of families bereft, of earning power lost due to the loss of hands and feet and eyes? Those things you cannot evaluate in statistics and I say that now in our safety job we have to face the moral values that are so hard to realize unless the man who is considering the proposition has the heart and the feeling toward his fellow men to give them their proper weight in industrial affairs.

You come to these meetings year after year and you hear the story told of the gains that have been made in the safety work throughout the industrial country that you represent, and when you analyze those gains, they are satisfying of course but they come down to some pretty simple fundamentals. Why are we making the gains? Because in industrial establishments we have brought to the individual the responsibility for his safety and the safety of his fellow employee. In addition we have forced on him a discipline that makes him bear in mind those simple safety laws, and we have pinned on our supervisory staff the responsibility for properly guarding their people, for thinking ahead, for making plans that are safe, for seeing that the housekeeping in the plant is safe, and so on. Those are the very simple fundamental things that we have done in industry and against which we are able now to show gains with which we are pretty well satisfied.

I say that we are pretty well satisfied because a good many men in industry do feel satisfied with their safety results, but after all, how long do they have the worker in their institution? Perhaps eight hours out of the twenty-four. Sixteen hours are not spent under the discipline of the industrial plant, and during that sixteen hours what happens? I think you have to bear in mind the physical law of action and reaction. Your worker leaves the plant imbued with the safety lessons that he has learned and then he reacts against them. On his way home, perhaps he takes a little delight in driving faster than he should drive, because he has been repressed all day.

In our own institution the lost time accidents occur to our people outside of work-hours in the percentage of four to one. That is, we have one accident in the plant to four that our people suffer outside the plant and when you take their sleeping hours and their eating hours out of the sixteen, certainly their exposure is not in the nature of four to one. Our record last year was one death from accidental injury in the plant and that was not really an injury; it was a small puncture wound that was neglected, became infected and resulted in death. We had thirteen deaths from accidents to our people outside the plant.

Any industrial man can ask the question, "Why should industry take an interest in public accidents? Why should industry make itself responsible for its employees when they leave the doors of the factory?" Well, if you want to get down to economic considerations, I think you could prove your interest on economic grounds. I know in our own case the deaths last year cost us many thousands of dollars because many of those employees who were killed were entitled to death benefits and many of our employees who were injured were entitled to sick benefit. I have not placed the thing on a dollar basis because I am not interested but I believe I can prove to any big industry that it can afford to be interested in public accidents from the point of view of the dollars it costs them in the carrying on of their business.

I suspect that from a public accident point of view, Chicago perhaps has one of the worst records of any city in the United States. I am not ashamed of it, I am sorry for it. Our record shows that in the nine months of this year there were 926 people killed in Cook County, an increase of 20 per cent over the same period in 1930 and an increase of 36 per cent over 1929. Is it any wonder that I, as president of the Chicago Safety Council, feel that there is something for industry to do when we have this record staring us in the face? Yet, industry says, "Are we responsible?" And then you can step back to my argument of a year ago when I pointed out that society had charged industry with the responsibility for its accidents and now industry was passing the charge back to society, but I have to ask the question, "Who is society?" and the answer comes back right away that society is you and I. You and I are the people who are responsible.

You cannot pin the responsibility on the public officials of the city because the problem is too large. The judge just pointed that out to us. They cannot carry the burden; they must be backed up by public opinion, and when you analyze that, what do you find? We have a total of forty-nine million wage earners in the United States in normal times, who to a large extent are in industrial endeavor of some sort. In Chicago, there are in normal times 1,500,000. In the little town of La Grange, where I live, we have 11,000 population, among whom there are 300 Western Electric families. That situation is true in every industrial community in this whole country. Among those 300 families in La Grange, there are a good many outstanding men who have something to do in civic affairs. They have all been trained in safety and they all should be lined up to take a part in the safety efforts of the community. Every industrial organization, if it analyzes itself, will find it is in that same situation. Whether it is a large community or small, the industrial organization represents a large part of the population of that community and a large part of the sentiment, and if it is willing to do so, it can build up the public spirit with which the public at large goes after the safety problem.

To illustrate to you what can be done, in La Grange we had no safety council

her opportunities and responsibilities, and who has the benefit of the V. N. A. supervision. If the nurse is ill, on vacation or leave of absence, she can be replaced by a similarly trained substitute. The nurse, under this plan, has the advice and support of her Association at all times. In the event of curtailment the nurse resumes her work on the V. N. A. staff.

At the meeting of the Industrial Nursing Section in Pittsburgh, last October, Dr. Glenn S. Everts gave an account of "The Organization and Administration of Industrial Health Units", based on the plan of the Philadelphia Health Council and Tuberculosis Committee. "An industrial health unit is a group of plants each having from 100 to 500 employees, which for purposes of health supervision are grouped into a single administrative unit with a total of approximately 1,000 employees. The reason this number of employees has been fixed upon as constituting a unit is that one industrial nurse, if her time is carefully scheduled and the plants reasonably near together, can satisfactorily serve that number and do the necessary travel between plants."

This plan is a unique demonstration by a voluntary health organization of the practicability of a joint health service among smaller industrial plants, which, when the work has become thoroughly organized and integrated into plant routine, may be turned over, together with the nurse and physician who have been carrying on the work, to the administration of the plants themselves.

The individual state meetings, in addition to presenting topics of general interest, usually stress specific needs or specific developments of local interest. These meetings have decided educational value to the nurse. Who has not been thrilled and keenly interested in the work of the Frontier Nursing Service of Kentucky, pellagra prevention work in the Southern cotton belt, nursing in the camps of fruit pickers in the fruit growing districts, and (the latest development) aerial nursing in trans-continental aeroplanes?

Each of these projects presents a different problem, yet the underlying principles are the same. Our daily contact with employees who look to us for guidance in health matters demands that we keep informed of the newest developments in public health. Never was there a time when the knowledge of food values was so essential as it is now; nor did we ever appreciate the information given us by the ever increasing number of talks on mental hygiene as we do during this period of depression with its readjustment of the standards of living.

Our local needs and problems are brought to us chiefly through attendance at clinics and conferences. If the industrial nurse wishes to be as helpful as possible to the worker she must be able to answer all questions of health which the worker may bring to her in relation to any member of his family. Therefore, she must be familiar with the community health program. She should make occasional visits to neighboring clinics where an unusual or outstanding piece of work is being done in actual method or procedure in some one special field as, for instance, surgical technique, physical examination, preventive measures such as clinics for the well baby, nutrition, mental hygiene, toxin-anti-toxin, or tuberculosis, where the tuberculin test for tuberculosis in children is being done. If possible the industrial nurse should contribute to local conferences where there is group discussion by health and social workers. Not only are these instructive but they make for mutual understanding of each other's problems.

The eyes of the nursing world have been too long focused upon the industrial nurse in the large establishment. The U. S. Chamber of Commerce tells us that not a fourth of our workers are with companies employing 1,000 or more workers, while 61.9 per cent are in plants where less than 500 are working. This means that management and ownership are often the same; that, except in the largest cities, these smaller industries are definite factors in the welfare of the community. Most employers recognize this fact and are willing to assume their share of the responsibility. Against this fact stands our knowledge that the smaller industries have

been slow to employ a nurse. We know, too, that there are many instances where a nurse has been employed and this service discontinued after a short time. Why is this? Isn't it true that only too often the fault lies with the nurse? She lacks the broad vision and understanding which are necessary if she is to interpret the worker to his employer and vice-versa. She must be willing to study the problems of the employer as well as those of the employee; to take up responsibilities which are not exactly nursing but which do to a definite degree make for increased health and happiness of the worker as well as increased efficiency and production for the employer.

Conditions change constantly, new methods develop, techniques are improved, and trends follow new directions. There is no standing still. This is especially true of the industrial world. It includes the industrial nurse. If she wishes to be ready to meet the constant changes she must make every effort to increase her professional knowledge. Only by doing so will she be able to see and act quickly upon her opportunities for service and to work with any degree of sureness and confidence.

The presence of leading workers in their respective fields, the great variety of interesting papers, as well as the time and study given to make discussions helpful, make attendance at meetings, conventions, clinics, and conferences not only stimulating and interesting but of great educational value.

CHAIRMAN HENDEL: It is especially true that the contact with people doing a similar piece of work frequently gives us an insight into our own job.

We will pass on to the next paper now, which will be given by Miss Alice M. Ellis, who will tell us how to sell personal hygiene to our employees. Miss Ellis is going to supplement her remarks with slides showing some of the work being done in their factory.

How We Sold Personal Hygiene To Our Employees

By ALICE M. ELLIS, R. N.

Welfare Department, American Cigar Company, New York City

The work which I am about to report was begun in February, 1930, through the interest of the late Alfred W. McCann. Three of the company's plants were selected, those at Philadelphia, Camden, and Passaic. Although cleanliness was present to a marked degree, the company aimed for better conditions.

We were faced with the problem of bringing personal cleanliness to groups of from 900 to 1,200 or more girls in these three plants. The ages averaged from just over school age to thirty years.

In the beginning we decided that the easiest way to obtain results was through the eye and by setting a good example. Hence we decided at first to begin on environmental cleanliness and gradually applying it to the personal phases.

So that you may understand the processes in our applications of cleanliness to them, I want first to briefly describe the various steps in cigar making and make some comments on these. (Photographs of these processes may be obtained either from the author or through the National Safety Council.)

After unloading the tobacco it is run down a steel chute and is immediately packed inside the so-called lethal chamber where it is thoroughly fumigated to kill insects and their larvae. This process is the responsibility of one man who is an expert, and he is under supervision by our chemists. After removal from the lethal chamber, the tobacco is placed on small platforms for airing. Precautions are used to keep it clean and during this process the lethal chamber is thoroughly aired of dangerous fumes.

Strict humidity and temperature must be maintained to keep the tobacco leaf in good condition and it is then loosened and moistened with a special formula.

but we had a Civic Club which had never done very much. It was there as a sort of a political body having an inactive membership but it was in a position to be useful. We got them to agree to take up safety work. A year ago last fall, they started with a public safety campaign in which they got all the civic and public bodies of the village interested. They have carried on and plan to carry on continuously in safety work. Their record shows a reduction in public accidents. I haven't the records right up to date but it is something like a 50 per cent reduction in public accidents over a period of about eighteen months.

The city of Evanston is showing the world something in public or community safety. That has been done by a Safety Council tied in closely with the public officials of that city.

The Chicago Safety Council has been able to get outlying communities, such as Chicago Heights, Harvey and a number of others lined up in the same kind of an effort that we are carrying on in La Grange.

When you go back to your homes, if you are located in a community that has not started a safety campaign, it is your job to start it. When you analyze the accident records of the country, you will find that public vehicles, trucks, buses, etc., figure in a very small percentage of the accidents. Private cars figure in a very large percentage. What does that mean? It means that you and I and your neighbor and my neighbor and your children and my children are the people who are responsible for the accidents in your community. Just because they do not happen to you is no reason why they may not happen to you tomorrow. What is your business is everybody's business, and what is everybody's business perhaps is done by nobody, so here we are with a proposition that requires somebody to start something in the community. I say that the industrialist is the man who has the biggest interest, the best conception of the way to do the job and he is the man to do it, so I offer you the proposition now that you enroll yourselves in the ranks of the safety council of your particular community when you get back there.

Maybe you will find that they haven't a safety council. Perhaps you will find that the Chamber of Commerce is doing some work. All right, get behind and push it. If you find that there is nothing going on, then look around and see if you do not find a woman's club, a men's club or some other organization in your community that never has done anything. Give them the idea that here is something for them to do. That is the way that you and I, as industrial people, can take a part in making our streets and highways and cities and towns safe for our families and for ourselves and friends and that is one way we can help to justify our existence.

CHAIRMAN LONG: Our next speaker is going to talk to us about what a community safety program can do for the municipality. He is Major Robert B. Brooks, of St. Louis, Mo., and has long been active in the St. Louis Safety Council.

What a Community Safety Program Can Do For the Municipality

By ROBERT B. BROOKS
Director of Streets and Sewers, St. Louis, Mo.

Prof. Yerkes of Yale has set out some interesting steps to indicate how a scientist would go about solving a problem:

1. Get together the facts surrounding the problem.
2. Study the problem and relate the facts to it.
3. Choose a way by which human beings can best be tempted to regulate themselves, in view of the facts.
4. Make tests to see if the solution is sound, later modifying the methods if need be.

More than a million people are living in Greater St. Louis. Nowhere will you

find a more fair-minded or a more considerate citizenship, and yet there are many problems to be solved in order to improve their common occupancy of this area.

According to the dictionary a community is, (1) "The people who reside in one locality and are subject to the same laws or have the same interests; a body politic whether village, town, city or state. (2) A body of persons having common interests, privileges, etc." In this day and age there must be added to the second part of the definition, "in which individuals share equally certain responsibilities."

This responsibility includes the administration of affairs by the city officials and by the individual citizens through the support and cooperation which they render, and the respect which they show for law and order.

Only under such a mutual agreement and understanding can the community grow and prosper in a safe manner. This applies equally in the case of a bond issue for city improvements, the administration of a school system, the Police or Fire Departments and support rendered to charitable or civic organizations.

In the final analysis the big responsibility rests with each and every individual citizen because it is within his or her power to elect officials and to determine the policy either directly or indirectly of the other organizations.

Again we must turn to the dictionary for the definition of a municipality. "A municipality is a borough, town or city possessed of a charter of incorporation conferring privileges of local self government." This charter sets up the city government, creates departments and defines the scope of their work, and it also fixes requirements in the matter of ordinances and legislative procedure.

Under the St. Louis City Charter, we have a Board of Public Service, composed of the Director of Public Safety, Director of Public Welfare, Director of Public Utilities and Director of Streets and Sewers and the President of the Board of Public Service.

Through various departments and subordinates these men conduct the City's business. Each of these departments constantly is confronted with problems pertaining to safety. Each one benefits by any community safety program. In addition to these five administrative departments, we have the Police Department which is state controlled but maintained by the City and two City Police Courts, which deal with matters pertaining to public safety and welfare.

In recent years, however, with traffic on our streets overwhelming us at every turn and taking an annual toll of human lives exceeding that of the World War, most of our attention has been claimed by traffic safety. Those of us who deal with traffic problems are constantly reminded of the problems of others and we know that a community safety program includes many items.

Fire Prevention Week activities just closed October 10th. In St. Louis this activity is sponsored by the Safety Council and the program was developed by a Committee which included the Director of Public Safety, the Fire Chief and his deputies and the Board of Education. The program exceeded that of last year in scope and results. Last year's program brought to St. Louis the first award of the National Fire Protection Association, St. Louis being the winner in the State of Missouri.

This committee exemplifies the benefit of an established community safety program: it is sponsored by the St. Louis Safety Council in cooperation with city officials, business interests and civic organizations. The work done by this Committee consists chiefly of educational propaganda. The benefits from such an activity are twofold: (a) Our citizens are informed and educated along fire prevention work and the hazards and costs of fire, and (b) The Fire Department is helped materially because fires are being prevented and the knowledge which people gain of their Fire Department makes just so many additional supporters for the Department.

The fire prevention activities are but one part of a community safety program. The good results obtained are due to the fact that the work is centralized in the Safety Council and other organizations are relieved of much duplication of effort and expenditures.

Some years ago the Safety Council aided in drafting a new elevator ordinance for the city. Its special committee, because of affiliation with the National Safety Council and other Local Councils, was in a position to get much valuable data for consideration in the drafting of the ordinance. Such service is appreciated by department heads when presented in the proper manner.

At present, the Safety Council is collaborating with the City in the drafting of a fumigating ordinance. The Council has canvassed other cities and as a result has been able to supply the city with valuable information.

These are just a few instances of the benefit resulting from the existence of an organization working along definite lines in public, as well as industrial safety.

Traffic matters are handled by the Department of Streets and Sewers, therefore the main part of this paper will be devoted to discussing the Department's relation to a community safety program.

As a member of the executive committee of the St. Louis Safety Council for the past seven years, I can speak knowingly of the various activities which the Council is conducting in the interest of public and particularly traffic safety. Shortly after publication of the Model Municipal Traffic Ordinance, a special committee, sponsored by the Safety Council and appointed by Hon. Victor J. Miller, Mayor of St. Louis, began work on an ordinance for use in St. Louis. This committee considered every phase of the Model Ordinance in relation to local conditions, after which the Safety Council prepared a draft ordinance for submission to our Board of Aldermen for its passage and approval by the Mayor.

This Traffic Committee of the Safety Council was composed of our leading citizens. The time which these men devoted to the preparation of this ordinance could not have been paid for, but they did this work because of their affiliation with the Safety Council and their interest in public safety.

As a result, we secured for St. Louis a traffic ordinance which differs only slightly from the Model Ordinance.

At the time St. Louis was working out its traffic ordinance, Reyburn Hoffmann, manager of the St. Louis Safety Council, was City Traffic Engineer. He was our first City Traffic Engineer and the position at that time, as now, was extremely difficult to handle. A great deal of the success in formulating this ordinance is due Mr. Hoffmann.

The St. Louis Safety Council now has a Highway Safety Committee which grew out of the committee working on the traffic ordinance. It functions in the interest of street and highway safety. This committee has available all of the statistics and data collected for years. Its conclusions and recommendations are made only after careful consideration of facts.

During the past few years the relations between the Police Department and the Department of Streets and Sewers and the City Courts have been ideal. There has been a spirit of cooperation which had never before existed and into this picture fits the Safety Council which has upon its Executive Committee representatives from these several Departments.

The Safety Council through the continual gathering of material, and the analysis of traffic accidents, is in a position to consult with the Police Department, the two Police Court Judges and the City Traffic Engineer. It calls attention to hazardous conditions and later makes comparisons to see what effect additional policing of the streets or installations of traffic central equipment have had on these hazards.

We are much interested in what we might term "before and after" studies. The Safety Council has completed spot maps on which all traffic accidents during the past eighteen months have been indicated. These maps show what intersections are dangerous. What types of accidents predominate and their causes. With this information the Police Department has gone out and has checked those unsafe practices and the Traffic Department has installed those things which apparently were needed to better conditions.

There are many activities which the Safety Council conducts for the improvement of traffic conditions. One is a Women's Safe Drivers' School every spring. Last year 400 women enrolled for the complete course of 10 lectures, and most of them participated in the driving contest. The school turns out women versed not only in safe driving, but also in the supervision and maintenance of their automobiles.

The Safety Council conducts an Inter-Fleet Contest participated in by 60 concerns, operating some 3,000 vehicles. This activity will begin its fourth year and shows an enviable record in accident reduction. Its participants reduced accidents from 50 per 100,000 hours of operation to 30 per 100,000 hours during the last contest, a reduction of 40 per cent.

This activity certainly helps the city in its endeavor to promote safety upon the streets. If we could produce the same results proportionately among individuals many of our problems would not be with us today. The safe handling of these commercial vehicles, conspicuous because of their size and color, by these 3,000 drivers in addition to improving actual conditions on the streets has a decided educational effect upon other drivers. The safe handling of these heavy vehicles upon our streets does much to preserve our pavements thus reducing the cost of maintenance.

In connection with the Inter-Fleet Contest activities a weekly bulletin service is maintained. These bulletins carry safety messages and advance information on new traffic regulations, stop signs, etc. This information will many times avert an accident.

One of the most productive methods of improving traffic conditions is through educational propaganda. People who obey ordinances voluntarily are the ones who will ultimately swing the tide against our present accident and fatality records. People who are forced to do things through ordinance and by police regulation, with no understanding of the reason, resent this apparent imposition upon their inborn rights as American citizens and are quite likely to repeat their offense at the first opportunity. The effect of enforcement is only as permanent as the enforcement itself. This is not true when people do things because they have learned that they are right.

The Safety Council is conducting several activities along educational lines. They have organized Junior Safety Councils in the schools. Since 1926 they have conducted a Careful Children's Club over the radio. This Club has at this time 459,131 members to whom safety messages are broadcast three evenings a week. You can well appreciate the good which such an activity is producing.

Through the work of the Safety Council the Board of Education included in its curriculum the teaching of safety in all grades. After this educational program was begun in 1926, fatalities among children dropped from 48 to 29. In 1930, there were 28. Since then until the beginning of this year child fatalities and injuries have decreased. Along with the activities of the School Boy Patrol and the sincere endeavor on the part of the Police Department to patrol every school crossing educational work among the children has had and will continue to have a great effect upon our accident problem.

It is my opinion that safety instruction, beginning in the kindergarten, will become as much of the educational life of our future citizens as have the fundamentals of reading, writing and arithmetic. This statement can be borne out by the following report made by Mr. William F. Yorger, Public Safety Supervisor of the St. Louis Safety Council. During the 189 days our 83,798 children attended school there were 307 accidents on the school grounds, mostly due to athletics and playing; 186 miscellaneous; 131 in the school buildings, on the steps, etc.; and 146 accidents in their own homes. During the school year the total number of student trips to and from school amounted to 63,352,800 but there were only 44 accidents and one fatality, that of a youngster killed by a street car. The child has been taught to be safe not only at school, but at home. Although he apparently

is safer going to and from school than at home. It appears that to have the child safer at home we must reach the parents. This is another activity conducted by the Safety Council.

They have a Home Safety Division which promotes home safety activities and conducts home safety programs over the radio with the hopes that ultimately all parents will be reached by a safety message and absorb the same safety fundamentals as have their children in school. It is quite likely that in many cases we will not have safety in the homes until the children now in school become the parents of our next generation.

The Traffic Vigilante Committee, reestablished this past June by the Safety Council, is an unofficial volunteer body of 200 men, who in the interest of better and safer driving act as reporters of violations.

Many times they also report unsafe conditions on the street, potential accident hazards. This information helps the police and it helps our Department. Reports are made through the Safety Council office.

We have four traffic inspectors who are expected to cover the city checking up on overloaded vehicles, sidewalk encroachments, and other violations. They also make regular inspections of all taxicabs and service cars. I doubt if twenty-five men could do all of this work so any help we get from observing citizens is appreciated.

The Safety Council has accident statistics from years back filed by street names and intersections and by summaries classified according to the standards set up by the National Safety Council. The office also has on file the names of all street intersections at which there have occurred three or more accidents during any quarter year period.

All of this information is available to my Department at all times. Those records are consulted when we are considering the installation of signals, stop signs, safety zones, etc. The City Plan Commission calls for accident records at intersections under consideration for the elimination of jogs, dead end streets or for possible street widenings. We use these records to check up on the effect of parking regulations and to help us determine the desirability of establishing no-parking zones.

The information in the files seem inexhaustible and its possibilities for various uses are many. Neither our Department nor any other has the facilities for gathering, tabulating or examining the thousands of reports received each year. The traffic accident reports alone average 800 each month.

May we again quote Prof. Yerkes' four steps indicating how a scientist would go about solving a problem. You have been shown how the facts have been gathered concerning our community problems, how our municipal officials and the Safety Council study these problems and relate the facts, how we choose a way by which human beings can best regulate themselves in view of the facts, and then how our cooperative work makes it possible to make tests to see if our solutions to our community safety problems are sound. This is what any community safety program can do for a municipality.

CHAIRMAN LONG: Our next speaker is going to talk to us about what a community safety program can do from the fleet operator's standpoint. Mr. Horrocks is secretary of the Minnesota Truck Owners' Association, Minneapolis.

What a Community Safety Program Can Do For the Fleet Operators

By T. A. HORROCKS

Secretary, Minnesota Truck Owners' Association, Minneapolis, Minn.

Registration records reveal that in the year 1930 3,576,400 commercial motor vehicles, exclusive of taxicabs, were in operation on the streets and highways of this country. These records also inform us that of these three and one-half million vehicles close to two and one-half million are owned and driven by individual owners. This is particularly true in regard to trucks.

In 1930 approximately 96,000 bus units were registered. Figures on taxicabs are more difficult to secure because most of them are registered as private cars. Because the ownership and operation of buses and cabs are largely confined to concerns controlling large fleets, I have elected to point my remarks more specifically as to motor trucks. In this field safety progress is slower in comparison with either the bus or taxicab because, as I have stated, of the numerically large individual ownership.

We are accustomed in trucking circles to include under the caption of fleets practically all types of motor trucks.

Because of this large individual ownership of trucks, reaction to the educational features of a community safety program is more difficult to attain; yet, I am glad to say that a distinct measure of improvement has been noted in recent years in the control of those responsible for the safe operation of commercial units.

If it were possible to place the control of these millions of commercial units under a system whereby each driver or operator would be under strict rules and supervision of a lesser number of owners, the task of educating drivers to operate more safely would be made more simple, and would result in a stricter application of discipline. However, we haven't yet reached that state of Utopia, and we are confronted with altogether different conditions.

It is now a generally accepted fact that where a certain group of drivers are under one supervision, such as one ownership, the accidents caused by carelessness, discourtesy, indifference, inattention, etc. have been largely eliminated. Recent surveys made of fleets enrolled in the membership of the National Safety Council show in a marked degree that accident control by commercial users can be accomplished.

Few fleets, comparatively speaking, are large enough to afford a complete safety organization and program of their own. It naturally follows that the majority of this class of operators would be more susceptible to such activities as joint safety meetings for drivers; interfleet contests; and regular meetings of the different fleet representatives under auspices such as may be obtained through community safety organizations.

It is a matter of common knowledge in cities that have held fleet safety campaigns that a sharp improvement has been obtained in the conduct of drivers. I know of my own knowledge that joint safety meetings with drivers have been fruitful and productive of definite results.

I submit therefore, that properly organized safety campaigns conducted by community safety councils are decidedly valuable to commercial operators, for no matter how much individual effort is spent by fleet owners in the interest of safety, they are at the mercy of other ignorant, careless or reckless drivers. As I see it, the only possible way to solve this problem is through a joint activity embracing all the principal fleets, city and county officials and the general public.

One of the chief problems of the fleet owner is to impress upon the minds of his drivers the importance of what we may call "road courtesy" or "courtesy to the public," without admitting for one minute that commercial drivers are inferior in manners to private car drivers. It is a fact that the private car outnumbers the commercial units about nine to one, that were it not for the private car, we would not have the magnificent road systems that we have at present. Thus, it is an important feature to cultivate the good will rather than the antagonism of the private car driver. No greater result could be obtained in this connection than that offered through community safety organization. The fact that people observe the characteristics of certain commercial drivers acts as a strong deterrent to discourtesy on their part. In the safety curriculum of the state truck association of which I am secretary, we have stressed this very important matter of courtesy to the public, with good results. True, we have probably done it for self protection; to stimulate good feeling on the part of our customers, and to discourage the passage of restrictive laws and ordinances. However, the fact that almost all trucks bear the name of the employer, makes the driver more susceptible to criticism, and

tends to influence his conduct as a driver. The community safety group could render a distinct service to its community in this connection. Contrary to the opinion held by many folks, employers do care and care a great deal about the deportment of their drivers. They are much concerned because they realize they are in a different position from, for instance, the industrial employer, who has his employees under observation during working hours. The commercial vehicle driver is out of sight of his employer 90 per cent of his employed time; therefore, road courtesy on the part of his drivers becomes a very important consideration to the fleet owner.

And may I ask what greater satisfaction there can be to public spirited citizens and what greater reward can be obtained than by combining all the elements of good citizenship in a "grand and glorious" onslaught on this greatest of all American tragedies?

My friends, believe it or not, we are all engaged in one of the most monumental tasks ever given to a civilized people—the prevention of loss of life—the amelioration of a crippled people—the defense of childhood.

This task calls for the enlistment of all our resources and of all our civic forces, not one group but *all* groups can and should respond to this call. This is no time for quibbling or petty jealousies between civic groups in the communities of our country. It is a call to every red blooded man and woman to end this bloody carnage. The same call we responded to so enthusiastically in 1917 is again ringing in our ears. Shall we ignore this? God forbid!

An when that time comes, that we, individually and collectively, must turn over our live's pages of history to the scrutiny of others, may we truly say we did our part—we fought a good fight.

CHAIRMAN LONG: Julien Harvey, manager of the New York office of the National Safety Council, is now going to discuss the remaining topic of how to organize a community safety program.

How to Organize a Community for Safety

By JULIEN H. HARVEY

Manager, New York Office, National Safety Council

In attempting to respond to my subject I find that I am confronted at the very outset with a difficult situation. That difficulty arises from the fact that in this audience there are representatives of many communities in no two of which the problem may be the same and suggestions which may be of value to one may be of no value to another.

To illustrate, there are undoubtedly representatives here of communities with a population ranging upward to 25,000 where only a limited program is practical or possible. Or you may represent a somewhat larger city, let us say with a population of 100,000, where a little different treatment might be necessary; and, lastly, your city may be one of the few large ones which at the present time are doing no organized work, and in this class still another type of treatment may be required. Taking it from another angle, in certain of these cities, regardless of their size, there may be no organized effort whatsoever, or there may be some one or more activities carried on by the Chamber of Commerce, Automobile Club, the American Legion, a service organization, a local newspaper, or other agency. In some cities the schools or the Police Department may be quite active and again they may not.

This leads me to the first premise, that it is very difficult to lay down a definite plan for organizing the community without a definite knowledge of the local conditions. However, I should add that no matter what the local situation may be, there are still fundamental principles which apply to all and which may be modified or amplified to suit specific conditions.

Community Safety—All Inclusive

Before going further, and in order to remove any lingering doubt which you may still have as to just what a community safety program consists of, I would like to emphasize one point which has already been made, namely that the community safety program is not designed for any one phase of safety effort but is all-inclusive. Its purpose is general is to reach every man, woman and child in the community in a program largely educational in character and designed to so publicize the subject that it will work for the creation of an attitude of safety mindedness on the part of all. This involves the worker in the plant, the individual in the home and all of us on the streets and highways, either as drivers or pedestrians. This means that there should be activities designed specifically for industry, the public, and the home. I refer specifically to this subject because I have been led to believe that industry sometimes feels that the community safety program is designed to cover public safety only and does not contain a line of attack which can help industries specifically. This conclusion is erroneous for there are many activities of a purely industrial character and of great value to industry and industry alone. Furthermore, industry for perfectly obvious reasons has a vital interest in accidents occurring to its workers on the streets and in the homes and second only to accidents occurring in their own plants.

The First Step

If you are interested in organizing your community for safety, the first step will be an analysis of the community. This involves:

1—What is the local accident situation?

In almost every American city we know that the accident situation is bad and can be greatly improved. However, our information should be more than general and from Police, Health Department and other records we should ascertain at least the number of fatal accidents occurring and the general trend.

2—What is being done?

The answer to this question would include an analysis of street and highway activity on the part of the Police Department; safety work in general in the schools, activity on the part of automobile clubs, Chambers of Commerce, service clubs and others.

3—What are the chances for support?

In other words, is there an active interest in this subject?

Has the press been active in calling attention to the accident prevention problem?

Can agencies which should be interested be educated to an attitude of mind where their support can be secured?

Assuming that the accident situation exists, that you have a proper knowledge of what is being done and that the chances of support are good, the next step would be to determine the type the organization would take.

What Type of Organization

The answers to the foregoing questions will point the way to whether you are ready for a full blown organization, such as has been previously described to you, or feel that the program for the time being must be more modest in character in order to build up a greater measure of interest and support. Assuming that you are ready for the larger program, I should point out that in the community work of the National Safety Council extending over a period of twenty years, councils have automatically divided themselves into three groups—A, B, and C.

Class A. councils are confined to larger cities where a full-time manager is required to do the job.

Class B. councils are confined to cities smaller in size where the part time of some individual can be given to the work.

Class C. councils are confined to those cities still smaller in size where the effort must be entirely voluntary.

Dependent, not upon the size of your city alone, but upon all local conditions, you must decide which type of organization will best fit your needs.

Leadership

However, let us remember that it is not alone necessary that there be a need for community safety work; that the chances for support are good and that we are satisfied as to the type of organization needed. Probably the most important of all is the necessity for proper leadership. At the outset there must be one or more of you who are sold on the idea and are willing to take the lead in building up a preliminary interest. This involves a discussion of the subject with various outstanding leaders in your community and the selling of those people on what should be done. After the smaller group has been sold on the task, we should first secure the proper sponsorship for the organization. In some cases the mayor of the city can be induced to call together representatives of various agencies which should be represented in the safety council, if the council is to represent a proper cross section of business and community life. In other cases the Chamber of Commerce or other organization might be the proper one to initiate the movement. Regardless of the sponsorship, the larger group called together should be composed of

- 1—Men who have an economic interest in the accident prevention problem, such as the president or general manager of the street railway company, taxicab company, representatives of the industries, retail merchants, auto dealers and insurance interests.
- 2—Men having a public responsibility for accident prevention such as the mayor, commissioner of safety, chief of police, fire chief and health officer.
- 3—Public spirited citizens and representatives of community organizations directly interested such as, chamber of commerce, motor clubs, parent-teacher associations and women's clubs.
- 4—People who can assist in the promotion of activities such as the school authorities, the churches, luncheon clubs, etc.

However, prior to calling these people together, the small working group previously referred to should interview representatives of the leading industries, public utilities, insurance interests and automobile dealers directly interested in the prevention of accidents and get these people definitely sold so that when the entire group is brought together you can count on a very active support from at least certain groups. When the entire group is called together, the local situation should be set forth in detail, the story told of what is being done, a description given of what the organization set-up would be, type of activity described, and the meeting finally culminating in a decision as to whether or not the community organization will be formed. It automatically follows that committees would be appointed to draft appropriate By-Laws, a program of activities with supporting budget, a method of financing the work and lastly a plan of administering the work.

In planting the program and its complement, the budget, you will of course take into consideration the size of the community, the amount of money needed and the possibility of raising this money in your city.

To be all inclusive, your program, as pointed out before, should deal with many types of work, such as

- Public Safety in general
- Industrial Safety
- Child Safety
- Home Safety
- Fleet Safety
- Fire Prevention

The program would be set up not with the thought that every activity would be

started at once but that it would be the ultimate objective of the council. As an organization practice, there would radiate from the governing board standing committees for each of the major divisions of the work.

It obviously follows that after this preliminary work has been done and the council formally organized, it will lastly be a question of raising the money and starting the program wheels in motion.

The Limited Program

While the complete plan which has been described to you may be the one desired, yet the analysis of your local situation may lead you to the conclusion—and rightfully so—that you are not yet ready for such a radical step and that it will be better to start in a modest way. If there is one thing which we should guard against it is attempting to do the impossible, and I am personally of the opinion that there is a tendency among us, who are enthusiasts and anxious to see a job done, to be a little too optimistic as to what can be done and as a result our efforts may come to naught. Until we are absolutely sure of our ground, we should be content to make a modest start and grow in a normal way.

This type of program involves the same analysis of the community and a decision on just what can be done at the present time. It may be an industrial activity. It may have to do with the protection of our children or it may have to do with certain engineering features of the street and highway safety problem. In any event, a small committee genuinely interested would be organized and the limited program decided upon, definitely put on paper, and carried through to a conclusion.

This would involve, not the setting up of a Safety Council as such, but simply the organization of a safety committee, possibly as a part of some such organization as the Chamber of Commerce, or it may be the calling together of all National Safety Council members with their representatives constituting the committee.

By way of illustration, may I point out an activity now under way in South Norwalk, Connecticut? South Norwalk, with other small cities which adjoin it, has a total population of approximately 40,000. Representatives of certain industries in that area attended a state-wide safety conference in New Haven last April and heard an address on "Organizing a Community for Safety." As a result, a few enthusiastic members of the National Safety Council joined together and, after consulting with us, decided upon just one activity for the coming year and that an industrial one. The matter was then taken up with the local Chamber of Commerce who agreed to assist by handling all details in connection with the program. The one activity in question is known as a Plant Representatives Section and consists of a series of monthly meetings participated in by an accredited representative of twenty-five industrial plants. These men will meet once a month for a social hour at dinner, to be followed by a two-hour discussion on fundamental industrial safety problems. South Norwalk feels that through the medium of this series of dinners, everyone participating will definitely profit. Further, it will stimulate greater interest in the value of community work and a year from now they will be able to expand their work and take on other activities.

I might add that in addition to South Norwalk, four other Connecticut cities have indicated their interest in the starting of a preliminary program and it is hoped that by the first of the year some activity will be going on in each of these cities, all growing out of the discussion of the subject at the Connecticut Safety Conference in April.

A great many other illustrations could be given of limited programs along specific lines sponsored by Chambers of Commerce and other organizations. I personally feel that such a program, although not of the type most to be desired, affords a method of getting something started. However, if the work is to be inaugurated in that way, its sponsors should have ever in mind the ultimate object of a complete community wide safety program.

What You Can Do

The purpose of this gathering will be of value only in so far as it produces results. If we meet here, listen to the papers presented, participate in the discussion, and are convinced of the potential value of community work, and then do nothing, this meeting will have failed in its objective.

If you are agreed that something should be done in your community and are willing to assist, the National Safety Council stands ready to give you its fullest cooperation. After a period of twenty years we have built up a wonderful fund of information touching on every conceivable phase of community work. We will be glad to adapt this information to your needs and where possible meet with you locally and help push the good work along.

A record of attendance is being kept this morning and it will indicate those cities in which, so far as our knowledge is concerned, no community safety work is being done. It will be possible for us to follow up and ascertain your specific interest and let you know of others from your city who would be interested in starting the ball rolling in a community effort in your city. When such an appeal is made to you we hope that your answer will be immediate and to the effect that your support can be counted upon.

The Council is committed to the policy of community safety as one of the mediums of approach to the solution of the accident problem. However, in the final analysis the Council cannot do the community job—that must be done by the community itself, and we can only be of assistance in pointing out some of the things you can do as well as some of the things that have proved snares and delusions to others.

C. E. GAULT (Mine Safety Appliances Co., Los Angeles, California): I would like to get some information on what the American Legion can do in putting across a civic program.

SIDNEY J. WILLIAMS (National Safety Council, Chicago): Our National office has had quite a lot of contact with the Legion just lately. John Hall of the National Bureau of Casualty & Surety Underwriters in New York, who is a Legionnaire, has been working directly with the national officers of the Legion and his organization is about to publish a pamphlet containing a suggested outline of activities for local posts of the Legion which will be distributed throughout the country. That will be mostly for small communities. Were you referring to a small or large community?

COL. WM. M. MYERS (Managing Director, Richmond Safety Council, Richmond, Virginia): I am indeed pleased to see such an assembly here this morning interested in community safety. What we need today in each community is another Mr. Rice who made his talk on community safety from an industrial standpoint. Each industry in every community has an interest in the safety of that community and there is no one activity in your community which goes further to make your industrial family happier and your entire city a better place in which to live than a community safety program. He has told you that thirteen of his employees were killed during non-occupational hours to one while at work. In some cities and in some industries, it runs as high as twenty. The small industry that is taking no active part in safety today is the industry that is having a large number of accidents, and a community safety program can eliminate most of those accidents in the small industries.

In the city of Richmond, in the two years previous to an active program in the public and parochial schools of that city, 64 children were killed in 1927 and 1928. During the two years of an active child program only 33 were killed,—31 lives saved. Isn't that worth the effort? We have numbers of industrial plants who took no interest whatever in safety before the community program was organized. We have reduced the frequency of the accidents from 24 per cent to 50 per cent in a period of three years. That means a whole lot of happiness for the community.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Psychology and Safety

Tuesday Morning Session
October 13, 1931

The first session of the Psychology Class convened with Mr. W. H. Cameron, Managing Director of the National Safety Council, Chicago, presiding.

CHAIRMAN CAMERON: It seems superfluous to introduce Dr. Hulbert because he has talked at the last three or four conventions, but we are going through the formality of introducing him. Dr. Hulbert is the most famous psychiatrist in the United States. He is known throughout the country.

I will only say a brief word about the substance of his addresses. He is going to talk about normal psychology. It is not his intention to present to you a lot of freakish cases, but the practical aspects of psychology which will be interesting and valuable to you in your work.

LECTURE NO. 1

Normal Thinking—Its Surprising Vagaries Until the Mind is Disciplined

By HAROLD S. HULBERT, M.D., F.A.C.P.
Chicago, Illinois

The cruel fact that we are forever making criticisms of others indicates over-expectations of the mental-emotional part of human nature. If others over-expect of us while we do our average best, it is conclusive that we are all ignorant of the limitations and tendencies of human nature.

The penalty of discouragement follows self-disappointment from failure to attain improbably high self-expectations.

Ignorance of hidden mental mechanisms is responsible for these misjudgments of what humans may be expected to do.

The basic reason for this ignorance is lack of realizing the inevitable and inseparable connection between the body, its health and nervous systems (crude central nervous system, and the ancient and uncivilized dual sympathetics) and the mind with its ideas, emotions, available memories and impulses and tendencies to react in certain typical or habitual ways. Psychologists have stressed only one side of this connection, physicians have stressed the other, and only psychiatrists stress both the physical and neurological-psychological in proper proportion. A working knowledge helpful to all is not too difficult to obtain and is really an interesting study.

"In these days of mechanical safeguards, 95 per cent of all accidents are due to man-failure," says Carney. "Attention of those interested in safety, therefore, may well be devoted to the mental causes of 'man-failure.'"

Ambivalence

There is one very interesting mental trait known as ambivalence, or bi-polarity. It means that thoughts come to mind in opposite pairs: it means that emotions come to mind in opposite pairs, and it is of importance to you in handling men to realize this tendency.

Let me give an example. A person stands at Goat Island, Niagara Falls, and he thinks of his safety and steps back. He might think of his peril, which is the opposite idea, and plunge forward. Both thoughts come to every person's mind at the same time. It may be that he is aware of both these thoughts, the peril and the safety. In that case he is paralyzed, rooted to the spot where he is.

(Holding up the first two fingers of his left hand and holding his right hand horizontally across at the level of the tip of the first finger.) A mountain peak rising above the ocean appears as an island, but if we lower the water level, we see another peak of the same mountain range. Ambivalence is like these two fingers: one of these is apparent to the individual and he reacts to that, but if you look in the lower levels of his mind, you see that the other or opposite idea is in his mind too.

Or, to take the case of a lady who is visiting a new mother and she picks up the tiny infant and croons over it and talks baby talk and says with a smile, "I could crush you in my arms, you dear, sweet little thing," and laughs. Where did she get this idea, "I might crush you." It is in her mind or she would not say it. Two thoughts come to mind at the same moment. "I could cherish and protect you in my arms to my death, if necessary," or "I could crush you to your death." Ambivalence; two thoughts come to mind at the same time.

That may explain to you, then, why some persons are fascinated by danger and the over-emphasis of safety work, the peril of working over this kind of a vat of hot metal, an acid vat, this punch press or what not. This dangerous thing may so fascinate the individual that subconsciously he creates accidents. He imperils himself instead of trying to save himself. So in your talk on safety work, tell the men their peril and tell them the advantages of being careful, both at the same time, because they are both in their minds. Then you select the one which should be stressed, namely, safety.

Ambivalence. That is how persons who at times are most loyal may become most hateful toward the company or organization. We love-hate many persons. The growing boy love-hates his father. A great many men have learned to love-hate their mothers-in-law. We take an opposing attitude toward many persons.

Phantasies

My second point is much more common, and that is the mental habit of indulging in phantasies, p-h-a-n-t-a-s-i-e-s, and not f-a-n-t-a-s-i-e-s, daydreams, wishful thinking, wishful thinking, wasteful thinking or reveries. They are four types of phantasies:

1. Anticipatory
2. Worry
3. Retrospection
4. Vengeful

The most common is the anticipatory type. These daydreams of the future are very commonplace; they are by far the most common type of thinking that goes on in the minds of persons younger than 64 years of age. Some of their characteristics may be mentioned. They usually occur when we are unoccupied, for example, between awaking and arising, when sick or convalescing, when traveling or alone in a crowd. These thoughts are usually vague or shadowy and not clear cut. These thoughts are usually so extreme as to sound absurd to another if told. These thoughts have many inconsistencies one part with another. These thoughts are almost always personal or relating to one's own self. Therefore, we do not tell others of daydreams. They are personal, for example we never daydream about good luck for somebody else so much as we daydream about good luck for ourselves. They are a bit heroic. They are the show-off type of thought and the interesting thing is that this imaginary audience be-

fore whom we are acting such great things is either a very tiny audience of one or two persons or else it is a world-wide audience and never is a medium-sized one. This wishful thinking is very, very self flattering and self gratifying. It is very, very personal and it is highly emotional. These phantasies may be very short, they may even be momentary (and he snaps his fingers here) or these phantasies may be long, 20 or 30 minutes long. These reveries may be unique and occur but once in a lifetime or the same phantasies may reoccur again and again and again modified and edited and ruminated upon and changed from time to time.

People regard these phantasies as the basis of plans and ambitions. I tell you they are not. They regard these phantasies as "the cheapest of indoor sports." I tell you they are not. They are very expensive to the personality. People regard daydreams as a pleasant anticipation of some lovely thing that is going to happen, believing that they can enjoy it in advance and enjoy it again when it occurs. I tell you that that is not possible, for you can enjoy it only once. Some say that reveries may be used to make an otherwise drab life rosy but I say it is only suitable for prisoners and prisoners and others whom the caste system denies any possibility of advancing in life through their own efforts.

Phantasies take the mind of the individual off the work at hand and carry him into a daydream world. They are sweet. Persons who phantasy a great deal are obviously abstracted, and we can usually spot a daydreamer because of his abstractedness. Phantasies do not lead to happiness but they lead to disappointment later and the more extreme the phantasies the greater the disappointment in the ordinary things of life. So it actually becomes a most expensive mental habit. If so happens that phantasies in a workman take his mind off work at hand and although he may look at his work before him with his actual eyes, his "mind's eye" is elsewhere and thus he is pre-disposed toward contributing to a great many accidents.

It would not be fair and proper, gentlemen, for me to tell you that there is this mental habit, that it is commonplace and that it makes persons accident prone, unless at least I should tell you how the habit may be first identified and second, changed.

All phantasies, if they were to be expressed out loud in clear cut phrasology would begin with one of these three phrases: "If", or "When", or "I wish", e. g., "If I had an extra \$400—" and then daydream about where he would go in a Plymouth car, and so on; or "When I see so and so—" and then a long daydream of a lovely episode, or "I wish I had—" some possession or attribute.

My objection to this type of thinking, gentlemen, is that it is dishonest. You haven't the extra \$400, and dishonest thinking distorts your appreciation of the realities of life. So I urge you, whenever an "if," "when," or "I wish" thought comes to mind, take it out and scrutinize it and see if it is a practical thing or whether it is a fantastic thing, and if it is a fantastic thing abandon that train of thought. If it is a practical thing, then the laws of human nature are that you do well if you do something about it physically—motor, with your hands, manual preferably, and right now! That is the prescription. "Do something motor right now when a phantasy comes to mind, or dismiss the thought." I will tell you in a detour comment why.

Emotional Allowance

You all know what we mean by the word budget. You think at once in terms of a financial budget, or allowance. You have so much money to spend over such a length of time. If I should speak to you about your physical allowance, you would grasp what I mean, that we can do so much in a day.

1. Tired
2. Fatigued
3. Exhausted

You know if you overdo a little bit, you become tired. If you overdo a great deal you become fatigued. If you overdo enormously you become exhausted.

By tired, we mean you can recuperate in the ordinary rest periods, like over night, over the week-end, or over the summer vacation. If you are fatigued, it takes a pro-

longed rest period to become refreshed. A person who is exhausted never returns to normal health. We have at the Hines Hospital, Speedway, a great many cases of exhausted hearts in soldiers from the strain of war thirteen years ago; their health will never be good.

Financially, you know it is the same thing. You run on credit, and the next payday you square up. If you spend too much you run in debt and it takes several paydays to get square. And if you overspend your budget enormously you are bankrupt and never get a good credit rating again.

I want to tell you, gentlemen, that there is also an emotional budget or allowance, and that we have only so much emotion to spend day by day. If we overspend we become emotionally tired. If we vastly overspend we become emotionally fatigued. If we enormously overspend our emotions we become emotionally exhausted.

Daydreaming is the dissipation of emotion, and a person who has not adequate emotion is a listless, apathetic, unreactive sort of person, of not much use to himself or the world; certainly not fit for promotion.

E-motion. Now the word "emotion" has as its root, "motion." Emotion is that which puts us into motion. It is initiative—the self-starter. If you have an idea and little emotion connected with it, you might think of the idea and do nothing about it. But if the idea is highly emotional, you are bound to do something about it. The emotional part of our life is of vast importance and should not be wasted in daydreams.

Furthermore, when we indulge in these pleasant, anticipatory daydreams about some moment, and in the course of time that moment finally comes to pass, instead of reacting to that moment vividly as we should or as it deserves, we react in an apathetic or disappointed manner for the emotion for the incident has already been spent.

Self disappointment and disappointment in the world and self consciousness follow indulgence in reveries.

Dissipation of emotion is emotional thinking without a motor outlet.

Worry

There is a second form of phantasy called worry. It has the same mental mechanism except, instead of saying, "I wish," you say, "I wish not," or "I fear," and except the mood is sad or anxious instead of happy and self-satisfying, and the time is the present or immediate future instead of the more or less distant future. It is horribly exhausting to the individual and makes him very ungracious socially and unwelcome. The mechanism of treatment is the same: do something about your worries or quit thinking about them. The embarrassment of doing something about most of your worries is so painful that it is better to quit thinking about them. Worry does no good, but the rule is—do something, or abandon that train of thought.

Retrospection

There is a third form of phantasy called the retrospective, which is poisonous thinking. It always begins with, "Oh, if the past had only been different," for example, "Oh, if the sheriff had only met the train," "If I had only sent the telegram," "If I had called the doctor sooner," etc. The reason that type of thinking is poisonous and leads to insanity, if indulged in to excess, is this: There is nothing more we can do about it. The past is past. Your mistakes of the past are just as much ancient history as your grandfather's mistakes, and there is nothing you can do about altering having made them.

When you find persons indulging in excess in that type of thinking, beware of their sanity and stability.

Revenge Phantasies

There is possibly a fourth type of phantasy—I am not sure of this—the vengeful or revengeful type. The reason we are not afraid of criminals when they come out

of prison is that they have spent so much time plotting revenge, they have exhausted themselves emotionally; hence they come out listless, inactive, non-spontaneous personalities. If I ever get in trouble with anyone, I hope he will spend his time daydreaming about revenge on me. He will be harmless. He could not motivate himself to hurt me.

If I ever get in a fight with anybody, I am not going to daydream about how I am going to get him. I am going to get him; do something about it.

You have a great deal of risk, then, of vengeful phantasies destroying the integrity of the personality of persons after strikes. Those persons must be delicately handled.

When an individual has been off from work for any length of time from any cause, whether he has been injured, or sick, laid off because of non-employment, or for disciplinary reasons, it is the duty of his superiors when he comes back to work to see that his first task is made a success! If you will make his first task come out right, you will then have a rehabilitated, useful workman. If you do not make his first task come out a success, you will have a mild, chronic, invalid on your hands for ever so long.

The same is true in your home life, and the same is true in school, that when persons return to duty they must have their work so arranged and simplified, and such invisible assistance given them that they "get away with it" to their credit, so they feel good about it.

Therefore, it is important that when a person has been sick or injured that he be returned to light duty—the binnacle list as we call it in the Navy—just as soon as possible. To keep him from what? To keep him from daydreaming about his wrongs or work, which daydreaming makes him more or less useless.

Priority Establishes Normalcy

It is said, and I think correctly, that priority establishes normalcy for the individual. I mean by that, that if you were brought up in a polygamous country you would naturally think it quite proper for one man to have many wives, but if you were brought up in a monogamous country you would probably think it improper for a man to have more than one wife, at a time. Priority establishes normalcy.

Heridity, however, establishes what is normal for the race irrespective of what might be the first episode of its kind in the life of the individual.

Hand and Mind Work Together

Our studies of biology have taught us that it is normal for humans to apply their mind and their hand to the same task at the same moment, and it is abnormal for a person to be so dumb that he has to have somebody do all his thinking for him, being only a hand worker with a strong back. It is equally abnormal for a person to regard himself as such a sheer thinker that he can not do anything with his hands. That is why we like the engineer, the surgeon, the sculptor, the actual creative writer, the composer, and such persons, because those persons work with their minds and their hands at the same task at the same moment. That is normal. Furthermore, it brings greatest happiness as well as makes the personality more substantial.

If you look back on some of the happy moments in your life, you will find it was when you were working with your hands at something you were thinking about, making a garden, building a motor boat, playing golf, or what not.

Escape Reactions

There is a characteristic of humans to escape from painful situations. I recommend against the indulgence and the habit of making mental escapes, because escaping from a problem does not settle the problem. It remains full force when you come back to it. If a problem confronts you, it is better to work at it than it is to run away from it, lest it haunt you.

The simplest escape, of course, is truancy, to skip school or stay away from work because you have a mild headache some day when they are taking inventory, or some other hard job is waiting for you.

Another form of escape is to tell a lie. It takes two to tell a lie: the person who tells the lie and the person he is afraid of, afraid to tell the truth to. If your workmen ever lie to you it is more or less half your fault.

Another form of escape is to escape into daydreams. If we are very poor, we daydream we are rich and stay poor.

Sometimes persons escape from their troubles in a very interesting way psychologically, and I will waste a few moments of your time to discuss this condition.

Hysteria

Hysteria means emotionalism. We are all hysterical whenever we are emotional. If you make a birdie at golf, or hold four aces, or something, and get a little twitter out of it, you are hysterical at that time. But the disease hysteria is a different thing. That means such a degree of over-emotionalism that you cannot live normally. There have been volumes written on it, and I suppose more or less of your time has been spent on the side in light reading on such things as psychoanalysis, complexes, and God knows what. I think I can simplify it for you in a few minutes. My conclusion is, please do not read any more. It does not do you any good and it may make you introspective.

1. Repression
2. Incompleteness
3. Conflict in inner mental life
4. Time displacement

The causes of hysteria are regarded by some people as due to repression; regarded by other people as due to incompleteness; by other persons as due to conflict (in the inner mental life especially) and by others as due to a time displacement. I mean by time displacement the thought the individual thinks is a normal thought for human beings to think, but comes in a wrong time of his life.

It is quite all right for a man seventy or eighty to make his will, and change it, and contemplate death and his soul's damnation or salvation, but it is quite out of order for a boy of eighteen or nineteen or twenty to write poems on death. The thought is proper in the human mind, but it comes at the wrong time.

It is quite all right for the boy of eighteen or nineteen to think of having two or three girls on the string at the same time, but it is quite out of order for a man of fifty-five to be thinking that thought. The thought is normal, but it comes at the wrong time. So sometimes you get hysteria from normal thinking coming at the wrong time of the individual's life. That is the English viewpoint of the cause of hysteria.

Repression. An individual wants to do something and he may not; others will not allow him to, and he develops a hysteria based on this repression.

When a chap goes on his honeymoon with his sweetheart and her mother comes along (she is an old prune and refuses to let the children have any privacy) he develops a repression, and of course he wants to kill her, for he wants her to leave them alone, so he develops hysteria.

The incompleteness is the French viewpoint. The things that are incomplete make us sick. Father's textbook said—I being the son of a minister may quote the Bible: "Hope deferred maketh the heart sick." I will tell you what that sickness is. It is hysteria.

Incompleteness. Now we are back for a moment to this question of phantasy. A thing which is totally incomplete is more sickening than a thing which is only partially incomplete. I recommend, if you have any tendency to emotionalism, that you leave nothing totally incomplete where you can do something about it. When you get your mail, jot down the answers on the backs of the envelopes. Partially complete that answer and you will have less anxiety.

The most common cause, although these really are the same thing, is conflict. An individual wants to do something and he knows he should not; he is at war with himself. You are the worst possible enemy you can have; and the most exhausting quarrel is to be at war with yourself. You want to do something and you know it is naughty, you know it is wrong. You know you may not; you know it is unconventional-

al; you know you will be caught if you do, and so on, but still you want to. That is sickening for the reason that you never get away from yourself, and you take your troubles with you wherever you go.

The common forms of hysteria are:

1. Anxiety
2. Conversion hysteria
- +
—
O
- Distortions
3. Traumatic

} of any function of the body.

Anxiety is the most common form. We are tense and anxious, and we feel tight. Anxiety involves the sympathetic nervous system which involves the glands of the body which affect our health. Many persons, however, can carry mental anxiety and tension without change.

There are some people—we don't know why—who can not carry anxiety. They have developed what we call conversion hysteria, where they convert their mental anxiety into physical symptoms.

The interesting thing about this conversion is that the symptom which they develop is always momentarily adequate, although it may be very destructive, expensive, or painful to the individual later. These conversion symptoms may be an increase, a decrease, an absence of, or a distortion of any function of the body—muscular strength, sensations, taste, smell, pulse rate, or what not. Increase, decrease, absence of, or distortion of any function of the body may be caused by hysteria.

The most common form of hysteria that you will meet is the fluctuation of interest and eagerness and aversion toward ordinary things of life. For example, if your wife and you have agreed to go to play cards at a certain person's home and you sort of don't want to go and mention it at the supper table, about quarter past seven you get quite a headache and she tells you to take some aspirin, and you do. You don't want to go to this party, and your headache gets worse. It gets around half past eight and you have to call it off. Then somebody else, a good friend of yours, calls up and says, "Let's go out and see 'Green Pastures'" or something else that is more interesting. In a few minutes your headache is gone and you say, "That aspirin worked fine." That fluctuation: first an increase then a decrease in the sense of pain is hysteria, emotionalism. Shell shock during the war is a definitely hysterical reaction. No coward ever got shell shock—he ran away before the conflict in his soul became extreme, the conflict of the instinct of self-preservation vs. the instinct of preservation of his group.

My objection to hysteria, this fighting yourself, not settling your own problems, is that if hysteria be continued for too long a time it leads to a state of irritability and fatigue.

Hysteria → (Irritability, Fatigue.)

Neurasthenic → Hypochondriacal.

When a person is in a state of irritability and fatigue, we call that person neurasthenic. It means the nerves are tired, and they show themselves in their irritability. Neurasthenia is caused by protracted mental conflict. If neurasthenia is protracted too long without settling the problem, the individual then becomes sick in a form which we call hypochondriacal, sick without much being the matter. That is a Greek word. "Hypo" means "under" the chondrium, and "chondrium" is the cartilage under the ribs, so the hypochondriacs have pain below the ribs, and without knowing any Greek the American who uses slang developed the phrase "belly ache," and a hypochondriacal person is a "belly acher" as we know the type. It means the same thing. These persons must be helped physically, but particularly their problems must be settled to relieve that internal mental conflict, that hysteria.

Traumatic hysteria is a form of emotionalism after injury where the symptoms persist functionally after the organic injury has healed, or where the symptoms re-

turn functionally, full force, from time to time, after the wound has healed. It is a form of conversion hysteria. It is often related to the thoughts which were in the mind of the individual at the time of the injury; it is sometimes related to thoughts of the complication of the injury such as compensation for the injury. As examples of the last point might be mentioned a weaking bride, of the spoiled child type, who became a tyrant ever after her husband spanked her on their honeymoon, and she used the weapon of semi-invalidism as her conversion symptom. Another example is the persisting of symptoms pending adjudication of a man's claim before the Workmen's Industrial Compensation Board.

A typical case of traumatic hysteria was a woman riding in a taxicab one noon in the loop. As the taxi turned to the right to go around a corner, it was run into in a collision with the fire department truck. The woman was thrown across the cab and broke three ribs; she suffered severe pain from the fractures. After the ribs healed, the pain continued for a long time. Eventually it disappeared, only to return from time to time suddenly and as painfully as ever without any recurrence of loosening or separation of the bony fragments. Conferring with her and taking a careful history brought out the fact that if she was sitting quietly in her apartment and heard a fire department passing in the street below, she would instantly have the same sharp pain in her side where her ribs had been broken. Or if she was in a taxi and it turned to the right, the old pain would come back full force. The reason for this was apparent only when we brought out the fact that there was a sharp conflict in her inner mental life at the time the accident occurred.

Q. Where were you going and what were you thinking at the time you were struck?

A. I was going to the lawyer's office after lunch to have a conference there with him before court resumed for the afternoon session.

Q. What was this law suit, and how much interested were you in it?

A. I was getting my divorce.

Q. Had you loved your husband when you first married him?

A. Yes, I had fallen in love with him. And then I fell out of love with him and in love with another man.

Q. Had you ever cheated with this other man?

No answer.

Q. Well, never mind. As you grew up, were you trained into and did you accept the belief that divorce was an awful thing?

She nodded affirmatively.

Q. Had you any assurance the second man would marry you if you became divorced?

A. We had talked about it, and he had said he would, but I was not certain. I was sick with the uncertainty about that, and I was aghast at the prospect of being permanently unmarried and unsupported because my husband really had been good to me and in many ways I hated to close that episode of our life together. But I did love the other man even though I knew it was wrong for me to do so. That was in my mind when the fire department hit us.

Happiness vs. Fatigue

Let me speak of something different for a moment, the role of happiness in life—and I am no sentimentalist. Yes, I am; we all are.

It was my fortune at one time during the war to be attached for a very brief period of time to a British Army Hospital. All the patients there were dressed in blue, a certain light-colored blue. Their caps, blouses, shirts, pants, stockings, slippers, bathrobes, overcoats, everything was blue of a certain shade. They were known as Blue Boys. Everybody in town knew them. We would see these convalescent Blue Boys at the cinema, or walking along the streets.

In this particular hospital there were men who had chronic infection, like rheumatism or arthritis, trench fever, and so on. These men were being studied as well as

treated, and one of the studies was that a group of medical officers and sergeants would sit at a table downstairs on the first floor to which the soldiers would come up one at a time. The medics would put on the blood pressure apparatus and take his blood pressure and test his pulse. Then he would walk upstairs. It was an old building, and from the first to the second floors was quite a long walk. Upstairs there were some other officers sitting at a table keeping the records, and they would record his blood pressure and pulse, and in that way have a measure of the energy it took for him to go upstairs, hour after hour and day after day. At five minute intervals these soldiers would come up, and an hour later a soldier would come up again and go through the treadmill. We got to know exactly how much effort it was for this man, this man, and this man to climb the stairs.

Then, as a test, one Saturday morning a Sergeant-Major came in and read off a list, "These men are denied shore leave or liberty to go downtown this afternoon and evening: Smythe, Robinson," and somebody else. These men, now unhappy, were found to be fatigued after they climbed the stairs and were measured. From these measurements, it was shown that because of their unhappiness it was a greater effort for them to climb the stairs, as compared to their efforts before being unhappy.

At ten minutes after twelve the Sergeant-Major came in and corrected the list. He said, "Some of these names are wrong. 'It is Smith, not Smythe; it is Robertson, not Robinson,' and so on. Their next tests showed that these men now made happy went upstairs with the same little effort they had all day long week after week before and with much less fatigue than when unhappy.

Unhappiness produces fatigue. Fatigue, you know, contributes toward accidents and inaccuracy, so there is a role in business for happiness. How can you make your men happy? The rule is simple: Happiness is a state of mind which accompanies your carrying out in part at least, activities in which you, yourself, have shared a little in the planning. If we will let our workmen and others share a little in plans, then they can work on that work without fatigue, without so much inaccuracy, without the tendency toward producing an accident. Of course, do not let them share more than they are able to share properly. Happiness does not consist of patronizing them. It does consist in handing them well-deserved compliments in proper proportion.

Free Will

One of the most debated points in all forms of philosophy, including psychology and psychiatry, is this question of free will. Has the individual any ability to make decisions for himself? Is there such a thing as freedom of the will, or are we slaves to our inheritance, our environment, our endocrine glands, and so on? It has been studied pro and con.

The viewpoint which I believe and which you can accept as a very workable one is this: There is such a thing as freedom of choice, or free will, by resolution bearing on the future. I doubt very much there is any such thing as free will in an individual's mind of what he is going to do at any one moment. There are too many other things influencing at any one moment to allow us much freedom of choice, if any, but we can look ahead and say, "I will keep my temper better," or "I will be more thrifty," or "I will make greater effort to get up when I should," "I will try to please the folks better," "Next time I see that chap I am going to sock him, I won't get into another argument with him; I will hit him first," or whatever it might be. We can sort of plan our life a little bit. Then when these moments come and all the forces which bear on the so-called psychological moment are playing on us, there is also this past resolution as one of these factors, and that helps us to decide.

So we do have some ability to plan our lives in advance, and the most important thing, the psychiatrist says, is that you plan your mental life soundly. The greatest menace to sound mental thinking is the menace of indulging in false thoughts, the reveries, the phantasies, the wishful thinking and worries which are apt to lead to hysteria and all these complications.

Wednesday Morning Session

October 14, 1931

LECTURE NO. 2

Personal Application of Some Mental Hygiene Rules

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In review, for a moment, of what was said yesterday, "Clear orderly thinking may become habitual by self-discipline and knowledge in practically all healthy men of good inheritance and average opportunities." Emotions affect human affairs more than intelligence or reason—for example religion or politics or love. This is so because intelligence and reason and ability to suspend final judgment were evolved long after appetites and emotions and emotional reactions appeared in the history of life on this earth.

I told you yesterday that we believe there is such a thing as freedom of choice or free will, but that it is in making decisions in advance. The personal application of that idea to safety is this: that by rehearsals and making decisions in advance we can head off possibility or probability of surprise. As you know, surprise is a state of mind where there is no clear, orderly thinking. Thoughts are in confusion. It is during this period that the complications of accidents grow. Accidents may come with almost instantaneous rapidity, and throw into a surprised state of mental confusion.

We said yesterday that one of the vagaries of the human mind was to indulge in wistful and wasteful thinking; that it is important and normal to apply the hand and the mind to the same task at the same time; and that individuals can best be kept busy because they are interested and happy in their work. Occupation is the best prevention of misconduct, of bad habits, and of bad mental habits.

May I tell you a little story? A girl who had been working on a punch press for some four months was re-examined by the psychiatrist at the place where she was working, and he commented on the fact that she had all her fingers. She said, "Yep, it's only them wot thinks wot loses their fingers." She was a feeble-minded girl, but what she meant was, that only those people who think of things away from their work, the daydream type of thinker, are the ones who lose their fingers.

We said yesterday that the important thing to control phantasies was motor activity on practical matters; that there is a second type of phantasy known as worry, where the time is not the distant future but the immediate future or present, and the mood is sad, and that the proper way to handle worry is to do something about it or dismiss the thought.

May I give you an example? I maintain that it is very good business for the foreman to direct one of the workmen to telephone occasionally home or the hospital, if the foreman knows that the man's wife is in the hospital expecting. He should call to inquire as to her progress. He should be permitted to call home and see how the little girl is taking care of the then baby, so that his mind may not be cluttered up with worry, and so that he can return with concentration to the task at hand.

We spoke yesterday somewhat of emotions or moods; that these energizing things in our life, these emotions, are of vast importance. It may be of some interest to know that moods or emotions fatigue and diminish. You have noticed that in campaigns. You have noticed that in slogan campaigns. In the highest

type of persons, and there are not many of them, ideas will outlast the mood, but in most persons the mood will outlast the idea and color the next thought. The rate of rebound of mood is hereditary, and may be modified by training in self-control early in childhood or early in employment. If you can not get over your grouches then do not have children. Probably you have not tried hard enough to get over them. A person is mature when he takes over self-training and when he becomes open-minded.

Projection

We humans are gifted with two particularly peculiar traits. One is known as projection, that we are able to see in other people our own faults, but we are oblivious to those faults in ourselves. When you find somebody sneering at this or that characteristic, or this or that person, you know pretty well that this person is handicapped in that way himself but does not know it.

Identification

We also have the ability by a trait which we call identification to see in others our own good traits, either actually good traits or traits which potentially we might have. The boy sees the drum major coming down the street, and he imagines himself as a drum major with an enormous band behind him.

When we read a good book or see a good show, we like some character in it because we have, by identification, placed ourselves in the role of that character. That can probably be made use of in handling men by fostering what is, in boys and young men especially, hero worship. It is very important, then, that we set an example which may be copied because others will identify themselves with us. It is perfectly impossible for an officer or an official in a company to enforce a "No Smoking" sign while he smokes as he goes through the plant; similarly, the man who comes late to the office cannot make his staff be early. They identify themselves with the official.

The World of Fact

The world we live in, gentlemen, is the world our ancestors lived in, and therefore it is a world that people can live in. That is obvious. The world of fact is a world which can be inhabited. Our human inheritance equips us to meet, without perishing or being crushed, the incidents of life and the experiences which countless of our ancestors had and in spite of which they survived. The human mind has the greatest capabilities of any organ of any living creature and its main function is to so adapt to the procession of changes in the environment that the individual does not perish and does not hurt others in his efforts to succeed. Sanity is adaptability.

There are a few exceptions, yes; earthquakes and such acts of God, the death of a lover the night before the marriage, or the death of a growing son. There are a few tragedies that are so rare we cannot cope with them, but there are only six or seven of them. But as a rule we can live in this world if we are honest in our perception of it.

I think we have all enjoyed looking at the Philco advertisements of two pictures side by side, one of them grossly distorted and the other one clear and sharp. Their point is that their radio apparatus makes music sharp and not distorted.

You certainly would not try to walk on the streets and on the ground if you had glasses which were warped and would distort the surface over which you walked. You would stumble, but with clear vision you probably can walk safely. Mentally, it is still more important that we have the proper mental vision of the world of fact in which we live.

How are facts distorted ordinarily? They are distorted by this wistful, fanciful type of thinking, the "I wish" type of thinking, or the "if" or "when" type of thinking.

From your point of view, the safety point of view, we must consider this: that distorted, wistful thinking causes the sin of omission, causes people not to be alert, and when an individual is not alert of course he is predisposed to cause an accident.

I think you can get along with all the people you know, unless they are essentially vicious or wicked or hostile to you, if you size them up honestly. But the dumbest thing a person can do is to wish that somebody else were different from what he actually is, to wish that some of your more or less distant relatives were different from what they are. It only makes you dissatisfied with them and does not help domestic harmony.

Comparisons

My next point is specific comparisons. There is a tendency of persons to compare specifically one individual with another. We think it is the proper thing to do; we think it is a stimulating thing to do. I think it is a very dangerous thing to do.

Let me give you an example. (I have told this story before.) Suppose a woman says to her husband some morning when there is some snow on the ground freshly fallen, and she knows his habits, "Why don't you shovel our sidewalk as well as Joe Tomlinson does? He lives on the corner and has two sides to shovel." She thinks by making that specific comparison of her husband to some one specific man it is going to stimulate him.

Actually, this is what goes through his mind: "If she wanted to marry a champion snow shoveler, why didn't she marry a white wing? Furthermore, I never liked Joe very much any way, and the old lady she ain't so hot, and I wish we lived in an apartment." He even comes in and shakes the furnace and breaks the handle to the grate, he is so angry.

There is nothing gained by any such specific comparison. What she could do with propriety is to compare him with the average of his group, "Why don't you shovel our walks as well as the average man in our subdivision?" That would stimulate him.

The same way in handling your men. When your foreman says to a workman, "Why don't you do as well as Oscar Strauss?" he hates Oscar Strauss, he hates his foreman, he hates his management, and he hates himself and there is no gain. But when you put on little campaigns of one safety team against another, Shop 4 against Shop 5, and so forth, that is fine. It is not an individual, specific comparison.

When you compare yourself with someone else, no good is gained. If you compare yourself to someone who is above you, you are jealous of him and hate him. If you compare yourself with someone not on your level, you become snobbish and cocky and careless, and there is no gain. Yet, gentlemen, that is a very common thing to do and is in part the cause of so much of the inferiority complex we hear about nowadays, comparing ourselves with someone else.

Often, persons make comparisons of themselves with others and develop self pity. The definition of pity differs from the definition of sympathy in that we have sympathy for our equals and pity for our inferiors. For example, if I should see an accident of a human being and a dog run over by a bus, I would have sympathy for that man; I would have pity for the dog. When an individual pities himself because he has made comparisons, he makes himself more inferior than he actually was before.

Then there are men who compare times: the good old days when old man Brush was in charge, and the present time with this superintendent. Those

persons are an evil influence in team-work in group effort. Some persons make comparisons without realizing their own shortcomings. They become paranoid, p-a-r-a-n-o-i-d, a mental condition which is incurable and tends to get worse. They become more and more fault finding, more and more suspicious, and finally get delusions of interference, of persecution, and they become hostile. They are very dangerous, and when you find a paranoid person in your employment get rid of him instantaneously. There is no room in competitive industry for these paranoid persons. The condition is not curable. It tends to be progressive.

Inferences

Another human trait which we can make use of is the trait of making inferences. An inference is a conclusion based on slight data. All of us smart folks think it is fine for us to make inferences for we can do it, and pity the poor dumb-bells who cannot do it. It is supposed to be mental gymnastics for the classes. Actually, making inferences is a bit tricky and sometimes dangerous.

Who is the most important person in the world today, October 14? There is only one answer, gentlemen, and that is yourself. That is the correct answer. If you do not believe that you are the most important person, that your welfare deserves most of your attention, that your teething requires most trips to the dentist, and so on, that your bank account needs most thrifty handling, then you are going to perish. You must look out for yourself first.

We are all emotional about ourselves because of this self-interest. It is an axiom that highly emotional judgments are not very good judgments, and that cold, calm, deliberate judgments may be correct. We are always emotional about ourselves in any decision which we might make, and I said an inference was a judgment based on slight data. So it is quite likely that any inference you might make about yourself will be wrong; that you can do very much better in drawing conclusions where you are technically trained, as in your business, than you can about your personal life. So possibly it is well to get some advice on how to handle making inferences.

The highest type of thinking is called by the lawyers judicial thinking—very complimentary to their profession (sic). The highest type of thinking we scientists call scientific thinking—very complimentary to our profession. The highest type of thinking, actually, is the ability to suspend your judgment.

While you suspend your judgment to get data enough to draw a permanently sound conclusion you should react to the preponderance of the data at hand. I am not recommending that while we get more and more information to make a true judgment we remain paralyzed or inactive or wishy-washy. You should react, but you should suspend your final judgment until all the available data is in, and be open-minded to receive new data.

There is a tendency so often for persons to infer unfavorably to themselves. That is bad mental hygiene. For example, an assistant bookkeeper gets a message that the boss wants to see him at ten o'clock this morning, and he begins to infer one unfavorable thing after another. "I wonder if he knew that last week I was away from the office out in the rest room for about an hour and a half listening to the radio reports of the World's Series games. I wonder if he knew I parked my car near a fire plug in the yard, I wonder if he knew I was late last week. I wonder if he has heard about my kissing that cashier," and so on. "Has that money lender been in touch with him?" The poor devil gets himself in such an unfit state of mind that when he does come to see the man who sent for him he makes a poor impression.

He might have inferred just this: Every conversation begins with "I want:" every letter, telephone conversation, or what not. "I want something." If the boss sent for the assistant bookkeeper, he should infer "The boss wants from me something I can deliver, probably our account with Dodge Brothers," or some-

thing else. He should infer favorably to himself. "I don't know what he wants, but since he sent for me it is probably something in my department. I can give it to him," and he goes in, head up and chest out, and makes a good impression.

When he infers unfavorably to himself, he cringes, he half paralyzes himself, he makes a wretched appearance. Suppose there is a matter about which he wants to see the boss, about such a thing as a raise in pay; the family is growing, needs are increasing, and he hasn't had a pay raise for some time. He spends the intervening two weeks thinking, "Well, times are hard and he has let off this man, and this man, and maybe he will let me off." He listens around to the gossip of the mood of the boss, whether he has had good coffee, whether he is irritable, and so on. He goes in with a hang-dog attitude, and probably doesn't ask for his raise. He has inferred unfavorably, that the boss would not grant him what he wants. He should infer at least favorably to himself. The boss will give him a fair hearing.

The successful salesman, of course, realizes this thing particularly well. He infers rather favorably to himself.

Any person who is trying to put across a new idea, be it safety or what not, should infer favorably that he will get a reception to his ideas. I will tell you this: When you infer favorably to yourself, eight times out of nine you will be right and one time you will be painfully, woefully wrong, but that is better than paralyzing yourself five times to four times you succeed.

We worked that out during the war in aviation. A flight is up, and one ship turns and goes back. If the men were permitted to infer unfavorably, they would say, "Oh, there goes Black. I wonder what is the matter with him. If he had gone to bed early and cut out his drinking he probably would have had his machine well oiled. I didn't get drunk last night. I took care of my machine. I am ready to go." Somebody else infers he is a yellow coward, and they infer one thing after another.

Finally he comes back with two men on his tail. Because the group inferred unfavorably they are slow to come to the rescue of the old scoundrel. He goes down, and maybe one or two more on our side with him. That was too expensive.

We trained our aviators to infer favorably. Each one trained in making favorable inferences about others in his flight said to himself, "Oh, there goes Black. He knows something I don't know. He's doing the right thing about it under the circumstances; if I knew, I would be doing what he is doing. Good old Black! He's on top of his job, and so are we!" He comes back and they are eager to go to his rescue, and get the two Huns, increasing the odds in our favor. So you have to infer favorably to have enthusiasm in your team work and joint efforts. Self disciplined persons are really happier than the totally repressed or than the self-indulgent with their extreme reactions.

Promises

A promise is regarded by the scientist as an expression of intention, expressed now to do something at a future time under circumstances which we can foresee. Most people regard a promise as an oath, which is a different thing. An oath must be carried out at any cost. A promise is an expression of intention. I recommend that you do not make very many promises, but rather you express your intention obviously and say to somebody, "I intend to see you at ten o'clock this morning by the telephone booths downstairs," or something like that. That is the way to say it. You might get a nosebleed and be in the washroom, and you couldn't possibly be there at ten unless you wanted to look a sight. You are not full master of everything that is going to intervene in that time, and you are apt to break your promise and disappoint yourself and disappoint others. You must be very chary in making promises. Correct promises are made

D.v., Deo volente—God willing—or with some loophole. It is best to say, "I intend to."

If you cannot carry out a promise, the thing to do is to get in touch with the person to whom you made the promise and ask permission to change the agreement as to what is expected of you. Sometimes you can not get in touch with that individual. It is good mental hygiene to assume that if he knew about the change of circumstances, being a reasonable person he would grant you permission to vary the agreement according to the new circumstances which have arisen. You must infer favorably that you are permitted to change your promise provided the intention to fulfill it as close as you reasonably can remains.

Now we come to the problem of death-bed promises which have caused a lot of mental anguish. If I can interrupt myself to tell a story, I had a Major in the army as a patient. His father had been a Lieutenant-Colonel in the same regiment, and his grandfather had also been an officer of rank in the same regiment. They were all of a family that had been in the regular army. The father, dying, says, "My boy, I attained the Lieutenant-Colonelcy. I have never been a Colonel. It has been my ambition and my father's before me that one of us should attain that rank. Will you promise me ere I go that you will become Colonel of this regiment?"

"I will."

That was too rigid a promise, gentlemen. This is the type of man he was: A man who was very happy in engineering and very unhappy with troops because he did not have that little element of command-personality which would make him successful in command. You know how it is in the service, that you are two years with troops and three years away on detached engineering duty, then two years with troops as a Major, and three with troops away.

He was unhappy when with troops. The first term with troops he was morbid. Later, when he was back and assigned to troop duty he began to drink when First Lieutenant. As a Captain, when he came back to duty with troops, he began to gamble as well as drink. As a Major with the troops he began to run around with other officers' wives, drank and gambled, and was dismissed from the Army and court-martialed. But a fine man in many ways when detached on engineering duty.

Being exiled from the Army, how could he become Colonel as he promised his father? He could not, and he became a hopeless and morbid individual, depressed because of the rigidity of this death-bed promise.

We should not invoke too specific promises from a person. His father should have said, "Will you do your best to carry on the family tradition and get as high in the regiment as circumstances permit?"

"Yes, father." Then he could have lived up to that, but the specific promise was too rigid and he could not attain.

Who is your own worst friend? Yourself. As we grow up we make self promises. "Under no circumstances will I ever do that." Maybe a child has seen his father hit his mother, and he says, "If I ever get married, I will never hit my wife." He grows up and gets married, and one time they are swimming. She starts to drown and grasps him, and there is only one thing to do to get them both ashore, and that is to hit her on the jaw to make her momentarily unconscious. He should, but the self promise stands in his way and they both drown. What net gain? None.

So your self promises, where they have been helpful to the individual, should be retained, and where they interfere with the modernization of your life should be edited and brought up to date, and the best way to do it is to generalize it. Promises are enslaving if too specific.

Character

Character means decisiveness in the personality. A person of strong character is a person who can make decisions for himself, and a person of weak character is one who cannot make his decisions, or cannot hold them if he has made them.

The beginning of character is at home. We should permit children to make decisions for themselves within their ability to decide safely. "Will you wear your galoshes or rubbers today, dear?" when there is half an inch of snow or slush on the ground. Mother has decided the boy will wear some form of footwear, and she lets him decide what it will be. She begins to develop character in him. She lets him make some decisions.

The same in business. The chief clerk should permit the new office boy, who has three messages to deliver, to decide for himself whether he will go to the Roanoke Building first, the Pittsfield Building next, and the Capitol Building next, and in that way develop business character in that new employee. If he says too specifically, "Go here, and then there, and thirdly there and come back and report," and allows the individual to make no decision for himself he is going to make a rather weak character out of that person from a business viewpoint.

A man at home who is not permitted to make his own decisions, whose mother-in-law decides whether he will wear rubbers or take an umbrella, or what not, will never get higher than third assistant to some inferior position.

The man who will not let his wife make decisions on money matters, the spending of her money (it is a fifty-fifty chance that he will die before she will, or she will die before he does), is not developing in her a business character so that she has the ability to make decisions in the handling of money, and yet he leaves her all his estate. We must permit persons to make decisions within their ability to make decisions. That develops strength of character, and there is no other way.

Percentage of Error

The expected percentage of error. Human beings make a great many mistakes. In every type of mistake, where we could measure the causative factors, we have found that in sincere persons more errors are made because they are humans than because they are wilfully wrong. I mean that the inevitable percentage is greater than the personal contribution in the total percentage of error. So when you have occasion to criticize some person, realize that part of his mistake at least is not his own fault, actually the greater part is that he is only a human being.

The Human Graph

All human beings can be classified by a certain graph which we will call the human graph.

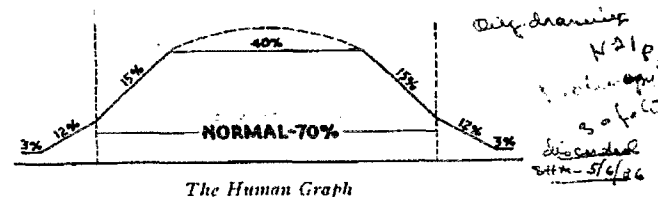
A three per cent almost parallel to the base line, a gradual sloping up twelve per cent, a rapid sloping up fifteen per cent, a broad plateau of forty per cent, slightly domed. Then, on the other side, is the rapidly sloping down fifteen per cent, the gradual sloping down twelve per cent, and the practically flat three per cent.

All humans classify according to this graph, by any standard whatsoever, within a plus or minus one per cent error: three per cent failure, three per cent of glorious success; twelve per cent dismal, twelve per cent strikingly fine; and the big, middle normal here. It should be our ambition, by any standard at all, to be high average, and that is the proper ambition—to be high average.

Take the tardiness record at Western Electric. Three per cent are very frequently tardy. And the alibis they bring in! Maybe they live in Maywood. There are no bridges except a stationary one over the Desplaines River, and yet a lot of them say they were bridged. Three per cent are tremendously early, an hour or so, and they study International Correspondence School books. Twelve per cent are frequently late and are an annoyance. Twelve per cent are exceptionally on time. Most of us are in the mid 40% of normal.—Another example is the cash in pockets of persons who pass through the Union Station, a few beggars, a few persons with payrolls, but most of us in here with \$6 to \$26 in our pockets.

The safety record of a group of persons is the same. Three per cent are definitely accident prone, and you should eliminate them. Twelve per cent need painstaking education, but you can help them a great deal. Keep them. Three per cent are so overly cautious that they never make a mistake of commission. Twelve per cent are exceptionally fine. Most of us are in here. In your safety work you should devote your attention to the normal big mid seventy per cent, because you will get more dividends for the involvement of your time effort.

The tragedy of nature is that sixteen out of seventeen of each extreme perish or are never born. Nature abhors extremes. As I see it from my viewpoint of



The Human Graph

life, very few of the potentially feeble-minded grow up and are burdens to the community. The sterility and miscarriage rate is tremendously high, and the death rate of these babies is very high. The greatest tragedy in the world is the fact that very few exceptional, superior persons of the genius type grow up. There are very few bishops; there are very few men like Gary, and, oh! how we need a man like Robert Morris now, Washington's friend and the greatest financier the country had.

We are not having enough of the genius type. The extremes have perished. Only a few survive. If you want to survive do not be an extremist in anything. Be one of the high average. The man who is extremely crazy about golf or drinking, or making everybody want to join the Presbyterian Church, or otherwise becomes a pest, does not survive. (Laughter) Do not be an extremist, and do not let your children be extremists if you cherish them. High average is the proper ambition.

I will interrupt for a moment. In my opinion there is no suitable psychological test, or series of tests, that will place men properly. You can eliminate the bottom three per cent by group tests, yes, but after you have examined a group of men and eliminated the worst I do not think your tests will help you sufficiently to place men. The best way to place men is to employ them, watch them for two or three months, confer with the foremen and others over them and see whether they are worth retaining or worth promotion. If you have good, common sense you can do that. You can very easily place a man on this graph after three months' study, about how good he is actually or in his potentialities.

Criticism

But the larger part of every mistake we make is due to human nature. We must not criticize persons, therefore, totally. You can't damn anyone black. When you do have occasion to criticize a person for his mistake, it is your bounden duty also to compliment him for his success in proper proportion as deserved.

Let me give a little analogy. I like school teachers, and I am not fond of parents or grandparents from the point of view of child guidance work. A school teacher is very fair. She will send a child home with a report marked "seventy" on his page. You know what sort of reception he will get at home, don't you? The father and mother will say, "What! Three of them wrong," and the grandmother will say, "How sweet! you got seven of them right." That spoils him, too, but the teacher says, "Seven right and three wrong," and that helps him.

So in handling adults, when you have occasion to report on them to their face or to someone else, score them properly. Criticize their mistake but give them credit for their success. And do it out loud so that you can be heard, because the old gossip will get around about you anyway and if you have not spoken fairly of him the workman will feel mistreated and aggrieved, and will become sulky, indifferent, inaccurate, unalert, and accident prone.

It is important to differentiate the offense from the offender. If you have a little child who has been in the habit of biting his fingernails, you do not say, "I have a horrid child who bites his fingernails." You say, "I have a nice child with a horrid habit." We must differentiate the offense from the offender.

When you have occasion to comment to a man or scold him, do not condemn all of him but just the mistake he has made. Train your foremen to do that and you will get better work. For example, a foreman may not come up to a man and say, "Oscar, you damned big Swede, what did you do that for?" No, you can't totally condemn him. He must say, "Oscar, I have noticed you are never drunk Monday mornings; you are practically never late, and you make a mistake like this. What the hell!" (Laughter) Now what? He will go home and tell his wife that the company has noticed he is never drunk and rarely ever late. He will not say a word about his mistake. He will try to live that down, and live up to his good reputation. Two pats on the back to one kick in the pants is the proportion.

Forgiveness

Then you must forgive him if you are going to keep him, and forgive him in full. When I was away for two or three years I let my lodge membership lapse, but when I came back I paid up and got a receipt in full from the secretary, so I am as eligible to office as though I had never slipped up in my payment. You must forgive your workers in full when they have made a mistake.

Forgiveness has several factors, and I think I am going to be quite correct in this analysis of forgiveness. I have discussed it with a great many men, rabbis, priests, pastors, philosophers and so on.

In order to be forgiven, several things must occur.

1. Awareness
2. Contrition
3. Sincere determination to try not to repeat.

First, you must be aware of having made a mistake. Of course, you cannot apologize unless you know about it. There are some tragedies at times when we do make mistakes of which we are unaware, and persons feel aggrieved toward us.

Secondly, we must be sorry, because a person who is gloating over his mistakes can not beg forgiveness.

Third, there must be a sincere determination to try to not repeat. Those are the essential postulates in order for an individual to be forgiven.

The minor postulates are three.

1. Apology
2. Restitution
3. Punishment.

First, we should apologize if we can. Sometimes we can not; the person is too far away. An apology is best if given quickly. Sometimes it is too dangerous to make an apology face to face with a person you have aggrieved. It is best to send a lawyer or intercessor of some kind to do your apologizing for you to prevent further trouble. Apologize if possible.

Secondly, make restitution if you can, but if you can not you may still be forgiven. For example, if I were in your home for dinner and accidentally tipped over and broke a glass of a type of which you had previously said, because they are so pretty, "We got these at Field's," it would be my duty to replace that. You would say, "Oh, no, no; never mind," but you wouldn't mean it. However, if I should break an heirloom, and apologize, and could not replace it, I still could be forgiven. So restitution is not an essential.

The third minor postulate for forgiveness is punishment, and the only purpose of punishment, gentlemen, is to see that the individual is sorry or contrite; and if adequately sorry there is no need for penance or punishment.

If a person goes through these major and what is feasible of the minor postulates after he has made a mistake, then you must forgive him, and forgive him in full.

Whose mistakes hurt you the most? Your own. If you are going to be a successful personality and well integrated, after you have made some mistake and you are aware of it and you are mighty sorry, and you are sincerely determined not to repeat it if you can help it, then you must forgive yourself and go on from there. It is childish, after you trip on a wrinkle in the rug, to lie on the floor and kick. Get up, dust off, and go on. You must forgive yourself, but this does not mean indulgence; it does not mean that you forgive yourself while you expect to do it again, too. No. That is destructive to the personality. Indulgence or self forgiveness in advance is almost as destructive in disintegrating the personality as taking dope. You must be reasonably strict with yourself. You do not need to apologize to yourself. You do not need to make restitution. And you know whether you are sorry or whether you are not sorry, so self punishment is not indicated if you are sincerely determined to try to avoid repetition of that mistake.

The feeble-minded repeat their mistakes. Persons who are not feeble-minded learn from their mistakes to avoid the repetition of them. You can make your own diagnosis without laboratory tests—on the people who work under you who repeat or do not repeat their mistakes.

Nervous Breakdown

My last point is the so-called "nervous breakdown." A nervous breakdown is a condition which has not the finality of mental disease. I have never seen a case of so-called nervous breakdown but that two factors were working on the individual at the same time.

1. Poor health
2. Emotional strain.

An individual in good health can carry any normal emotional strain without a nervous breakdown, but if his health is poor, for example if he is suffering from a fever from a sinus infection, or has some rheumatism, and has trouble at home, or gets bad news, or there has been a fire in the factory of which he is in charge, or something like that, then he gets a nervous breakdown.

You never can anticipate when emotional strains are going to come, sickness or death in the family, bank failure, or something like that. We cannot tell. So to pre-

vent so-called nervous breakdown in yourself and in your workmen, give them abounding good health and watch them. Watch their health lest they be in poor health at a critical moment. *When your body is sickly, so is your old thinking.* You can not think well nor react emotionally properly when your body is sick. There is the closest possible connection between physical health and mental health. The healthy man, not particularly introspective nor self-centered, interests himself in his work and activities and thus protects his nervous and mental health.

My conclusion in this talk on application of some mental hygiene rules to people is that the sane person, the healthy minded person is adaptable to the changes in his environment as they actually occur, and your adaptability to change is the measure of your sanity.

Thursday Morning Session
October 15, 1931

LECTURE NO. 3

The Use and Misuse of Those Innate Tendencies with Which All Men Are Endowed

By HAROLD S. HULBERT, M.D., F.A.C.P.
Chicago, Illinois

Two questions have been asked me frequently in these small conferences, and one is, What do I think of Dr. Karl Menninger's book, "The Human Mind"? I think well of it.

The other question is: Is there any publication on mental hygiene in industry? The answer is, Yes. There is a magazine published called "The Human Factor." It is about three years old now. It comes in loose-leaf form, punched for your loose-leaf notebook. I have seen many copies of it; some of them are very worth while. It is published by the Massachusetts Mental Hygiene Society at 6 Joy Street, Boston, Massachusetts. It is a very cheap magazine, costing two or three dollars a year, and it comes out very frequently. [This has since been discontinued. Ed.]

In this series of talks on Healthy Thinking versus Accident Risk, we have, in an informal manner, taken up on the two preceding mornings some comments on normal thinking and some personal applications of mental hygiene rules. This morning the talk will be a little more classical, with a psychiatrist's comments applicable to 1931, on "The Use and Misuse of Those Innate Tendencies with Which All Men are Endowed."*

Instincts

Each human being is born with the buds of racial memories and with a tendency to react in a certain pattern to these memories whenever they are aroused. These buds develop at the proper but different times in the life of each individual in much the same way that a new born baby has in his upper and lower jaws the dental buds of his first and second group of teeth, but the teeth do not develop all at once but each at its proper time. It is a good thing for us that we are born with these tendencies; otherwise we would be overwhelmed for we would have too much to learn. Some authors call these tendencies instincts. In many individuals the instincts seldom reach the maximum potential strength because of health reasons or because of environment and training.

Now, these tendencies may be analyzed into several components of each tendency. The first is the stimulus which causes the rest of the so-called instinct to come to pass in the human mind. There is a stimulus or cause. Now, gentlemen, this may be modified. For example, this morning I fell eighteen floors. Usually when you fall you are frightened, but I have ridden in elevators before; so I have been able to modify the stimulus and as we fell, that is to say, as the elevator descends, I was not frightened. The stimulus, then, is subject to modification.

The next part of each instinct is a combined part consisting of an idea and an emotion, and, of course, you are well aware, I suppose, that the modern emphasis in psychology and psychiatry is on the emotional life of individuals. The proper idea always calls up the proper emotion in persons who are sane. If we lose money, we are sad. If we are curious, we are interested, and so on.

*After McDougall.

The third part is the *impulse* or tendency whenever an instinct is in the mind. There are two parts of that. There is the involuntary part and that cannot be changed by experience, and there is the voluntary part which may be changed by experience. In fact, it may be changed to nothing, or it may have several moments' duration, or it may last or recur many, many times in a lifetime.

Let me give you an example of what I mean by this variation of this voluntary impulse. I happened to be walking along Madison Street from State over toward Dearborn; I passed the Buck & Raynor's drug store, and a man carelessly, not seeing that I was walking faster and about to pass him between him and the curb, spit into the street; but I walked into it. Involuntarily, all the body changes of anger took place. We will come to them. My pupils became large, my blood pressure went up, my blood sugar went up, my jaws got tight, my fists got tight, and I socked him. The hitting of him was the voluntary impulse; the changes in the rest of the body, the involuntary impulse.

A few days later I was walking along Madison Street and the same episode happened and I wanted to hit him, but there was another man with him and I noticed the other man was a cop. My pupils got large, my blood pressure went up, my blood sugar went up, and so forth, but there was no hitting. So this voluntary impulse can be modified.

In human beings who are civilized, we seldom react to the primitive instincts, but we do react in ways that are based on a combination of those instincts, much like a chord of music is based on notes played together. However, it is normal, I tell you, to react, when you need to, in a simple, primitive, instinctive way; it is nothing of which to be ashamed.

Our reaction is modified by our available memories, plus these racial memories. Now, these memories of ours may be from formal education, such as schooling and instructions and things which we deliberately read and study, or it may be informal, based on experiences in life which we have gone through, or it may be informal, based on things we imagined but which were not true.

Disposition

By definition we use the word, disposition, to mean one's inherited strengths of his instincts. Now, no two persons have exactly the same inherited strengths of instincts. We have a dozen or so instincts, one much stronger than another, one moderately stronger than another, and so forth, like the fingers of the hands, and no two persons have fingers alike, the right hand fingers being a little larger than the left, you know. And since there are thousands or more of variations of strengths of each one of these, nature has so worked it out that by inheritance no two persons are alike, and probably never have been.

Inheritance, I believe, not only defines the type but is like the force of the germ and the nourishment in the soil that causes the plant to grow up; and environment is like a ceiling, like a low ceiling in a hothouse or a higher ceiling in some other place, which determines how high the plant is going to grow within the limitation or momentum of its inheritance. Energy and health are the only things we can pass on to our children.

I want to say further that men and woman have the same instincts. There is not a single instinct which is distinctly feminine nor one that is distinctly masculine, although they vary a great deal. There may be more tenderness in the average woman and more joy of battle in the average man, but there is some joy of battle in women, and there is a proper role in man's life for a great deal of tenderness.

There are racial differences in the strength of instincts, examples of which are the following: the acquisitive instinct predominates in Jewish people; the sex instinct in the Latin races; force, law, order, and regimentation in the Romans; curiosity and exploration in the blond, tall, long-heads; while the Chinese are notable for lack of anger.

Generalization and Variation of Instincts

CAUSES	MENTAL-EMOTIONAL	IMPULSE-TENDENCIES AND BODILY CHANGES
	<i>Discussion PROPER USE</i>	
<i>TOO LITTLE</i>		<i>TOO MUCH</i>
	1. Fear	
Totally unfamiliar	Fly fright	To escape, run, or hide. Paralyzes other activities.
<i>Coward</i>	<i>Caution</i>	<i>Sickening. Foolhardy.</i>
	2. Curiosity	
Partially (unfamiliar)	Wonder-Interest	Approach-Examine
<i>Narrow interests</i>	<i>Explore</i>	<i>Fascination</i>
	3. Disgust	
Stimulus unwholesome	Aversion	Reject or avoid
<i>Coarse-Rotten</i>	<i>Select and procure the wholesome.</i>	<i>Sickening Dainty</i>
	4. Parental Tenderness	
Tiny or fragile	To shield or develop or cherish tenderly.	Protect or cherish.
<i>Cruel</i>	<i>Safeguard and civil- ize</i>	<i>Overly solicitous.</i>
	5. Self-Regard (Positive)	
Good health and another individual.	Feeling of well-being or superiority.	Display and work
<i>Inferiority</i>	<i>Be agreeable and on top of job</i>	<i>Pride</i>
	6. Self-Regard (Negative)	
Poor Health and another individual	Feeling of ignominy or inferiority	Shirk and cringe
<i>Superiority</i>	<i>Conserve one's re- sources</i>	<i>Meekness</i>
	7. Anger	
Being thwarted	Pugnacity—Anger	To fight to overcome obstacle or obstructor
<i>Defeatism</i>	<i>Resentful. Determin- ation</i>	<i>Irascibility</i>
	Some Minor Instincts	
	8. Aggression	
An eligible mate	Joy of Comfort	To pursue and overcome or possess
<i>No family or home life</i>	<i>Strong home ties</i>	<i>Ostracized as a poly- gamous brute</i>

9. Jealousy		
Another male, triangle	Jealously Homocidal	To abolish a rival
<i>Eviled from his own home</i>	<i>Protect his own (home)</i>	<i>Sickening Suspicious</i>
10. Sex or Creative		
Mate or opportunity	Creativeness and Love	Pelvic Sex or create a memorial
<i>Barren life</i>	<i>Large family in their own permanent home</i>	<i>Polygamy or Diversified fads</i>
11. Social or Herd		
Others	Pleasure in contacts	Seek team work
<i>Hermit existence</i>	<i>Social responsibility and comfort</i>	<i>Joiner—No individual work</i>
12. Acquisitive		
Loose objects	Satisfaction	To collect or hoard
<i>Poverty</i>	<i>Estale for self and associates or heirs</i>	<i>Miser—object of robbery</i>
13. Constructive		
Building material	Happiness while planning and building. Contentment after it is built	To pile up and build
<i>Destructive—nomad</i>	<i>Engineering, manufacturing and building. The basis of our civilization.</i>	<i>Sacrifice mean for the end.</i>

The appearance of the same instinct may vary with the age of the person.

A little, tiny baby girl has pleasure in nursing and in wetting her diapers, but at the age of two, this instinct shows itself in her playing with a doll and imitating her mother. At the age of six, she is interested in the new baby. At eight she likes to dress up like her mother. At ten, boys are awful. At twelve, she is interested in the anatomic difference between boys and girls. At fourteen, there is a physiological change in her, puberty. At sixteen, she is curious about the difference between boys and girls. At eighteen, she falls in love. At twenty, she is a man-hater or else she likes a crowd of men. At twenty-two, she is engaged to marry. At twenty-three, she is impatient. At twenty-four comes the sexual excess on the honeymoon. At twenty-six she is pregnant and at twenty-seven expresses the tenderness toward the new baby. At twenty-eight she is pregnant again. At thirty, she dreads pregnancy. At thirty-six, she is indifferent to sex. At forty-two she is repulsive to sex. At forty-six she is a mother-in-law; sex is awful. At fifty-two, she is a grandmother and loves it. At fifty-eight, her grandchildren are commonplace. At sixty-two, she has forgotten about pelvic sex, and at sixty-eight she is self-centered and interested in no one but herself. What a change in the same instinct, in the same individual, depending on the age!

Ugly Until Matured

I must say this because we are troubled about ourselves and our children and others, that these instincts have great use in life, as we will point out. As they appear in the development of the growing child, they often show ugly aspects. The anlage or budding of the embryonic instinct in an individual often is ugly, but because it is ugly does not mean it must be repressed. No. It must be cultivated. Are not all things, practically, with the exception of flowers, ugly in their appearance at the time they are being developed? A ship being built on the ways is a matter of ribs, not the pretty thing it will be when finished.

Usefulness

Each instinct with which we are endowed has its use. It may be of a great or of a slight use. The trouble is that we are apt to misuse these things. The misuses consist of three types: (1) *too much*, or (2) *too little*, or (3) the instinct appears at the *wrong* time. Too much, too little—but I am not interested in telling you about abnormal psychology. I get enough of that every day. The pleasure of being here is the pleasure of associating with normal persons. We are interested in the proper use of these endowments which came with us when we were born.

Fear

The first instinct that I will discuss is the instinct of fear. The main stimulus that causes this to come to mind is the totally unfamiliar. For example, unfamiliar experiences or thoughts of unfamiliar experiences such as sickness or injury or mutilation or breaking down. Other stimuli are initial experiences. Some persons are afraid to get married because they have never been married before or are afraid to have their first child because they have not had the experience before. We are afraid when we are left alone. We are afraid of the supernatural, the hideous, the mysterious and the uncanny. We are afraid of units more powerful than ourselves, for example, cars or locomotives in rapid motion or an enormous animal (quite near) or an animal with great power to injure (a charging bull or a mad dog) or a person who is quick to hire and fire. We are all afraid of high places and the risk of falling, and this fear of falling dates from the third day of each individual's life. We are afraid of an unseen danger or of an enemy against whom we cannot fight back. We are afraid of suddenness such as sudden noise or light or darkness. We are afraid of public disapproval and of God's disapproval. We are afraid when others are afraid, and this is called a panic or contagious fear be it a theatre panic like the Iroquois Fire or financial panic such as we are suffering from now. Our memory can bring up correct or distorted records of events which can throw us into fear.

The idea of this instinct is to fly and the emotion is fright. The impulse is to escape or hide or to become inconspicuous or to be sceptical and deny the existence of fearsome things. The escape may be made by running or covering up or lying down. The most common social impulse is to tell a lie. We have written in our copy books in school that "it takes two to make a fight" and two to make up. I tell you it takes two to tell a lie. The person who is afraid to tell the truth and the awesome person who frightens the liar into an attempt to escape from the probable effects of telling the truth.

The physical changes or involuntary impulses of this emotion are many. The pupils of the eyes enlarge the better to see an enemy in the dark, which of course restricts sharpness of visual perception of things near at hand. The pulse rate increases, digestion stops, the breath is short, fast and shallow. The sex impulse is diminished. Blood sugar goes up (as stocks go down). The mouth is dry and the muscles tremble. In fact, the moment we are afraid our body acts as though we had run to the point of exhaustion. Fear, gentlemen, is sickening. It is not stimulating to ordinary activity. It has been said that fear is a disease. Well, it is not.

but it does cause a lot of sickening symptoms. Fear is a poor whip to use on men. In a chronic state of fear people lose weight.

The dreadful thing about this instinct of fear is that it is the only instinct which can return to a man full-force time after time after time. No other instinct does this. For example, you cannot remember and feel again and suffer again how much it hurt you when you were at the dentist's the last time. No more can you get, by thinking and memory, the thrill of your love life when it was fresh and sweet, but when you recollect how scared you were at something that has happened, your whole body goes into a flutter and you are just as scared now as you ever were. It is haunting. It may appear in dreams or in the waking life. There is some tendency for it to become less prominent in the life of an individual after he gains in weight above his previous top weight.

The most unfamiliar, universal, human experience for which we have no inherited guide is Death. People are afraid of death and to some extent fear, like death, paralyzes other activity. That is why a sudden surprise with fear brings so many complications when a disaster has occurred. The men cannot do what they should do unless previously they have been rehearsed and rehearsed in what they are to do. You see familiarity or rendering the situation not totally unfamiliar robs it of its fearfulness. Fear is most pronounced in persons of the mental age of 9 and it is smallest in persons around the age of 20. That is why it has complicated your safety program in dealing with men you have regarded as foolhardy. You cannot use the fear factor on men mentally 20 years old. This instinct increases again to reach another peak around the age of 50 but then it is called conservatism.

The important thing for us is the use rather than the misuse of this sickening, haunting instinct. The proper use of fear is caution. The result of having too little is that the individual is foolhardy. Too much of the instinct of fear makes persons cowards. I maintain that there is a proper, dignified and noble use of all of these endowments which come with us into the world and that it is proper and dignified and noble to be cautious to the extent of preserving one's self and one's group. Unless some grave emergency comes such as a War or the risking of one's life by going over the side of a bridge to save a baby who has fallen into the river, many persons seem ashamed to be cautious, and it is for you today to show them the propriety of caution.

Curiosity

The next instinct I want to speak of is the instinct of curiosity. This is a very pleasant one. The stimulus that arouses it is the partially unfamiliar. The emotion is wonder and the idea is interest. The tendency is to approach and to examine things. It appears particularly in children, and their questions should be answered instantly, briefly, and approximately correct.

I believe in a system of approximate answers. For example, my dear little boy one time said to me, "Daddy, how far could you drive a golf ball with a tennis racket?"

"About forty feet," I replied.

He said, "What is the Holy Ghost?" (Now he knows I pray.)

Because I had answered that question, he went on to something else. When we answer questions approximately, as best we can, we rob curiosity of its dirtiness and of its morbidity.

Around the age of twenty, curiosity reaches its peak in most persons. It practically disappears around fifty, and they become very conservative.

Sometimes it alternates with fear.

Now, those persons who use this instinct of curiosity have a rich life. Those persons who do not have sufficient curiosity have very narrow interests.

Those persons who have too much curiosity are fascinated and get themselves into trouble, and we can be fascinated by persons, things, or circumstances: maybe by a

blond, or the risk that we can get handling a certain piece of dangerous machinery, or stealing money, or skating on thin ice. It is our duty, gentlemen to help the person who is fascinated. Intrude, and tell him he is silly. He will hate you, but you have done him a good deed. Persons cannot get out of fascinations themselves.

This instinct should be encouraged socially. It enriches the life of the individual and may enrich the world for many generations to come. It is the basis of exploration, it is the basis of research, it is one of the things which has made our world so fine.

Disgust

The next instinct of which I wish to speak is the instinct of disgust. I will comment very briefly on this because it is painful to discuss and equally painful to hear described. In general, the stimulation which arouses this instinct is the *unwholesome*. The idea of the instinct is a repulsion or revulsion. The emotion is disgust or horror or uneasiness. The voluntary impulse, or the tendency to the voluntary impulse, is to avoid, to turn away or reject or push away; and the involuntary impulse is to reject or throw out the unwholesome.

This instinct was primarily one to help our ancestors to eat in the dark when they were too weak to fight the animals of the field in the daytime, and they learned by sickness that certain tastes and smells of the food they ate in the dark made them sick, and to this day we don't like fuzzy things or slimy things or slippery things or stinking things or odors that are too strong. And we don't like snakes and other low animals that we can't eat, and when we don't like a person, we call him "a snake in the grass."

Other things which arouse this instinct are unwholesome mannerisms of speech, improper and suggestive or licentious talk, books, pictures, actions and invitations. We have an attitude of disgust or disapproval of that which might injure the home; bad judgment which might render others unhealthy or unwholesome is disapproved of by almost every one else. In the same vein, things which are unorthodox or freakish tend to repel us and we bestow on them our disapproval for the reason we do not like eccentrics, nor the insane nor those with physical contagious diseases like blotches or ulcers on the skin.

The body changes accompanying the arousal of this instinct are sickening. There is a shrinking, creeping sensation. We shudder and spit and even vomit, digestion stops, blood pressure goes down, we sweat and we feel faint.

This instinct is not of much use to us in modern times with our sanitary methods of preserving and cooking foods but it was of use to our ancestors, who being weak and unable to kill fresh meat animals, used to skulk in the dark around dead animals partly eaten and partly decomposed, which were left over by some bigger animal after he had made his kill.

This instinct does play some role in life today, inelegant as it may seem. It may interest you to know that stale sweat is very disgusting to a woman but a modern woman has no objection to fresh sweat if she can see in the latter case that the efforts which produced the sweat were efforts in her behalf. Her objection to stale sweat is primitive and ancestral. Suppose about 6000 B. C. a man came home from a two or three day trip over the hills into the next valley where he said he had been killing deer, or at least hunting deer, and he was all smelly with stale sweat. The primitive woman did not know but what he had been living with another woman in the next valley, consequently his physical efforts certainly did not do her any good. But, when he was sweating freshly side by side with her, cutting down trees for their home or plowing or skinning animals, living and working together, then she could see the benefit of his efforts and to this day women have no objection to seeing men sweat in their behalf.

Stale blood is very offensive to the male. It does not do a man any good to see some other man with stale blood. But, the drawing of fresh blood, one man from

another, where you can wound your enemy, is thrilling, because it has probably done you some good to make him bleed in combat. Some of the most dreadful murders are of this type, the type that like to kill with their hands in order to draw fresh blood, and we find them in Illinois and we find them in West Virginia, and elsewhere, and they are all repeaters. This blood lust is a most dreadful thing. Never invoke it.

The proper use of this instinct, then, is to avoid the unwholesome, and I believe you cannot be a great success unless you avoid unwholesome people and books and pictures and plays and stories and circumstances. Most of us are very particular, aren't we, that only pure things shall be eaten? We do not want to eat bad food, bad drinks, spoiled food, and so on. It is equally important, gentlemen, that we give to others and to ourselves a wholesome auditory environment, that we only talk or listen to things which are helpful, not unwholesome. I advise you never to act in such a way that anyone can say that you are disgusting and I advise you never to use the word "disgusting" in your conversation, because you will find that your audience will sicken of listening to you no matter what the topic may be.

I maintain that a human body that is healthy is a beautiful thing and a human body that has been maimed is disgusting and ugly. You can get all the sentiment you want about the poor chap in his affliction, but he is an ugly thing compared to what he was before the accident mutilated him. We should take a strong attitude toward those things in life which mutilate human beings needlessly.

Tenderness

The instinct of tenderness is quite different. We all, men as well as women, have this instinct. It is called the parental instinct. The stimulation is helplessness or frailty, especially the frailty of an invalid or a child. The instinct may be aroused by the idea that an individual might become frail. That probably is one of the basic keynotes of this big movement, this safety movement. We want to protect persons who might become frail through accidents.

The idea is to protect. The emotion is tenderness. The impulse is to cherish, and sacrifice, if necessary; to cry sometimes, to embrace, and when one is feeling very tender, the body softens, just like a mother who has a new baby; the lips, arms, everything, soften.

This usually appears in children a little late. First they are cruel and then they get tender. The ambivalent or opposite form of this instinct is cruelty.

This instinct is one of the most universally shared of all human impulses. It brings together persons who have nothing else in common. It is an instinct that is easily hooked up with moral indignation. When tenderness is backed up with moral indignation, we have a powerful force in a civilization like ours that cannot be stopped except by internal dissension. The future for this safety movement is wonderful, particularly in America.

The abuse of this instinct is being over-solicitous, keeping persons from growing up. We must let them get their bumps. We must let persons make their own decisions more and more as they grow older in judgment and experience. A perfect parent is one who makes no more voluntary decisions for his children after they are eighteen years old. In an emergency or unexpected things, yes, but after eighteen, a child should decide most things, ordinary things for himself. If you train him properly, he can.

A proper form of this instinct is the over-solicitude of the grandparents. Any grandparent worth a whoop in a gale of wind spoils all the grandchildren, or does his best to; feeds them between meals, shields them from their sins or their "come-uppings," as we used to say, and that does not hurt the human race. It is a good thing we have some such persons.

The trouble with us is that we are too embarrassed to express out-loud in words our tenderness on proper occasion. We are very glib to give our hand service and money, but when it comes to saying proper tender things we are all tongue-tied.

I had a patient who was quite depressed. Her analysis, which it took an hour or so to unfold, can be boiled down into a few words. "What is it you want?" "Petting—word petting." So you men who are married, indulge in a little word petting at home. It would be very welcome—at home.

Many persons who have no children of their own and who have a terrific amount of tenderness, engage in group tenderness since they have no children of their own on which to concentrate.

In Europe, force has always outweighed everything else. In America, moral righteousness has always outweighed everything else, and tenderness is a big part of it. This instinct never had its proper outlet in all the history of the world until our country was developed.

Positive and Negative Self-Regard

I come now to the most difficult tendencies to describe, the so-called instinct of self-regard in the phases of positive self-regard and negative self-regard. Sometimes the positive phase is called assertion or self-approval. The French call it, "bien-etre." The stimulus which brings this to mind, causes this to arise, is another person, actually present or thought about, whom we regard as our inferior. Other stimulations which call this up are the consciousness of success, admiration from other persons who are present or implied, applause, or robust health, stimulating foods and drugs cause it temporarily, and a normal physiological existence at home.

The idea is superiority or dignity, sometimes aggressiveness, or authority, which may be overdone into officiousness. The mood is one of gayety or elation. The voluntary impulse is to display oneself, or to be persistent, in some cases to be a bravado, or to be overly talkative.

The physical factors are very important because they are healthening, not sickening. There is an erect posture, and this is a reciprocal thing. The persons who take setting-up exercises and are erect have a higher superiority feeling. They have deeper respiration, the blood pressure goes up a little, they have a greater resistance to infectious disease, live longer, and vitality is increased. They can think more clearly, have much less fatigue or feeling of fatigue; they have more optimism and more courage; they move more rapidly, occasionally are very irritable, have much less caution, have a desire for the spotlight, and they may have a keener appreciation of normal sex. So it is a good thing to have a feeling of superiority, provided it is not overdone.

The abnormality of this idea is to have too much, to have pride. Now, a proud person is a person who knows all of his good characteristics, does not know any of his weak points, marches at the head of the parade, with the parade three or four blocks back of him and laughing at him. That is overdoing that superiority.

I am recommending neither modesty nor meekness nor pride. I am recommending honesty. If you know you have certain good characteristics, then admit them, to yourself anyhow. And if you know you have certain weak characteristics, admit them to yourself. You would be better for it and you can compensate for your weak characteristics. My family tell me I didn't go to school the day they taught spelling. My stenographic bills are awfully high. I can't spell. That is one of my weak points. Admit your shortcomings and admit your good points.

We are talking right now about admitting your good points. Now, many persons have a false attitude of superiority. They appear very superior, but they are only compensating for an inner inferiority feeling. They over-compensate. They are hard to get along with. Some persons develop an attitude of superiority at a certain time of life, particularly women, around the age of fifty-five: big-bosomed, flat-footed, deep-voiced, whiskered, opinionated—you can not handle them, but you can get two of them and let them handle each other.

Now, the really, truly superior person, the Roosevelt type, the Wilson type, we have them but in very small numbers. The true superiors are not too aggressive, do

not go out of the way to prove they are right and boss us all. They know they are right.

The thing for you to do in the proper use of this most important instinct is to infer that you are at least average with most persons you meet, to assume that you compare favorably with them; you are not greatly superior to them nor greatly inferior to them.

The opposite phase of this instinct is a feeling of inferiority or abasement or self-disapproval. We are shy, we have a sense of failure and that makes us feel more inferior. As I told you day before yesterday, when a workman has been laid off and comes back to duty, you must not make him feel inferior. Make him feel superior to his job by giving him a job to which he can be superior, because the sense of inferiority, the sense of failure, when this instinct is aroused, or this phase of it, is sickening. It comes on usually with failing health or poor health and causes health to fail, with low blood pressure, shallow breathing, not much oxygen, limited vision, cloudy thinking, self-pity, whining, lack of sex-appreciation, and these inferiors are socially inert.

Most of these cases of inferiority, gentlemen, in so far as I have been able to diagnose them, are the pitiful wrecks of a painful episode in childhood. The child becomes ashamed of himself, and although he might outgrow the thing which made him self-ashamed, the feeling of inferiority may persist for lifetime. And children pick the dog-gonest things about which to be ashamed. The tall boy's arms stick out of his sleeves and his feet stick out of his pantlegs. The short boy is the only boy in short pants who graduates from high school. There is the girl who thinks she is fat, the child whose teeth are being straightened with gold wire across her mouth. Such children develop ideas of self-shame, and the inferiority lasts forever.

Now, I maintain that we should never use the word "shame" to other persons for anything physical. We worked this out down at Ottawa. You know, we have some zinc mills down there, that there is a great deal of lead in the zinc, and that lead in the body is poisonous. So there are signs all around the lunch room, "Wash your hands before you eat," "Don't get lead poisoning," "Don't take lead into your system," "Wash your hands before you eat," and so on. One time, for some reason or other, one of the workmen did not wait to wash. While he was sitting there eating his lunch with atrociously dirty, polluted hands, the foreman said to him, "Mike, you ought to be ashamed of yourself, eating with dirty hands. You know better." (Pointing to the signs.)

What he did was to make Mike ashamed of himself. Mike became more and more slovenly, less and less inclined to be careful, and he developed lead poisoning.

When you tell a person he ought to be ashamed, he believes you, and he gets an inferiority attitude and that does no good. Don't do it. There are other ways of handling this problem without bringing in the word "shame," which creates the terrible inferiority which actually cripples men mentally, a great many of whom it cripples so badly that they become eliminated from the world. One of nature's eugenic movements is to get rid of the inferior. These persons seek solitude; they are self-reproachful, timid, not forceful; they are inadequate to handle delicate machinery. Many of them commit suicide. Many of them become criminals. "Nobody thinks well of me: why shouldn't I do as I want to?"

So if you are going to hold your job for any great length of time, you must be agreeable socially to the rest of the world, neither superior nor inferior. We have no great use for people too superior or too inferior.

Anger—Determination

The next instinct about which I will speak is the instinct of anger. This is a very wonderful instinct. The use of it is necessary for success, but as I said earlier, in the development of a child's character many of these instincts appear in an ugly way, and the fact that the child is high-spirited and irritable does not mean that you

have to crush him. Rather, you have to cultivate that instinct and make it useful.

Anger is aroused when the impulse of any other instinct is thwarted or baffled. We become cross when we are crossed. Anger is a reinforcing instinct. Feeling helpless brings it on. The unorthodoxy or non-conformance of others to our own standards or to the standards of our group provokes anger. We do not like to see advertisements in which capital letters are omitted just because it is "fawncy" printing. Do not do it. We like the orthodox and disapprove of the heterodox in other persons. We tend to grant to ourselves certain privileges to be dissimilar but we disapprove of persons who are not like the rest of us.

Pugnacity or anger varies, of course, in degrees and there may be every variation from rage to annoyance. The voluntary impulse is to destroy and the involuntary or bodily impulse is to put the body in fighting trim. You are placed in a fighting state the moment you are angry.

We are interested, however, in the voluntary impulse. This primitive impulse is to fight to the death—destroying the person who gets in your way. You want to totally destroy him, cut him to pieces, burn him up and bury his ashes in the sands of the sea and feed him to the birds of the air. Of course, all these things cannot be done to any one person but that is the way we feel. After a mortal combat the winner can rest and recuperate but he is pretty exhausted and "done-in." The penalty, therefore, in our modern civilization is that when we get in a rage it leaves us exhausted and "done-in" whether we have been in a fight or not.

This is understood when we consider the impulse and bodily changes associated with anger. The fists are clinched, muscles are taut, pupils are dilated, blood pressure increases, the face first flushes and then blanches, blood leaves the skin and the blood clotting substance in the blood is increased, the blood sugar goes up, digestion stops, sex usually diminishes and the enriched blood is available for the use of the muscles in fighting. After the period of irritability or anger has passed, the muscles lose their tautness and become flabby or tremulous, the eyes are wet, blood pressure decreases, blood sugar goes down and we feel exhausted, little wounds bleed long, digestion remains slow and other physical functions are sluggish. Insomnia often accompanies anger and the post-angry state.

It is a safe thing to say that baffled anger is sickening. The rule then for good health is "do not get mad unless you have a chance to fight." Sometimes we cannot fight. We cannot fight God, or the Fates or an absent enemy or an invisible enemy and particularly we cannot fight ourselves. Baffled self-anger may even produce a mental breakdown, as shown in the self-reproach of persons who talk for months and months at a time the same thing, reproaching themselves for past mistakes, melancholy, angry at every thing and with displeasure for all the world. Sometimes baffled anger dissipates itself in phantasies (p-h-a-n-t-a-s-i-e-s) of revenge which, of course, are destructive to the personality. It is important then that we associate the ability to forgive with this instinct of anger lest it make us sick. Many pacifists are either of the low blood pressure type or persons who have been angry and remained in a post-angry state for enormous reaches of time.

However, there is a very splendid use of this instinct. We said the primitive person tends to destroy whoever puts an obstacle in his path. The civilized person de-personalizes his anger and converts it into what we call *determination*. He is determined to get by, get under, or get around the obstacle. He keeps his mind on his main goal and is not disposed to attack those who interfere with his progress toward the goal. Persons with great determination are usually persons who had a great deal of primitive anger in their childhood. Without determination we cannot have success in the face of ordinary hardships. Determination does not make us sick like personalized anger makes us sick. On the contrary it is energizing. Persons with a great deal of determination should stay away from work when half-sick lest their associates see that these individuals have their weak moments. Persons with determination usually have the good sense to watch their own health carefully and to avoid indis-

cretions which would impair their health. Persons with determination, if they are also blessed with good judgment, are the ones who are most apt to have an annual physical examination to conserve the necessary health factors for determination.

There is a third form of this irritability which deserves some comment and that is the irritability from transitory pain. Persons who are more irritable than usual for a few days are usually sick or coming down with some sickness which may be characterized by such physical ailment as gastric ulcer, impacted molar or eye strain, etc. When irritable they become easily exasperated and accident-prone. A judicious foreman sends a suddenly irritable workman to the Company Doctor for examination rather than try to discipline him by "bawling him out" himself.

Aggression

The instinct of aggression is found in the male particularly, and its counterpart, coyness, is found in the female. The stimulant in the man is seeing or thinking of some preferred person of the opposite sex; his idea is to possess her and her idea is to surrender. He is aggressive and pursues her, overcoming such obstacles as might be in his way, and her impulse is to run away slowly with a "come-hither" glance backward. This impulse was very important in primitive days. Nowadays it is one of the bases for establishing a proper home. It shows itself in men socially in their masculine efforts like fighting for a trophy, or in baseball or other games. Too often the modern woman thinks that coyness and modesty are out of date but it is the properly coy and modest woman who is most respected and, if eligible, is the most besought. Men will fight for prizes, be it higher wages, better working conditions and they enjoy fighting in competition with each other or with different groups. This is a normal tendency and may be utilized in the evolution of social economic conditions or it may be misused in destructive revolution.

Jealousy

The instinct of jealousy is a human trait which was of greater value in ancient times probably than it is nowadays. It is based on the well-known triangle of two men and one woman or two women and one man. The idea of the two persons of the same sex is to eliminate each other and wholly possess the person of the opposite sex. It leads to anger at times, but, if that anger is baffled, it leads to a morbid state of mind. Its abnormality is that when a jealous person destroys his or her rival he may destroy the object of the jealousy and may even destroy himself or herself. We must realize that this is inevitable and rarely has anything to do with pelvic sex. It is found in most homes. If a mother has two sons, each is jealous of the other and strives to get the preferred place in her endearments. If a boy has two sisters, they will fight each other to be the preferred sister. There is an inevitable jealousy between mother-in-law and daughter-in-law and between father-in-law and son-in-law.

Sometimes there are racial jealousies: the Irish will stop fighting among themselves to succeed in demonstrating their superiority over the other workers at the plant who come mostly from some South European country. The trouble with this fighting from jealousy is that the fight is always unrestrained and often brutally dirty. In modern offices sometimes there is jealousy without any sex factor at all between the men employees, each seeking in his own way to demonstrate to the boss why he should be the preferred employee. I can only summarize it by saying that this instinct is properly used in building and holding the home together but it is socially awkward. A person is a fool to act in such a way as to discredit himself or herself.

Creative Instinct

This is pretty well or generally known. Stimulation is gradually developed or concentrated, and by steps may be listed as: any individual; of the same species; of the opposite sex; of approximately the same age; with preferential love; and the desire

for children in the children's own permanent home, with the approval of each individual and of society. The idea is to share mind and body and the desire for children. The emotion is love with tenderness. The voluntary impulse is to create mutually, be it children or a home or any conjoint project. The involuntary or physical impulse is pelvic sex. The abnormalities are most frequently immaturity or arrest of refinement of the processes of the stimuli.

For example, a great many persons fail to get over the hurdle of what we call "preferential love." The so-called Hollywood idea of preferential love is "I prefer you now to any other girl so let's go together." This is not preferential love. Preferential love means "I prefer you, dear, to all other women in the world put together. My love for you is over 51 per cent of all my love for women. I love you more than I loved all my other girls and my mother and my sister and my aunts and cousins and my future daughters, if any, and all other women that I have ever met or may meet." That, gentlemen, is preferential love and without that love the creative instinct never reaches its highest possible point and without that the human life never reaches its maximum potential fullness. The phrase "desire for children and the children's own permanent home" means a home where the children have but one father present, but one mother present and the children are full-blooded relation to each other and it does not mean polygamy. Civilization imposes many taboos, most of which are very helpful, but a few of which are sources of great distress.

This instinct is more largely mental than it is physical because the mental life of the individual dates from age three to, let us say, 73 whereas the physical phase of this instinct in life runs from 17 to 45 or 50 with some more vague extended periods beyond both of these ages.

Now the mental aspect of this instinct is creative work. Persons with a strong creative tendency must sublimate. They usually must sublimate about every two or three years. By sublimate is meant indulge in creative work which also must have, to be successful, all of these three postulates: (1) It must be self-selected and not assigned by others. (2) Sublimation must permit the individual's planning or sharing in the plans of this sublimation work. (3) Sublimation must permit of the individuals executing, or at least share in part in the executing of these plans. The work must be creative, often beginning at nothing and developing the idea into its fruition. Sublimation must lead to something which is visibly demonstrable to the individual and to others. Sublimation is not maintenance work like darning stockings or washing dishes and it is not drudgery. It may be making a new dress, not in buying a new dress; it may be in creating a Safety Council; it may be in writing a book or designing a building or forming an American Legion Post or a baseball team. There are countless forms of sublimation. It is the proper outlet of the creative impulse.

Now it is the duty of well disposed persons to permit and encourage sublimation in others. An assistant superintendent, when he sees a workman and has time to visit with him for a few minutes, if he is bright and humanistic, will say, "How is that fine big girl of yours? Is she playing basketball this winter?" and he encourages and expresses his approval of the man's natural creative instinct. He should, with equal propriety when he meets someone engaged in a sublimation, say "How are your plans getting along to fill in the old quarry and make a parking place that you told me about at our summer conference?" Sublimations are to be permitted and encouraged.

Social or Herd Instinct

There is a human tendency to be with other humans and form herds and sub-herds. We crave companionship, and are uneasy if alone but satisfied if in groups. The desire to be with others is so great that we will make great sacrifices to live with others; we sacrifice many ideas so that we may continue to live with others and have them welcome us and permit us to stay with them. Naturally or subconsciously we

tend to seek the companionship of persons who have similar ideas to ours. Persons of various races tend to congregate together; persons of the same religious denominations tend to group together; persons of the same economic status arrange to live in neighborhoods where they may be near others of their own kind. Persons with an interest in art or safety or the Republican party or persons who have shared experiences together tend to form sub-herds. The human soul is lonesome. We are lonesome all of the time; twins are lonesome. Lovers are lonesome and even on a honeymoon the limitations of human speech in contrast with the ability to think more rapidly render impossible the fullest or most desirability of companionship and exchange of ideas. Friendship is one of the most beautiful of human attributes. The most severe human penalty is ostracism:—"Put him in solitary confinement and be damned to him."

Now in order that a group can live together they must not sacrifice individuals and they must permit individuals to prosper for the sake of the individual concerned and for the sake of the social group. Therefore, there are certain standards of conduct in the United States. One is the New England Code. This code remains almost unaltered although practically every racial group coming as immigrants to this country has tried to modify it by impinging upon it its own cultural ideas. At the present time certain persons are trying to get us to abandon the New England Code for the Russian Code. We do not worry about this because we realize how futile it all is.

I think it is of first importance that an individual have a bank account for security of a kind, a church account for the security of one's immortal soul, and educational account for security of its kind, and a friendship account. Now in education there are two forms—the formal such as we learn in school and the tribal for training the child in the customs of the group. The group tends to eliminate or tends to permit the elimination of persons who are unorthodox as judged by group standards. We permit an individual to be unusual or different but we do not want to see him abnormal in several ways but only in two ways. If he has more than two unusualities we regard him as eccentric, and distrust his judgment on everything but give him enough rope to hang himself. If he has two unusual characteristics and either or both of them are exaggerated to a great degree, we call him insane and lock him up. On the contrary if the individual has certain profound limitations which are obvious to the rest of us, such as blindness, or the loss of an arm and so on, then society will permit him to exist and will compensate for his shortcomings assuming, of course, that society recognizes these handicaps as genuine. It is, therefore, of great importance for an individual to determine to conform to the standards of his group.

It is abnormal for an individual to try to make people believe that any sub-group is more important than the total herd. For example, one can almost describe a man by naming his sub-groups. If I say that a man belongs to the Rotary, Masonic Order, St. Andrews Episcopal Church, Gary Country Club, Illinois Steel Company, The Every Other Saturday Night Poker Club, Union League, Republican Party and lives on Euclid Avenue in the Riedell Subdivision, and so on, you have a pretty good picture of the man. Now he is quite normal until he gets the idea that every one should take up golf, or join his church or vote his party and so on: we regard such a person as an intolerant eccentric and tend to ignore him.

Labor Unions are inevitable and have their proper sphere in life but they are only sub-herds and must submerge themselves for the benefit of the larger group from society or else they will be ignored and may be exterminated.

We should encourage and guide the development of sub-herds such as safety teams.

Acquisitive Instinct

This is the business man's instinct and has its proper and noble sphere in life just as much as theology, research and law are important and have their proper sphere in life. This instinct is aroused in persons who perceive movable or removable objects

which may be acquired. There is a satisfaction in possessing things. This instinct appears also in the life of an individual as a little child who first picks up everything he wants and is permitted to do so because they interest him. Next he tries to make use of them. He continues with this tendency to acquire things as he goes along but suddenly folks tell him he is stealing and it takes him several years to learn that it is all right to acquire things provided he meets certain rules, namely that he openly ask for and receive permission, or that he give something in exchange of approximate value, which is his to give, or that he earn them openly. My objection to stealing is that the individual cannot keep what he steals for all society tries to take it away from him. Whereas if he gets things within the rules of society and shares them within some reason, such as taxes and some minor generosity and does not make misuse of them against the general welfare of the public, then all society tends to help him keep his possessions. This instinct of acquisition within the rules shows itself now in two main ways: (1) acquiring property (2) acquiring ideas. This era in which we are now living may be described as the era of non-destructive rivalry of big business. In other words, it is the era of the instinct of acquisition. Many eras have been characterized by the predominating instinct, such as the 15th century was the era of exploration or the era of the instinct of curiosity. I believe we are approaching the era of "Service without Sacrifice" which will be where the instinct of tenderness is enthroned and that is why I foresee such a permanently good future for this Safety Movement.

Constructive Instinct

The last of the instincts which we will discuss this morning by this classification based on McDougall is the instinct of construction. This is aroused in the mind when one observes objects which can be piled up or built together in some manner.

This differs from the creative instinct in that the constructive instinct is aroused by things at hand whereas the creative or sex instinct begins with invisible things such as ideas or physical processes within. Peculiarly enough, the ambivalent phase of this constructive instinct appears first in the life of each individual as it appeared in primitive people, namely in an impulse toward destruction. Little children and primitive folks destroyed things which were of some use. Mature persons in civilized races are constructive.

Now I want you to realize that it is impossible to plan the construction of anything perfect and have your plans perfectly executed. Other persons must share in your plans and in their execution and they will have their own ideas and you must permit them to have them. It should be sufficient for you and should bring you satisfaction then if your own ideas are carried out 50 to 60 per cent or more. You must not be too painstaking; you must not be like the puttering inventor who for the last 22 years has been "perfecting his invention" but has not yet put it into quantity production. If a thing is good and succeeds that should be a reasonable goal. The Irish philosopher said "Perfection is finality, finality is death, there is no perfection in this life. There are flaws in it."

This constructive instinct is the basic instinct in engineers and in a great many strong men. Probably to this instinct more than to any other in our ancestors the world owes its present comforts. It shows itself best in building those things which not only help the present generation but which will help future generations. Building with ideas and constructing organizations are splendid examples of this pleasant instinct.

The point of all this is that each instinct has a proper use. Do not be ashamed of having these characteristics in yourself nor try to stamp them out. Cultivate them, for too much, or too little, of the instinct appearing at the wrong time, is disastrous.

Friday Morning Session

October 16, 1931

LECTURE NO. 4

Evolution of the Personality, Well Integrated, Heedful of Its Own and Society's Welfare and of All Reasonable Rules, Including Safety Rules

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This is the fourth and last of a series of more or less informal talks on healthy thinking versus accident risk in which I have tried to leave out all abnormalities of psychology or psychiatry, but to draw lessons therefrom to help normal persons.

Supplementing, first, some of the things which were mentioned yesterday, and answering some questions given to me, I will say that there is a certain form of irritability which is not anger but is fretfulness which results from pain. Persons in physical pain especially, and persons in mental pain also are irritable. This irritability probably will last as long as the painful state endures. Punishment does not help such persons. It may be a grumbling, impacted molar tooth. It may be chronic appendicitis, need for glasses, the pain of loss after a bank failure, or things of that nature. We must be rather forbearing with these irritable persons until we can remove the source of the irritation.

I was asked, further, what is the best modern use of this out-of-date instinct of jealousy. The proper use of that instinct is loyalty. The ordinary conception of being loyal to your superiors is half right. We should be loyal down as well as loyal up; loyal to the best interests of the persons below us in the factory or shop or Navy Yard, or what not, as well as loyal to our superiors.

It is amusing to recall many funny episodes that happened during my tour of duty as a medical officer in the Navy. I was so loyal to the gobs working for me, those who of course were almost overwhelmed with their duties, that I spent a great deal of time getting them out of their own troubles. This is not the time to tell yarns, but I assure you that when I was loyal to their best interests I got great co-operation from them.

I have been asked what causes one to fear looking down from a height, and is it curable? Fear is the earliest of all these innate tendencies or instincts to appear in the life of the individual, and it appears as early as when the baby is three days old, probably because it appeared early in the evolution of the human race when our ancestors had to live in the tree tops to keep out of the swamps, to keep away from enemies, hostile to human welfare. A little baby three days old taken asleep from his mother by the nurse back to the nursery after he has been fed, if lowered gently into the crib, stays asleep, but if the nurse lowers that baby rapidly the baby wakes up, squawks and clutches. We are all afraid of high places. It is a normal thing; it is not abnormal. Therefore, it is not curable. The lesson is that when we are in high places we should be particularly careful to be secure.

The stimulations for the creative or sex instinct may be classified normally as follows:

- I. Any individual
 - A. Same species
 1. Opposite sex
 - a. Approximately the same age
 1. Preferential love

- a'. Desire for children in their own permanent home.
 - b. With individual and public approval

Let me explain that. As the individual grows up he is interested in all the world. Finally, he becomes more interested in people of his own species than he is in dolls, dogs, toys, and so on, and interested particularly in some one person, that being the mother of course in infancy.

Later his interest becomes more specialized as a little child, and his love life centers then more around persons of the opposite sex. Many persons stop the development of their personality along this line at that place. When we see a young man at a party making great effort to bring a cup of tea and a clean napkin, and so forth, to some white-haired lady chaperon instead of buzzing around his own girl, we know that he has not developed to the point where he prefers people of his own age. A great many marriages are unhappy because the individual still loves a parent more than he does his mate.

The next point is preferential love, and a great many persons in their maturity do not attain this. Preferential love does not mean the Hollywood type, where I love you more today than I loved her last week. Preferential love means I love you more than all other women put together, or all other men put together. It is fifty-per cent, or more, per cent. It is not in preference to some one other person. When we get to the state of preferential love we have very strong home ties.

The further development of this instinct is to have children, not many children in many homes, but children in their own permanent home. When an individual attains that height in the development of his instinct, he is a standard, splendid citizen.

There are very few abnormalities in this instinct, except the abnormality of immaturity. Most persons do not finish evolving to full maturity.

The important thing for you is this: that both officials and workmen should be encouraged to develop this characteristic to its maximum height. You should take an interest in the home life of the workman if you are trying to prevent accidents in their lives. Ask them about their fine boy. Ask them about their tall, big girl, or what not. When their home life is normal, they are not so prone to be doubtful and indecisive, because abnormality in this instinct causes indecisions and doubts and uncertainty.

When there is no normal opportunity for pelvic sex life, it is incumbent upon the individual to sublimate mentally. Sublimation is selecting for oneself some new interest which will engage his attention part of the time, an interest which will permit him to plan or at least to share in the planning thereof, and which permits him to execute, himself, or to actually share in the execution thereof. Designing and building a motorboat, making a garden, writing a book, creating or building up a strong safety movement in a certain factory, starting or increasing a Parent-Teacher Association in her child's school, inventing a new golf club—these are some examples. Maintaining something existing is drudgery, not sublimation—for example, washing dishes or mowing the lawn; and repairing things which have become worn or broken, like darning stockings or changing spark plugs—none of this is sublimation. It must be self-selective, creative, planful, practical work which can grow and where the results will be obvious to the individual and to others. The pattern which sublimation imitates is the planning and constructing of a home, family, house, and home life.

I have been asked how does one develop a superiority attitude within reason, of which we spoke. There are some things we can actually do besides stopping making comparisons; other things we mentioned in our first lecture. One is to improve the health. The second is to make use of early morning hours for self improvement. Other things being equal, a time of day comes when we have to indulge in group effort for group success. Prior to that, you have an hour or so, if you discipline yourself to get up around five, or what not, for self improvement. That is the time to study, because memories laid down then are more fixed than memories laid down by study of an evening, because sleep tends to wipe out what you have last learned.

Biologically, what are the proper hours for activity? A man should work or be active from daylight to dark. The five-hour-a-day idea is the bunk biologically. A woman should work as long as she is awake, whenever she is awake. (Laughter) Part of that work should be for self advancement, part for group duties, part for pleasure, and so on, but there is no proper time in the human life for inactivity.

How further can we develop this superiority attitude within reason? By doing as much good as you can in the time that is permitted you to work, and not working within the limitations of your pay, because the personality grows as it appraises its own work as good work well done. "I've done my best."

Now for today's talk on the evolution of the personality. Yesterday we went through certain tendencies all people have. How do these things fit together?

Four Planes of Conduct

First, let me say I believe there are four planes of human conduct to which we react:

1. Pleasure—Pain
2. Profit—Loss
3. Approval
4. Right.

We first react to the pleasure-pain level, and we do those things which will give us pleasure and avoid those things which will bring us pain. The psychiatrist differs from the psychologist in a few things. The psychologist says the personality should evolve from its lowest plane to the high, the higher, and the highest. I say no. I say all our life we should be able to react to any of these planes. We should be able to step back to a simpler plane of life. We should never outgrow the desire for pleasure; never outgrow the desire to avoid pain. That is the basis of physical hygiene, isn't it? And we know how important that is. We have a right to do things which will bring us pleasure, but we have no right to do those things which bring us pleasure if they hurt someone else.

The second plane of conduct is the business man's plane, the plane of profit and loss. He does those things that will bring him profit. He avoids those things which he thinks will bring loss. That is a noble, proper and dignified plane of conduct in business circles.

And it is important that you have a geographical conscience. One should have a geographical business conscience. I mean to say if I were down in the Ghetto trying to buy some Russian bronzes, antiques, and paid the first price asked me, all the merchants down there would think I was a simpleton. But if I were to go to Field's and try to haggle down a price on something they had for sale, they would think I was a simpleton. My business conscience must be in accordance with the place where I am. We must adapt to local conditions.

The third plane is a plane which we indulge in in our personal life a great deal. We do those things which we believe will merit public approval if known, and we tend to avoid those things which will bring down on us public disapproval if known. That is the way we live at home, but in business if we do those things which would bring us approval and loss, we had better stick to what would bring us profit.

Let me give an example. Suppose I was a merchant selling green vegetables, and so on, in a highly competitive market. I owed a man some money, and he continually forgot to send me a bill. I eventually came to the conclusion that he never was going to remember it. According to business practices, it is my profit if I do not remind him of it.

On the other hand, suppose that around January 15 the vestrymen forgot to send me the pew rental bill for church. It is my business to look him up and pay it. In our domestic life it is important to do those things which merit us approval, even if they cause us some loss. In case of doubt, it is advisable to err toward the higher plane. I believe that is the growing tendency of modern business—to prefer to do

what merits approval even at the expense of some profit. The greatest store in the world has as its motto, "The customer is always right."

The fourth plane of conduct is to do what is right irrespective of pain, profit or loss, approval or disapproval, and most of us do those things several times in our lives. I know of no one who can adhere to the fourth plane. Wilson did, I think, at the time he realized the people would repudiate him at the time he brought home his beautiful vision of a real League of Nations, but he did what he thought was right. Editorial writers occasionally do what they think is right. We do, occasionally. We must not be critical, then, of persons who act on one of the lower planes. You should be able to react on any plane, when the occasion warrants.

Answering a question that was brought up in the discussion in one of your meetings, it is quite proper, in the case of a man who is careless, to inflict pain on him to make him more careful, provided that when he becomes careful you give him an equal amount of pleasure. That is, to publish a list, if you wish, of the men who have caused accidents in your company. It brings him embarrassment and chagrin. It is painful, but it serves him right. We use pain as a whip these days, and we should, even the pain of death as we read in the paper this morning.

Irregular Maturity

An amusing and perplexing thing is that as people grow up they grow up very irregularly, and as men in your employ get older in the company they get mature irregularly. Maybe in some ways they are far ahead of the rest of their personality characteristics. You must expect that, irregular maturity in persons.

From a practical viewpoint, what are you going to do about it? You must indulge in habit training, rehearsals, fire drills, life saving drills, and so forth, because that will compensate for the immaturity in some characteristics of these individuals.

Conflicts

Every individual as he grows up is in conflict. He is in conflict with himself, and that is painful, as we have discussed, and he is in conflict with the world. We do not like our superiors. Children do not like adults. There is a little petty war on all the time. Oh, eventually we get benign and pretty old.

It has been mentioned to some of you that persons feeling so humble deliberately get themselves in accidents in order that they may become important. I think that is a very rare thing. It does occur. We call those cases S. I. W. — self-inflicted wounds, and we find it only in inferiors. The normal person does not get himself in trouble to become important. The inferiors may.

But we are in conflict. Men should fight; it is good for them, and we must expect it. You should not fight so hard but that you can quit fighting to pick it up another day, and without your having abolished your good old enemy. You must expect strikes. It is normal for persons to gather together in groups for fighting. All our lives we are in conflict, and we don't like the pacifist, the quitter, the swamp-liver, and the low-lander. We like persons who have some aggression. It makes them hard to handle, and it is good for us.

One should fight to advance his own self interest. We do not attach much glory to the idea of self-sacrifice in ordinary times for ordinary things. In emergencies like a child falling off a bridge into the river, or war, yes, self-sacrifice is called for. I think there should be a happy medium between selfishness and self-sacrifice. This is a very much debated point. I am not sure I am right, but I think it is something like this: that the normal person says, "After me, you are first."

For example, if a train was coming through the station and I looked through the windows and saw there was one seat, I probably would step up a little bit trying to be opposite the door of the car as it opened, step in and get that seat so

I can continue to do my daily work refreshed from the ride. But I would not shut the door behind me and leave the other passengers on the platform out there. I wouldn't say, "Me first, and you not at all." If I were tired and had a heavy evening's work ahead of me, I certainly wouldn't step aside and let all the rest of the world go through, and be lucky to find a strap. "After me, you are first. I won't hurt you, but I am not going to give you an advantage over myself." "I must look out for my own interests first." We are coming back to that point again, "I won't hurt you."

Era of Service

It is interesting to watch and review history and see which one of these instincts was the predominant one from time to time. The instinct of curiosity was predominant at the time of Magellan, Columbus, and other explorers. Different instincts predominated at the time of the Crusades, at the time of the great expansion of the Roman Empire. The era we are in right now, it seems to me, is the era of big business in non-destructive rivalry. Sears, Roebuck could borrow money from Montgomery Ward if it needed to. We are in non-destructive rivalry. One bank will help another.

The era we are approaching is the era of making profits by service, not making profits by force, by taking property away from the weak. Those firms, those industries which serve people and prosper in doing so have a permanent prosperity. They build up no enemies. They build up friends, and that is true with the individual. The man prospers best nowadays who is of service to others without hurting himself. You see that puts the stamp of approval on such movements as this safety movement. We are being of service to other persons and not taxing them unduly for it.

Team Work

In business team work, mentally, there are three stages of cooperation:

1. Obedience
2. Discipline
3. Indoctrination.

Obedience means the obeying of orders when orders are given. If you obey them very well you get a little more reward, and if you obey them poorly or defy them you are punished.

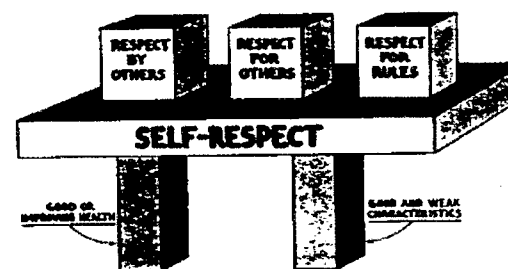
The next higher state in life is that of discipline. A disciple is a follower. Discipline means setting an example and following an example set. That is what you are doing largely in your safety work. You are giving orders that must be obeyed, and also you are setting an example.

Among yourselves, high-grade safety engineers, you can indulge in what we call indoctrination. Indoctrination means that we have discussed in advance all the possibilities of what might happen and what we should do under the various circumstances we have considered, so that when such-and-such things come to pass no orders need to be given and no examples set; everybody knows what he should do. The fleet has gone over its battle plan so often that if they become engaged with the enemy, whether they are nearer the sunrise, whether silhouetted, whether it is a clear or foggy day, whether the seas are high or low, even if the flagship goes down, they know what they should do with no examples set and no orders given. That is indoctrination. Do not expect men not of high-grade intellect to indoctrinate with you; they cannot. You have to prepare your orders in advance, what should be done under such-and-such circumstances. Only the highest type persons can indoctrinate. In the Army, officers usually attain the rank of Lieutenant-Colonel before being taught indoctrination.

Indignation

There is room in the world for group hate expressed in a sensible, not riotous form of group—moral indignation. It is a very useful thing in our civilization. The clever person is able to put his indignation away, as in a meeting when he says, "I move to lay it on the table, and take it up at the next meeting as a regular order of business," and then when the proper time comes become indignant all over again, full force. The less high-grade individual gets indignant and boils over, and about a week or two later when it is time to take it up with the vice president, or what not, he is all calmed down. Indignation is a forceful thing if you use it when you need it.

Indignation is not so well expressed in writing. It is best orally. Moral indignation which benefits yourself is not well received. That is why we do not fall for



The Chart of Self-respect

certain foreign propagandas: Help the workers; help the masses; throw off your chains so we may be free. That type of moral indignation does not carry much weight in the world at large.

Moral indignation against laws that hurt others, if forcibly and repeatedly expressed, have great force in our community. We listen, but we do not listen so much to your ideas as we listen to the punch behind your ideas.

Respect and Self-Respect

Probably the most important thing in the evolution of the personality may be illustrated by this chart which my friend has been kind enough to draw for us.

I would have you imagine a capstone resting on two pillars. This is the goal we try to achieve in those who are dear to us and who are younger, and whom we are bringing up in our homes or in business—self-respect. We have been able to analyze this with the same exactitude, I believe, that the chemists analyze the components of steel.

Self-respect is based on two things acting together. Neither one would hold it up alone. The first is good or improving health. We do not find self-respect in persons whose health is decadent, nor in persons whose health has always been wretched.

It is not your business to know medicine. That is ours. It is your business to know hygiene. As a minister once said, "It is not your business to know theology;

it is your business to know a code of ethics and live up to it. Let us theologians worry about the intangibles."

Good or improving health. I want to fix the responsibility for every person's health on himself, and you should too. If you have a grumbling tooth, or one of your workmen needs glasses, it is the individual's business to see that his health is improved. We tell a child or young workman or one recently promoted to a higher position or office that he himself is responsible for his own health, guilt, failure or success, but behind his back we modify those influences which are modifying him so that he may grow, develop, and make good. Good or improving health means the avoidance of those physical things which are destructive to the health—drinking too much bad liquor, for example; too sedentary an existence; not enough golf or play.

The surest way nowadays, with our present state of mind, to insure that a person has reasonably good or improving health is the annual physical birthday examination. It is the fad nowadays and has been for ten years, and really has a great deal of merit in it. I recommend it heartily.

The second thing which is the foundation for self-respect is an honest self-evaluation; that you know your good and your weak characteristics honestly. You know whether you are too curious, or too little; whether you are too irritable, or too little; too fearsome, or too little, and so on. We took up these various points yesterday. When you honestly size yourself up, don't tell anybody. Don't go around telling about your weak characteristics.

It says some place that the meek shall inherit the earth. That must be in another earth and another form of existence, because it never happened with human beings. It must have been said by a very meek person and was his daydream. Don't go around saying how good you are because—well, maybe you really are not. But yourself you should know. Try to correct your weak characteristics some. Accentuate your good points to make them more useful and less hurtful. Knowing your own shortcomings, one should take a common sense or philosophical attitude in frankly facing one's limitations and weaknesses and the inevitable vicissitudes of life involving himself and others.

When an individual honestly knows himself, and really has good or improving health, he automatically becomes self-respecting.

I heard a proud woman say, "I demand respect wherever I go."

I said, "Madam, you do." But she didn't *command* it; she demanded it. She was very unpopular, and they sent her away.

When an individual is self-respecting certain things automatically follow, and the first is that he is *respected by others*. Do you know anything sweeter, in relation to the public outside your family, than to be generally respected? I do not. To be respected by others brings enormous rewards to the personality. It is worth the effort.

The second thing is that we have *respect for others*. The tiny, non-self-respecting persons, the petty criminals, malingerers, male and female, are those who have no respect for anyone. We know they have no respect for themselves, and that is why. That is why you cannot correct certain types of petty offenders. It has been tried by the good people, and it does not work. The Salvation Army gets at it better than anybody else. A man may be down, but God alone knows he is never totally out. He still has some germ of self-respect. They feed him some coffee and begin to build him up so that eventually he will have respect for himself and respect for others and become a citizen. It is great.

The third point we are particularly interested in this morning is respect for rules. When an individual is self-respecting, because his health is good or improving, and he honestly knows himself, *he has respect for the rules of others*, for the laws, the moral code, the rules of business where he is employed, the conventions, and for the safety rules we are giving him to save him. Until your workman is properly self-respecting, you will not get him voluntarily and eagerly respecting and obeying the rules. You might make him by fear. You might give him mechanical safeguards and safety

shop practices. But the way to make your men fit in your program is to build up in them self-respect.

This means that the individual must stop doing what he knows is wrong, or naughty, or wicked, or deceitful, or underhanded, or careless, or cutting corners too sharp. A man cannot continue to be self-respecting and grant himself some private vices which he intends to keep on with. He must make an effort to stop doing those things which he knows are wrong; and I fix the responsibility on the individual for it.

They say that guilt is personal. That is a political credo nowadays, ever since the oil scandal. It is a good idea. It has some errors in it, but it is a good idea. You must focus on the individual himself. His is the responsibility for stopping what he is doing which he knows is wrong in order that he may maintain his self-respect, live up to the rules, and protect himself.

I told you earlier that we should never let a foreman tell a workman he should be ashamed of himself for making a certain mistake, and the reason now is apparent, that when you tell a person to be ashamed of himself you are undermining one of the necessary props for self-respect, and he does become ashamed of himself.

And as a man can largely select for himself what he will and will not do, so he can largely select the environment of his own mind in what he reads and hears and says. It is better to feed the mind on good things, wholesome things, than on mental garbage and condone bad mental habits which undermine self respect.

Society's Demands

What are the demands of society on this well integrated person who has a lot of peculiar things in his make-up, funny mental habits, the vagaries we discussed, who is possessed with a lot of ancient instincts which do not civilize very well, but who finally, we hope, becomes self-respecting? What does society demand of this person?

Society's first demand is that the individual be *respectful and respectable*, just where we left off. Second, that he be *agreeable*. An agreeable person is one who agrees on unimportant things, like the weather, whether it is going to rain or not, or some other thing like that. You may disagree on important things where you speak ex cathedra, from the office—officially, but on ordinary things be agreeable. If you are not, you will be crushed. We won't put up with disagreeable folks. We sort of wait until they are down, and then we kick them.

The third thing that society demands of persons who are agreeable and respectable is that they be *reactive*. We want persons to react. We do not like the dull, seclusive, Molly-sit-by-the-fireside type of dumb, non-reactive persons. Somebody says, "Let's go to see 'Green Pastures,'" or something else. The proper thing to say is, "Yeah, let's." You haven't committed yourself. The idea you have committed yourself to is "Let's do something," and you might end up at a movie or something else. But be reactive to social stimuli.

The fourth thing that society demands of a person is that he be *productive*. It is not sufficient that they work only to support themselves, because in so doing they may hurt others. They must produce something of public use; be productive. When persons are respectable, agreeable, reactive, and productive, we honor them, especially if they remain within the orthodox code and most especially if they are humane or humanitarian.

New England Code

This is a peculiar country. We differ greatly from our neighbors in the North and South, and we differ greatly from the countries in Europe. The code in this country is the New England Puritan code. Although a great many nationalities came over here early and started their own culture, the gentlemen of Baltimore, the Dutch at New York, the Swedes and the Quakers, Pennsylvanians, and so forth, only the New England code has had the virility to be passed on generation after generation. It is a hardy one. It is a stern, strict code, and every group of persons from any nation who have come over here and who have failed to accept that code have perished and

been pushed aside, and every group that has succeeded has succeeded only by accepting the New England code. It is so hard that none of us can quite live up to it. You must be strict with yourself. You must be strict with others, but particularly with yourself. You must be honest, honest in saying where things are right and where things are wrong. You have a right to punish, but you must reward. You must pay your debts, and you cannot escape by running away. You must be orthodox. We do not want a lot of freaks around. We let them move to Connecticut, or some other place. That was long ago. You must be orthodox.

Let's apply that last point for a moment. Society will permit you to be different from the rest of us in one or two characteristics only, and that is all, gentlemen; that is all. If you are an ardent tennis fan and a person enthusiastic about Boy Scouts, that is all they will let you do that is different from the rest of us. You may not take up theosophy or homeopathy, communism, color photography, freak clothes, or go without hats in the wintertime. We only permit persons to vary from the orthodox standard in one or two characteristics. If more than that, we push them aside as a snow plow shunts snow. That is the New England code. You must be orthodox.

I will tell you that if you cannot be as orthodox as demanded of you, it is your duty to say so anyhow to help other persons. You must say honesty is the correct thing, even though you are a little back in some of your own debts. We must help other persons to live up to this stern New England code.

This safety movement is exactly in accordance with that. It is emphasized in this one fraction of that code: *You must do nothing which will hurt yourself or others*, and I think you should demand it of others. The public will receive that idea and will not quarrel with you.

Conclusion

In conclusion, I believe mental hygiene, sound and practical, ought to be related to safety councils and to foremen groups. It is one thing for you people to know; it is another thing to get the knowledge where it will do the most good.

I believe that clear, honest, self-disciplined thinking constitutes healthy thinking, and healthy thinking means fewer mistakes and of course greater safety.

I want to say that I appreciate the opportunity to be here and I appreciate the attitude of the audience, so attentive and interested and cooperative, more than I can express. It has been a great pleasure to address you.

(Editor's Note: Because of the interest aroused by these lectures it is possible some members of the Council may want to secure the services of Dr. Hulbert. He may be reached through the National Safety Council, 20 North Wacker Drive, Chicago.)

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Accident Prevention Equipment Manufacturers' Section

Officers 1930-31

General Chairman—HOWARD B. FONDA, Burroughs Welcome & Co. (U. S. A.) Inc., New York City.
Vice-Chairman—L. E. DICKSON, Standard Safety Equipment Co., Chicago, Ill.
Treasurer—C. A. PARTHENHEIMER, American Optical Co., Chicago, Ill.
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Publicity Committee Chairman—R. T. SOLENSTEN, Elliott Service Co., New York City.
Safe Practices and Codes Committee Chairman—J. M. LEWIS, Mine Safety Appliances Co., Pittsburgh, Pa.
Executive Committee: Members at Large—
 EDWARD H. SYKES, Mine Safety Appliances Co., Pittsburgh, Pa.
 GEORGE S. SHULL, Safety First Supply Co., Pittsburgh, Pa.
 E. W. BULLARD, E. D. Bullard Company, San Francisco, Cal.
 E. FRED SHIPMAN, Industrial Products Co., Philadelphia, Pa.

Business Session

October 11, 1931

HOWARD B. FONDA, Chairman

Burroughs Welcome & Co. (U. S. A.) Inc., New York City

The annual business meeting of the Accident Prevention Equipment Manufacturers' Section of the National Safety Council was held in The Hotel Stevens on the evening of October 11, prior to the Twentieth Annual Safety Congress, General Chairman Howard B. Fonda, presiding.

Committee reports were presented by R. T. Solensten, Elliott Service Company, New York City, chairman of the Publicity Committee; by F. Rutledge Davis, Davis Emergency Equipment Company, New York City, chairman of the Better Business Relations Committee; by E. L. Wheeler, F. H. Wheeler Manufacturing Company, Chicago, chairman of the Program Committee; and by C. A. Parthenheimer, American Optical Company, Chicago, treasurer.

I. W. Millard, Industrial Gloves Corporation, Danville, Ill., presented the report of the Nominating Committee, naming the following officers for the coming year:

Chairman—LAWRENCE E. DICKSON, Standard Safety Equipment Company, Chicago.

Vice-Chairman—R. T. SOLESTEN, Elliott Service Company, New York, N. Y.

Treasurer—FREDERICK WAHLANT, Puknosan Safety Equipment Corp., Brooklyn, N. Y.

Secretary—E. L. WHEELER, F. H. Wheeler Mfg. Co., Chicago, Ill.

Upon proper motion, made, and carried, these officers were duly declared elected.

At a later meeting held Friday, October 16, General Chairman L. E. Dickson announced the appointment of chairmen of committees and members of the executive committee, as follows:

Better Business Relations Committee—F. RUTLEDGE DAVIS, Chairman, Davis Emergency Equipment Co., New York, N. Y.

Membership Committee—GEORGE S. STULL, Chairman, Safety First Supply Co., Pittsburgh, Pa.

Exposition Committee—I. W. MILLARD, Chairman, Industrial Gloves Corp., Danville, Ill.

News Letter Committee—J. H. REID, Chairman, Chicago Eye Shield Co., Chicago, Ill.

Publicity Committee—R. T. SOLESTEN, Chairman, Elliott Service Co., New York, N. Y.

Executive Committee: Members at Large—

H. W. MOWERY, American Abrasive Metals Co., New York, N. Y.

HOWARD B. FOXNA, Burroughs-Welcome & Co. (U. S. A.), Inc., New York, N. Y.

ED. H. SYKES, Mine Safety Appliances Co., Pittsburgh, Pa.

BURLE W. NUTT, Safety Equipment Service Company, Cleveland, Ohio.

C. A. PARTHENHEIMER, American Optical Company, Chicago, Ill.

FRED H. KLEIN, Wilson Products, Inc., Reading, Pa.

Accident Prevention Equipment Manufacturers

Who Made Exhibits at the Twentieth Annual Safety Congress, The Stevens Hotel, Chicago, October 12-16, 1931

Abbott Laboratories, North Chicago, Ill.

Pharmaceutical products and first aid specialties.
American Abrasive Metals Company, New York City.

Safe walkway materials.

American Ladder Company, Chicago, Ill.

All types genuine Miller-Built safety ladders.

American Optical Company, New York City.

Industrial head and eye protection.

Automatic Signal Corporation, New Haven, Conn.

Traffic actuated signal controls, traffic counters.

Bauer & Black, Chicago, Ill.

Surgical dressings and first aid kits.

Robert A. Bernhard, Rochester, N. Y.

Saf-T-top applicator bottles and Saf-fast liquid adhesive.

Bradley Washmountain Company, Milwaukee, Wis.

Group washing equipment.

Stewart R. Browne Manufacturing Company, Inc., New York City.

Portable safety lamps.

R. H. Burke Company, Chicago, Ill.

Safety belts, straps, buckets, tool guards.

E. D. Ballard Company, San Francisco, Calif.

Everything in safety.

Burroughs-Welcome & Co., (U. S. A.) Inc., New York City.

First aid, medical equipment and surgical dressings.

Chicago Eye Shield Company, Chicago, Ill.

Head and eye protection equipment.

H. Childs & Company, Inc., Pittsburgh, Pa.

Safety shoes.

Chippewa Shoe Manufacturing Company, Chippewa Falls, Wisc.

Work shoes, boots, safety shoes and Gardtoes.

Cleanliness Institute, New York City.

Cleanliness—Personal and Industrial—Its effect upon the worker and employer.

Clements Manufacturing Company, Chicago, Ill.

Clements Cadillac portable blowers.

Thos. E. Collins & Company, St. Louis, Mo.

Waterproof fabrics.

Davis Emergency Equipment Company, Inc., New York City.

First aid and safety equipment.

Dudley Lock Corporation, Chicago, Ill.

Dudley pick-proof keyless padlocks and locker locks.

D. A. Ebinger Sanitary Manufacturing Company, Inc., Columbus, Ohio.

Sanitary equipment for offices and factories.

Elliott Service Company, New York City.

Bulletin board display services.

Finnell System, Inc., Elkhart, Ind.

Electric floor scrubbing, waxing, polishing and water absorbing machines and auxiliary clean floor equipment and supplies.

Hanovia Chemical & Manufacturing Company, Chicago, Ill.

Ultra-Violet Ray equipment, scientific research for hospitals and homes.

Harley-Davidson Motor Company, Milwaukee, Wisc.

Police motorcycles, sidecars, radio and other police equipment.

Holcomb Safety Garment Company, Chicago, Ill.

Industrial safety clothing.

Hynson, Westcott & Dunning, Inc., Baltimore, Md.

Mercurochrome, a universal first aid antiseptic.

Industrial Products Company, Philadelphia, Pa.

Industrial accident prevention and first aid equipment.

Iodine Educational Bureau, Inc., New York City.

Iodine, and its relation to first aid.

Jewel Emblem Manufacturing Company, Inc., Chicago, Ill.

Badges, buttons and trophies.

Johnson & Johnson, New Brunswick, N. J.

Surgical dressings and first aid kits.

Justrite Manufacturing Company, Chicago, Ill.

Oily waste and safety cans.

Walter Kidde & Company, Inc., New York City.

Lux carbon dioxide fire extinguishing equipment.

Mathias Klein & Sons, Chicago, Ill.

Linemen's and electricians' tools.

Lehigh Safety Shoe Company, Allentown, Pa.

Safety shoes.

Libbey-Owens-Ford Glass Company, Toledo, Ohio.

Safety glass for all forms of transportation.

Lima Cord Sole & Heel Company, Lima, Ohio.
 Non-slip GRO-CORD soles and heels.
 Lincoln-Schlueter Floor Machinery Company, Chicago, Ill.
 Floor scrubbing, cleaning and polishing equipment.
 Metropolitan Life Insurance Company, New York City.
 Life Insurance.
 Mine Safety Appliances Company, Pittsburgh, Pa.
 Everything for mine and industrial safety.
 Morin Manufacturing Company, Holyoke, Mass.
 Safety attachment for washing machine wringers.
 Morton Manufacturing Company, Chicago, Ill.
 Kass safety treads and Sani-Gard cabinets.
 National Signal Device Corporation, Newark, N. J.
 Automobile safety signal.
 Patent Scaffolding Company, Chicago, Ill.
 Safety ladders and scaffolding for all purposes.
 Protectoseal Company, Chicago, Ill.
 Safety cans, miscellaneous operating cans, flame arrestors, tanks and fittings.
 Pulmosan Safety Equipment Corporation, Brooklyn, N. Y.
 Respirators, hoods, helmets and general safety appliances.
 Pyrene Manufacturing Company, Newark, N. J.
 Fire extinguishers and tire chains.
 Reece Wooden Sole Shoe Company, Columbus, Nchr.
 E. Z. Walking wooden sole safety shoes.
 Ruse Manufacturing Company, Hartsville, Ohio.
 Everplumb ladder base.
 Safety Engineering, New York City.
 Publishers "Safety Engineering."
 Safety Equipment Service Company, Cleveland, Ohio.
 Super-Drednaut goggles, personal protection and general safety equipment.
 Safety First Shoe Company, Framingham, Mass.
 Industrial safety shoes.
 W. H. Salisbury & Company, Inc., Chicago, Ill.
 Linemen's rubber protective devices.
 Leon Schiff & Company, Chicago, Ill.
 Industrial safety shoes.
 Schwenk Safety Device Corporation, New York City.
 Handlers for barrels, drums and carboys.
 F. J. Stahmer Shoe Company, Davenport, Iowa.
 Davenport wood soled footwear.
 Standard Safety Equipment Company, Chicago, Ill.
 Industrial safety devices.
 Stonehouse Signs, Inc., Denver, Colo.
 Accident prevention signs.
 Surety Rubber Company, Carrollton, Ohio.
 Linemen's safety equipment.
 Surtz Manufacturing Company, Chicago.
 Point of operation guards.
 Thompson Products, Inc., Cleveland, Ohio.
 Permanent road markers.
 Weaver Manufacturing Company, Springfield, Ill.
 Garage and safety testing equipment.
 West Disinfecting Company, Long Island City, N. Y.
 Products for promotion of sanitation.
 F. H. Wheeler Manufacturing Company, Chicago, Ill.
 Asbestos, fireproofed, duck and leather protective apparel.
 Willson Products, Inc., Reading, Pa.
 Goggles, respirators and welding equipment.

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Aeronautical Section

Program Committee

COL. HARRY H. BLEE, (Chairman), Aeronautics Branch, U. S. Department of Commerce, Washington, D. C.
 DAVID BEECROFT, Aeronautical Chamber of Commerce of America, New York City.
 DR. GEORGE W. LEWIS, National Advisory Committee for Aeronautics, Washington, D. C.
 CAPT. A. B. MCDANIEL, War Department, Washington, D. C.
 LT. M. T. SELIGMAN, Navy Department, Washington, D. C.
 EARL B. WADSWORTH, Post Office Department, Washington, D. C.

Thursday Morning Session

October 15, 1931

DAVID BEECROFT, Chairman

Chairman of Safety Committee, Aeronautical Chamber of Commerce of America, New York City

The meeting of the Aeronautical Section convened with David Beecroft, chairman, Safety Committee, Aeronautical Chamber of Commerce of America, New York City, presiding.

CHAIRMAN BEECROFT: The meeting this morning of the Aeronautical Section has been drafted more in the character of an educational meeting. The papers were selected by the Program Committee to cover as comprehensively as possible the airplane field, with the thought of showing the unusual extent to which the industry and the Department of Commerce, the regulatory body, have worked to bring about safety, since they felt that safety is the primary consideration in the success of the industry, and that without safety it would simply not be possible for the industry to make that economic success of which it is capable.

First, our program covers the factory; then the airport; then the operation of the vehicle in the air; and finally, thanks to the Department of Commerce, we are going to have a most comprehensive review of the provisions covering safety, the methods of securing safety, and the methods of enforcement to carry out safety as used by the Department of Commerce.

The first paper is by Ralph Damon, Vice President and General Manager of the Curtiss Airplane Company, Robertson, Missouri. Mr. Damon could not be here but his paper will be read by Mr. Price.

Safety in Aeronautical Factories

By RALPH S. DAMON

Vice-President and General Manager, Curtiss Airplane Company,
Robertson, Mo.

An attempt will be made to show wherein aeronautical factories differ from ordinary industrial establishments with respect to safety, causes for these differences, and the means which can be used to combat the hazards effectively.

First, it may be explained that there is no unsurmountable obstacle preventing safety in aircraft factories, that all factory operations on the ground or in the air, incident to the manufacture of aircraft, are subject to the same common sense rules of good housekeeping and discipline necessary for the satisfactory accomplishment of safety in any industrial organization.

One aircraft factory recently visited by the writer, employing approximately 1,000 persons on direct labor, had a 59-day no-lost-time record in effect on the day the writer was there, and the factory manager explained proudly that his factory held the no-lost-time record last year for the Western New York State District, embodying many industrial establishments of all sorts.

Such unusual hazards as are encountered in an aircraft factory may be divided into two general classifications, the first of which I will call "complication hazards", and the second of which I will call "specific hazards."

A complication hazard arises from the general use in the industry of a large number of types of skilled personnel. A recent check made in one factory showed that there are sixty-two different definite trades in an airplane factory, as differentiated by American Federation of Labor and allied organization classifications. For example, on the assembly of machines within the space of a thousand square feet, without violating any of the commonly accepted practices in airplane manufacture, it is quite conceivable there may exist mechanics actually operating the following trades:

Upholsterer, glazer, sign painter, stripper, rubber, rigger, engine mechanic, electrician, pipe fitter, and sheet metal worker.

In some cases there may also be finish carpenters, coverers, dopers, and occasionally even welders. To add to the complications, some airplanes, particularly the larger transport machines, are relatively tall, standing as high as nearly 20 feet, and the usual mechanic must be furnished with a ladder or scaffold on which to work conveniently, which often results in some mechanics working directly over others; and the working conditions are a cross between orderly factory working operations and a shipyard the day prior to the launching of a boat.

As a further element in the complication, the industry is very young, and the technique is continually changing, requiring continuous retraining of personnel. That any factory fighting this complication can hold the no-lost-time record in its district is proof of the fact that a danger known is a danger removed.

In addition to the above general complications, the industry has a number of specific and non-usual hazards. Although it may not be listed as a direct factory operation, the initial flying of each aircraft is probably the most obvious hazard. In this connection, it might be interesting to know that the writer at one time had to discharge a test pilot for refusal to wear a parachute or abide by certain other rules of housekeeping which were generally conceded to be beneficial on these test flights.

The test flight of an airplane need not be a particular hazard. The Workmen's Compensation rates are still quite high, but the liability rates have shown very satisfactory decreases, and the rate on damage to the machine itself is in some cases as low as 80c per \$1,000 for original test flights not exceeding one hour on Approved type aircraft. It is also interesting to note that one prominent commercial

factory, which has built over 1,000 commercial machines, has never had an accident on the initial test flight.

Probably the next most obvious hazard is that of doping. This term is used to cover the application, either by brush or spray gun, of pyroxylin finishes to the fabric and metal parts of airplanes. This finish is used as a protective or coloring coat on the metal, and has an additional value on the fabric of shrinking and strengthening the long staple cotton fabric, and is a very important process. On the cotton cloth the first two or three coats must be brushed rather than sprayed, in order to secure adequate bond with the fibers of the cloth. Contrary to all painting rules, the main object is to put as heavy and uniform a coat of dope on the cloth as possible. For this reason brush painters do not make good brush dopers, and vice versa, so it is generally better when enlarging the force to get absolutely untrained men than to hire painters and endeavor to teach them new rules.

After the first two or three coats have been applied with the brush, all other applications and technique are equivalent to common practice in any good body plant, except that the dopes are uniformly more plastic and less pigmented than the pyroxylin finishes used in a body shop. As pigment is generally an inert substance, this makes the airplane dopes and spray dust more flammable than the equivalent materials in a body shop, so that the necessity for proper ventilation and general cleanliness is much greater. All the precautions of body factory spray rooms should be used, such as masking all permanent fixtures of spray cabinets, floors, and other exposed parts, cleaning out all exhausts frequently, use of underwriters approved motors and vapor proof fixtures.

The fire hazard is by far the greatest hazard in the dope room. Other dangers to the health of personnel have been almost completely removed by the use of non-toxic solvents, and the elimination of lead pigments, which are prohibited from use in most specifications.

Another special hazard is the large percentage of hand torch welding necessary on the present day construction. This welding in itself is not particularly difficult to control where done on benches and with reasonable precautions, but is most difficult to control when getting into fixture work, such as fuselage and other jigs, where, in order to handle production properly, many welders work in a congested area in very unusual positions, often lying on the back and welding above them, and within close elbow reach of each other. This leads to many incidental burns, and is one of the most difficult conditions to control.

One solution recently accomplished where burns were becoming excessive was the duplication of the fixture, thereby cutting in half the number of operations required in a given time on either fixture, and spreading out the men thinly enough so practically all hazard was removed.

Except for storage of large parts, in process or completed, the above items approximately conclude the non-usual hazards in airplane manufacture. There are no unusual features to the machine shop and metal bench work, woodworking machinery, small parts assembly, engine assembly, or other operation. Owing to the unusual angles and extended portions of partly finished machines or completed machines, new employees and visitors must be carefully warned to be extremely careful. On smaller machines, propellers left in the customary horizontal position form a very distinct hazard of this sort. In completed machines, the amount of gasoline which can be kept within the building must be very closely regulated, and is probably one of the cases where great discipline is necessary.

An analysis of accidents in one airplane factory over a recent period is given herewith.

In all of the above items discussed, both the complication factor due to the large number of trades and the necessity for concentrating personnel on individual machines, and the very specific hazards, one conclusion stands out, as shown in the table of

Analysis of Accidents in One Airplane Factory

Occupation	Lost Time	No Lost Time	Total	Percent of Total
Machine shop	9	19	28	18
Sub assembly operations	9	12	21	13
Erection—final assembly	8	9	17	11
Welders	9	9	18	12
Maintenance	6	5	11	7
Woodworking	5	5	10	7
Dispatchers, inspectors, pilots	5	4	9	6
Sheet metal	3	3	6	4
Bench workers	1	5	6	4
Tool makers	2	3	5	3
Plating and polishing	1	3	4	3
Stock clerks	3	2	5	3
Painters	-	5	5	3
Mechanics	2	3	5	3
Building operations	1	3	4	3
	64	90	154	100

Causes	Lost Time	No Lost Time	Total	Percent of Total
Foreign body in eye	12	30	42	27
Lacerations and cuts	4	19	23	15
Falling and flying objects	5	10	15	10
Fall of person and bumping objects	8	6	14	9
Burns	9	4	13	8
Infections	1	10	11	7
Nails, splinters, splinters	3	8	11	7
Machine accidents	8	1	9	6
Airplane accidents	4	-	4	3
Other causes	-	2	2	1
Strains, sprains, and hernias	10	0	10	7

lost-time accidents, and that is the absolute necessity for good housekeeping and proper discipline.

To the writer's personal knowledge, almost every major accident which has occurred in factories in which he has been connected has been due to improper precautions in the first place, or laxness in the housekeeping and discipline. Well marked aisles kept clear at all times, particularly in the assembly department, are an absolute necessity, and are distinctly worth while, as shown in the accompanying photographs.

In general, it will be seen that the accident ratio is not due to the special risks of the industry, that these risks do not present any unsurmountable or inherent difficulties that would tend to cause high losses, and that the most prevalent accidents are due to every day causes of a miscellaneous nature.

CHAIRMAN BEECHER: We are sorry that Mr. Damon isn't here because he stands very high in the airplane manufacturing industry. He heads the committee that has relationship with the Department of Commerce at Washington. His analysis here and his giving of the leading danger factors is very clear and complete.

Our next paper, and again we are very sorry that the author isn't with us, is by Richard B. Barnitz, Director of Airports City of Los Angeles. I should like to say

on behalf of Mr. Barnitz that he is one of the best authorities in this field. He is chairman of the Airport Committee of the Aeronautical Chamber of Commerce.

We are particularly fortunate in having a past-president of the National Safety Council with us who has consented to read this paper, Lieutenant Colonel Henry A. Reninger, Allentown, Pennsylvania.

Safety at Airports

By R. B. BARNITZ

Director, The Los Angeles Airport, Los Angeles, Cal.

It is significant of the progress of aviation that safety has come to be regarded as a primary factor in its undertakings. In the early, experimental and demonstration stages, safety was all but disregarded in the enthusiasm over the fact of actually causing heavier-than-air machines to leave the ground. In the period of the development of airplanes for war purposes, speed, flexibility, and adaptability to military stratagems were given first consideration. But today, with the rapid advancement of aviation as commercial transportation, safety comes into its own as the essential element of success.

By its very nature, as well as because of its novelty and the public's peculiar psychological reaction to the idea of flying, aviation must give much more attention to safety than has ever been given by rail or marine commerce. We who are connected with commercial aviation in any capacity know too well how aeronautical mishaps appeal to the sensation-loving press, and we may take fair warning that one accident outweighs ten thousand successful flights in the public judgment. And logical or illogical, we have to take the public judgment as it comes to us, rather than as we should like to have it.

But there is something to be said for the public's attitude, at that. The public will pay a little to watch stunts by aviators who are either skillful or foolhardy enough to undertake them. The public will pay a little to go aloft for the thrill of an occasional joy hop on its account. But the public will give generous support to aviation as a sound industry only when it is assured that aviation is engaged in a safe and sober business of transportation. If a man pays to ride in an airplane from Los Angeles to New York City, the chances are that he wants to reach New York promptly rather more than he wants the experience. Unless aviation can assure him that he will arrive at his destination in safety and comfort, he will not patronize it. All the arguments are on the side of the public when it comes to demanding safety of aviation before aviation can claim to be a serious business rather than just a fascinating and daring game.

Safeguard the Non-flying Public

In discussing the relation of airports to safety in aviation, there is another phase of the subject which also occurs. That is the location and operation of airports in such a manner as to safeguard the persons and property of the non-flying public—those who live near the airport, and those who pay it visits to see what this flying business is all about. We have had not a few instances to record lately where airplane accidents, usually due to insufficient landing areas or bad layout of runways, have involved the well known "innocent bystander", or the next door neighbor to the airport. Now, much as we may deplore his numerous existence at times, the "innocent bystander" is a necessary "evil" in our activities. The airport is the place at which the public is brought into contact with aviation, taught its importance, and induced to give it deserved support. The public must be encouraged to stand by innocently a great deal if we are to inoculate it with air-mindedness. But while it does so, the obligation to see that it is protected from both its own innocence and

our mistakes rests fully upon the airport administration. Moreover, if we are to have airports reasonably accessible to the centers of population, we cannot expect that they will be altogether isolated from homes, factories, and the other appurtenances of settled communities. The protection of these by the proper traffic precautions and by sufficiency of airport size and layout will be alluded to further.

Much, we are happy to say, has already been done to make airports safe. Those haphazard landing fields which were typical of a decade ago are rapidly disappearing from the landscape, and the half dozen abandoned pasture lots which formerly served the average city with airplane landing facilities are being replaced by one or two sizable areas, equipped with prepared runways, and offering some reasonable accommodations. While there is still a divergence of opinion with respect to the most suitable surfacing for landing areas, and while experimentation is still busy with the problem of airport lighting, we can take pleasure in the fact that a great deal of satisfactory surfacing and lighting has been accomplished in the last three or four years, and aviation is immeasurably safer and more assured by reason of these activities. At least tentative measures of traffic control have been achieved in most places, with definite signs of bringing order out of the chaos. Rigid regulations, reasonably well enforced and sensibly observed, are making airports somewhat safer. I believe, than the ordinary city street. I know that since the city of Los Angeles came into control of The Los Angeles Airport three years ago, the one fatal accident that has occurred on the field resulted from an unauthorized flight in a homemade plane which had come over from another city to try some speed experiments on the spacious area of our port. Other than this we have had scarcely any mishaps of any serious consequences whatever. This, despite a record of something more than 7,000 airplane landings a month, representing many thousands of flight hours and tens of thousands of flight miles.

Five Factors of Airport Safety

But airport development has only commenced to take into account all of the factors of safety with which it must become familiar. I should like to summarize these briefly under five headings, having to do respectively with location, surroundings, equipment, regulations, and personnel.

To attain a maximum of safety, airports must be permanently located on areas of adequate size, with favorable meteorological conditions, and suitable terrain. These points are seldom sufficiently recognized by private business leaders or public officials who may have something to do with the selection of an airport site. They are, of course, commonplace requirements to the person experienced with aviation. But even he, I fear, is likely to neglect them in favor of other considerations which have to do with immediate economy. Hence it can do no harm to mention them here in detail.

Permanence of location is of importance because we cannot visualize any corporation or city adequately equipping an airport on a tract which it holds merely by a short-term lease, or where the land investment may soon come into competition with the improvement investment and tend to close out the latter. We need more airports which will stay put—which we may look forward to as established institutions of public service ten, twenty-five, and fifty years hence. Permanence inevitably means care and foresight in development, with all the consequent significance to safety.

As to size, I feel that it is folly to locate airports these days where all-way landing is not feasible, and where prepared runways of approximately 5,000 feet in length cannot be developed. While a 2,500-foot runway is sufficient for most purposes at the present time, an additional distance of 500 or 1000 feet is demanded by safety, and the present trends in aircraft construction demand that we should be able to extend the surfaced landing and take-off areas beyond 4,000 feet if we ex-

pect to take care of future traffic with safety. Already there is record of transport ships overshooting their fields with disastrous consequence which might have been avoided by a wiser selection of airport site.

As to soil and drainage conditions, I shall say little here. The relation of these to safety is well known, and I am justified in the present discussion in simply asserting that if, for reasons of economy or otherwise, a site is selected where soil and drainage are poor, then it must be taken into account from the start that a sufficient expenditure must be allowed for to repair these defects in the natural location. Here, again, I am simply insisting that we have no right to sacrifice safety to economy if we expect to make aviation a dependable and respectable business of commercial transportation.

Turning to meteorological conditions, we have a factor which no amount of subsequent expenditure can adjust. Conditions of a meteorological sort vary widely within short distances, and this fact must be understood. Even within the environs of a single city, a considerable range of weather and atmospheric conditions may be found. No company and no community can afford, from the standpoint of safety alone, to locate its airport at places where conditions are not the best to be had as regards moderateness and constancy of wind, absence of smoke and fog, and mildness of temperature. Moreover, I heartily endorse the suggestion that, once a large community has located and equipped one major airport with due regard to these factors, it may well afford to create one or more auxiliary landing fields, with sufficient runway areas only, to take care of emergency operations when weather at the major airport may render it unsafe.

As a final word on the subject of location, I may speak of the need for selection of airport sites where there is a minimum of natural, or unremovable artificial, obstruction in the surrounding area. Darkness occupies about half of every twenty-four hours, and even the best located airport is destined to have some thick weather at times. The airport which is so located that an approaching ship cannot swing in a circle of from three to five miles to get its bearings is distinctly handicapped from the standpoint of safety. If an unobstructed circle of from eight to ten miles radius is possible without crashing against a mountain side, so much the better. Where a city can so place its airport, or a transport company can so choose its terminal facilities that this freedom is possible, it becomes criminally negligent with the first crack-up if it has done otherwise.

How an Airport Invites Trouble

This brings us to consideration of my second main topic, that of the relation of airport surroundings to safety. An airport is inviting trouble when it locates where tall buildings, chimneys, gas tanks, power lines, oil derricks, and the like either exist or are likely to be constructed in its immediate vicinity. Careful flying, it is true, can ordinarily avoid such hazards, but hazards they are none the less, and as such they are menaces to aerial navigation which should never be permitted in the neighborhood of any airport. This means nothing more nor less than that airport sites must be chosen in unobstructed sections, and then that the territory surrounding these sites must be kept under restriction as to the types of construction permitted within a radius of perhaps two miles from the center of the port. Of course, if the port itself has an area of a mile square or more, the amount of territory outside the port which must be restricted is proportionately less.

As to methods by which such restricting control may be exercised, let me call your attention first to the recently developed legal doctrine of excess condemnation. The older legal process by which the right of eminent domain has been exercised to acquire property for the public benefit has limited such acquisition to the tract actually needed for the proposed undertaking. Legislative provision for excess condemnation would make it possible to secure considerably more land than is actually required.

for airport operation, with subsequent sale or lease of the excess tracts under such limiting clauses as would forever forbid construction of aerial navigation hazards in the vicinity of the port. A second method of control, less costly where feasible, is the location of an airport in a place where the immediately surrounding areas are yet unoccupied by anything objectionable, and then throwing a zone restriction upon the entire neighborhood. The legal theory of municipal zoning has been thoroughly threshed out, and the process is frequently used in other connections. Airport administrations should take early advantage of it wherever possible, to prevent hazardous developments in their surroundings.

Under the head of adequate ground equipment for the safe operation of an airport, the United States Department of Commerce specifications on runways and lighting for the AIA rating should be the minimum requirement of the modern airport. I realize that this would mean further improvement of some ports that are rather pretentious at the present time, and it would mean the ultimate closing up of some hundreds of vacant lot landing fields over the country. But when cities and citizens insist, in the name of safety, that these specifications be met as a minimum, aviation will be a great deal better off than it is today. Beyond this, there is the problem of controlling the visiting public, which I am sure you will recognize as a difficulty of no small proportion. Some European airports, I understand, and a few that I know of in this country, go so far as quite cutting off the public from witnessing the flying activities on the field. This is a mistake. The public should be given every opportunity and convenience consistent with safety for seeing what is going on. But at the same time the public must be kept away from revolving propellers and taxiing ships. Here again, ample area for airport layout is the prime requisite. Extensive automobile parking space, wide walks and aprons behind the fenced-off runway area, room for erection of grandstands when there is an air show—these are items not to be overlooked in the interest of safety when an airport is planned. Once these are provided, we must depend upon sufficient fencing under ordinary circumstances, and sufficient policing on special occasions, to keep things under control.

The Hazard of Fire

Considerations of economy in insurance, as well as safety to persons and property, will dictate ample provision for putting out fires as well as preventing them. With respect to the latter, proper hangar design is coming in for more attention. Not only as to materials, but in the matter of size, arrangement, location of doors and windows, height of roof, and distance from other buildings, the importance of correct hangar construction cannot be overemphasized. An airport, we may as well acknowledge, is a focus of extraordinary fire hazards, and we cannot do too much to guard against them. Some airports have found it advisable to conduct both daily and weekly fire inspections in which definite check is made upon every possible source of trouble. A field personnel trained, preferably by city fire department experts, to meet emergencies is a highly desirable asset on an airport's safety account. To these items of safety equipment, I should add appropriate signalling devices. Unfortunately, as we who have been deeply involved in traffic control problems will agree, airport engineering and administration have not yet decided just how, when, or whom to signal. In a sentence, however, let me sum up the requirements as I see them. We seek means by which, without any confusion, day or night, we can give a slip permission to taxi to an indicated take-off strip, clearance of the port, advice on landing direction, permission to land, indication of landing strip, and guidance to a selected parking spot on the line again. The early equipment of all airports with adequate radio apparatus will be a step in the right direction, and experiments now being made with light signal and other devices are something we can all watch with anxious hopes. In the meantime, ample field attendance including experienced flagmen is imperative.

All this naturally brings me to say something of uniform traffic regulations, enforced by competent authority, as a safety provision. Great strides toward achieving this goal have been made even within the last year under Department of Commerce leadership. We may be confident that we are well on the way toward a modification of regulations which will be acceptable everywhere. The question of adequate authority for their enforcement is one that must be answered by each airport for itself. The municipal airport has the advantage of being in a position to incorporate air traffic regulations into the city ordinances, and to enforce their observance by police power. I strongly urge such provisions upon every municipality which has its own airport, and further urge that nation-wide uniformity will be the very essence of safety in this respect.

I have mentioned thus far four factors in airport safety: namely, location, appropriateness of surroundings, adequacy of equipment, and proper traffic control. The selection or operation of each of these depends ultimately upon personnel. It should be recognized at once that airport administration has become a distinct profession in itself, and that the safe planning, construction, maintenance, and operation of an airport cannot be entrusted to anyone who happens to be either a good pilot or a good politician. From the standpoint of safety alone, I believe that the sooner this situation is consciously comprehended by airport administrators themselves, by the aviation industry, by civic and political leaders, and by the public generally, the better off we will be. The selection of field attendants, of clerical assistants, and of executive staff should be made from persons who are peculiarly fitted by training and disposition to this type of work. Too many airports are manned by persons who have just happened to be successful in other lines of work, and this practice is no more conducive to safety than would the management of railroads by capable barbers or the navigating of steamers by competent farmers. Let us decide what the qualifications of airport administration are, let us establish them as the standards of a profession, and let us adhere to them with a professional attitude.

The Municipal Airport in Favored Position

As regards all the safety factors I have discussed, the municipal airport should realize that it is in a highly favored position. Municipalities are able to guarantee permanence with much more assurance than can the private promoter. They are able to secure adequate check and operation of equipment involving engineering, crowd control, and fire prevention. They can, as said before, put police authority behind traffic regulations. Finally, by use of civil service examinations, they can establish a definite standard for personnel. With these powers available, the municipal airports of the country are particularly chargeable with the obligation of safety.

In conclusion, permit me to suggest the thought that the airport, to develop along safe and sane lines, needs a hearty public sympathy and support in its plans. We do not expect the public to understand all of the technical problems of either engineering or legislation which may be involved. But we must have a public which is at once air-minded and sensible. The airport must become, consciously, an educational institution where the public can be taught to comprehend that the place is a center for commercial transportation, for industry, pilot training, scientific experimentation, and legitimate recreation. We must win people to the concept of an airport as a public service establishment operated by engineers, business men, and scientific specialists, rather than reinforcing the notion that an airport is a circus manned by daredevils. In other words, airport safety means in the long run that airports must both possess and deserve public recognition and support as places where safety is a paramount factor in every consideration and plan.

CHAIRMAN BEECHER: Mr. Barnitz has given us a wonderfully comprehensive and practical concept of the ideal airport. There may be some here who would like to ask some questions; there may be some who have some suggestions.

Though it may not be the purpose of the Chair to make any remarks, I think we all ought to comprehend the great difficulty there has been in connection with airports. Our railroad stations, of course, came in the early days before our cities had their great growth. Our harbors were naturally determined before cities started; in fact, the settlements located by virtue of natural harbor facilities. Now the airplane comes at a time when our cities have acquired in a great measure their fixed growth. We have had some complaints about airports being located quite a distance out from the hearts of cities, and the problem has been a very difficult one.

I think the point that Mr. Barnitz brings out is a good one, namely, that we must select from the point of view of permanency. We realize what it would mean to Chicago if the railway stations were changed in location every five or ten years, or if our harbor facilities were changed. The permanency in airport selection is a very important consideration.

Discussion by Lt. Col. Reninger

COL. HENRY A. RENINGER (Lehigh Portland Cement Co., Allentown, Penna.): The things that appealed to me in the paper were: first, the permanency of the airport; and second, instilling the idea of safety into the minds of the public.

You and I realize that aviation is new. Those of us who were on the other side and saw the results of aviation during the war, particularly birds like myself who were on the ground dragging along at six to ten miles per hour in an ammunition train and having the German aviators bombing us from time to time, feel that aviation is a sort of invention of the devil. We can't get over it; some of us can't. What we need, if we want to be successful in aviation, is safety, just as the railroads put safety into their operation.

Last night there was presented to the New York Central Railroad a certificate for exceptional service in transporting passengers over 27,000,000,000 passenger miles without one passenger being killed. When we look at the records of the Army and the Navy in aviation, too, we see their passenger miles increasing right along without a fatality.

The Army and Navy probably should be as safe as any kind of transportation, however, because they have unlimited means to buy the best types of machines; they have unlimited means to train pilots, and they spend all kinds of money until these men get to a point where they should be A-1 without any question. Perhaps commercial aviation can't afford to spend the amount of money that it should.

If you want to make aviation successful, to make it pay, you have to educate the public in safety. The only thing that we in the National Safety Council can do is to help along in this work. That is our function. We can help you in your plants to make your plants safe; we can help to make your airports safe, and to spread the gospel of safety to the country; that is the part that we can play in this work.

I know (and this is a rather broad statement) that a safety man can go into that airport or that airplane factory referred to in the paper and reduce those lost-time accidents. To my mind there are entirely too many for the number of men employed. We know by actual experience in textile or cement or in steel or in any one of the particular departments that he mentioned that they have gone into big concerns with twice or three times the number of men in the machine shop or the welding department or any other department and have reduced the accidents to one or two lost-time accidents in the year. We can help there and that is our problem. If any of you people in the production of airplanes want any assistance that we can give you, we are always ready to do it. Understand, however, our organization is not trying to tell you how to build your airplanes. We can't go into the technical end of it.

CHAIRMAN BEECHTOLD: Colonel Reninger, we certainly appreciate your comments.

Coming to our third paper, I must as your chairman take a few moments to just say conscientiously how unusually fortunate we are to have the gentleman who is going to talk to us. He is a man who has had years of practical experience, which covers his line from Cleveland down to the heart of Texas and probably farther, and not only in the operation of that line but in the maintenance of its equipment. I have had the pleasure of spending some days in his big maintenance station in Chicago to see the character of organization, the spirit of workmanship, the constant thought of safety. It is due to the work of men such as our next speaker that aviation has made such remarkable progress as it has.

Some of you may say, "How much progress has aviation made?" I frequently meet people at home and they say, "Your industry is pretty low, isn't it?"

"No, it isn't low at all. It is absolutely remarkable how well it has kept up. It has grown faster than many of the most enthusiastic expected. The increase in passenger travel has been phenomenal. The patronage of new lines that have been established has been beyond the expectations of the people who conceived those lines."

Of course, I recognize that there were many people who were saying that we were going to have airplanes like we have automobiles. The conservative, clear-thinking man in the aviation field has never had that thought in mind at all.

Without further ceremony I want to introduce Colonel Lester D. Seymour.

Safety In Air Transportation

By LESTER D. SEYMOUR

Vice-President, United Air Lines, Chicago

Two years ago I was accorded the privilege of preparing a paper for this same body on the subject of "Maintenance of an Air Transport Service and Safety Standards." Practically the only difference in these two subjects is that today's is broader. I propose then to discuss the subject in its broadest aspect and approach it directly from the standpoint of the average man who thinks about leaving mother earth in an airplane. In other words, I should like to discuss the safety of actual flying and some of those things which we can do to make it safer.

In the paper prepared two years ago, I included a great deal of detail concerning such things as the instruction of personnel, proper working conditions, physical condition of equipment, mechanical and weather service, aids to navigation, crowds on airports, etc. These things have an extremely important part to play in how safe a man is in an airplane or how dangerous an instrument an airplane may be on the ground and in the air. However, after reading over the paper referred to, I find I can add very little to the treatment of these subjects. It may be of interest to note here that considerable progress has been made along many of the lines mentioned during the past two years.

Perhaps every man or woman who considers the possibility of a ride in the air, either mentally or actually, asks the question "How dangerous is this new method of traveling?" To a great many, unfortunately, the answer has been found in newspaper stories written in confusion of mind and read without a proper understanding of all of the facts. By far the greater number of startling records of accidents, fatal and otherwise, in the air which appear in the columns of the daily press are the records of the experience of private flyers or those engaged in extra hazardous pursuits with aircraft. These have little relation to the orderly operation of aircraft on schedule over established routes.

It is true that as in other forms of transportation, accidents have occurred on regular routes. However, for the amount of flying considered, their frequency is very small as compared with the other types of flying. This does not mean that all types of hazardous flying that may result in accidents should not be indulged

in. It is absolutely necessary that in training, for example, the curriculum include maneuvers that, except in emergencies, might never be experienced by a passenger on a regularly operated route. If I were given more to statistics, I might attempt to prove these statements to you with them. I think it will suffice to say that the statements are accurate within my understanding of the problem.

In any kind of flying, whether it be on scheduled air lines or otherwise, if those things which I mentioned in my original paper have been properly cared for, the safety or the danger that may be encountered in riding in any airplane is, in my judgment, mostly dependent not upon mechanical standards but standards of behavior on the part of the operator more than anything else. Some years ago, one of our greatest captains of industry said that an airplane, unlike any other form of transportation, was 90 percent pilot and 10 percent airplane, as regards safety. He further said that airplanes would not be safe nor would the business of flying them be substantial until the ratio were reversed and it could be truthfully said that the safety of flying depended only 10 percent on the pilot. I know that this man referred to the actual manipulation of the controls of the airplane and the skill with which the pilot might be able to maneuver the craft both in the air and on the ground. In a well organized, carefully equipped air transport organization, in so far as this ratio is concerned, it has already changed so that danger resulting from the pilot's lack of skill should not be expected even to approach a fraction of 10 percent.

Highest Skill in Pilots Essential

With an entirely different interpretation, the statement that safety in the air is 90 percent pilot and 10 percent airplane is still true from another standpoint. No well-equipped air transport line will entrust its equipment or its cargoes to pilots whose skill in the actual handling of the aircraft has not long since been developed to a point to present practically no danger from this source. The human behavior that I have reference to, therefore, is that resulting from the intelligence, judgment and attitude toward his task with which the pilot approaches any problem and upon the attitude and policies of the executives entrusted with the administration of the air line.

Unfortunately, because of the state of the art as developed today, there are limitations which are imposed upon flying by the weather. These in some circumstances are sufficiently indefinite as to require very definite limiting policies as to what shall be done under particular circumstances. This in turn requires a great deal of judgment and intelligence in recognizing these conditions or circumstances. We have not yet learned how to land airplanes safely when fog or smoke or some other aerological condition obscures the landing field, even though some progress has been made in this direction. This means that for safety in the air no pilot must ever permit himself to get into a circumstance that will require his landing under such conditions. Further our technical and research service should devote some major portion of their efforts to the development of a means of eliminating this difficulty in maintaining schedules uninterrupted by weather conditions.

Going back a little farther, an executive in the air transport business must have a complete understanding of the limitation which certain weather conditions impose upon the safe flying of aircraft. This has long been recognized in marine shipping. Hours are spent by ships at anchor when fog obscures harbors, etc. In recognizing these conditions we must also be willing to recognize that they place a limitation upon revenues, and that effort to increase these revenues at the expense of crowding the limitation of safe flying is not only dangerous but, from the long term standpoint, destructive to the very business itself. If air transportation is to prosper and grow to be a more useful servant to man, then it must as rapidly as possible make its way into public confidence. It cannot do this if accidents which occur

can be traced to erroneous policies on the part of those directing the operations of any air line. Thus the safety standards that I wish to consider today are those standards not directed toward physical equipment, but those limitations of conduct which make in the last analysis for either good or bad human behavior. In this instance good or bad are understood to mean safe or dangerous.

A man in charge of operations of any air line must acknowledge the fact that until we learn how to land our airplanes when we cannot see, we must be willing to take certain financial losses because of our inability to maintain service under all conditions. Recognizing this, he must instruct the personnel who are flying the airplanes not to take chances. Pilots should not attempt flights, the safety of which they are not absolutely confident of in their own minds before the attempt is made. Obviously, this means that the caliber of personnel selected must be such as to insure accurate judgment as to their own capabilities and those of their craft under any circumstances. Perhaps, then, the second standard is found in the careful selection of personnel. The next point is the provision of such assistance to the pilot in the air as will permit him to take advantage of every opportunity for greater safety. In my judgment, with the present limitations of aircraft, these opportunities lie for the most part along two lines. I have reference to the use of more complete weather information and the establishment of more dependable and more useful communications systems. Quite obviously, when the airplane is in the air the communications system must involve radio. On the ground it may be any form of rapid communication system.

The Importance of Radio

Some years ago, when the use made of weather information and communications was much less than it is now, the same important relationship between the two existed as at the moment. At the time mentioned very little was known of the possibilities of radio as applied to airplane use and about the only use made of weather information was for the pilot merely to learn by telephone or telegraph what the weather might be at the point to which he was going. In fact, our early dispatching and communications system was set up on this basis. The pilot received at each stopping point reports of weather ahead. His progress along the line was relayed from point to point.

It was not very long before we discovered that considerably more information was necessary. This gradually increased to include not only the weather at the point where the pilot was going but at intermediate points along the line and at a great number of points off the line. This enabled us not only to judge what the weather might be at that particular moment, but what its trend might be. We were thus able to some extent to forecast the weather during the flight period. This later increased to the point where it was combined with the regular weather forecasting service of the United States Weather Bureau which now supplies all the information along the airways. Once we had discovered the necessity of becoming advised of what the weather was in progress, it became evident that we would have to learn a good deal more about meteorology and aerology. We next discovered that it was important to get this to the pilot in the airplane at much more frequent intervals than by periodic landings enroute. To do this we were forced to develop the radio which in turn we found could be employed to actually guide us along the route by means of the now well known radio beacon. In this way we had gone a long way afield from the original set up of merely reporting to the pilot what the weather was at one particular point.

With the progress which we have made, we now find that furnishing the pilot with information as to the weather at the terminals is more important than ever, because we have learned how to get him through weather between terminals that might have been impossible before. We have also learned that, after all, it is not only weather

on the ground or at those comparatively few places that may be established on the ground that we need information about weather, but at every point where it may suddenly become bad or changeable. This point may not be the same for any two successive periods. It actually becomes the point at which any airplane finds bad weather. Consequently this again evolves itself into the necessity of securing weather information from the airplanes while in the air, transmitted not only to those on the ground who may be contemplating flight, but to other airplanes already in the air. They may need information either to get to a safe place to land or to continue on to their destination uninterrupted.

If this information is to be of any value, it must be extremely current and must be very frequently transmitted. Again it follows that this can only be done if there is a comparatively large number of airplanes in the air which means a comparatively large number of schedules. All of the airplanes must be able to communicate with each other. We have recently learned (which seems to fit in with this) that the only way we can hope to bring operations cost down to a point where the public can afford to ride is by operating a large number of schedules. Quantity production again reduces the unit cost. In my judgment, in the very near future a great step forward will be made in the matter of safety in the air by the extension of the use of radio and the increase in schedules which will finally set up a current supply of information as to what the weather is everywhere along and above a route at which it may be doubtful. This will be supplied by flyers best able to judge the effect of the bad weather because they are encountering it while reporting to others who wish to go through that same area.

Instructions to Pilots

To develop the availability of and the understood necessity of such information and such communications systems, as described, is to set a safety standard which may be the basis of personal behavior which will do more to actually make the airplane a safer vehicle than perhaps many other things that have had emphasis in the past.

It is obvious beyond any ability of the pilot to manipulate his airplane controls that safety must lie in his ability to assimilate, interpret and act upon the information he receives. This implies that his judgment must be excellent and that his instruction, emanating from the administrative head of his company as to not taking chances, must have been complete and concise. As an example of what I have in mind, I will quote in the following excerpts from a letter issued to the pilots of one air transport organization on the subject of taking chances. What I have in mind when I say that it is still true that safety in the air is even yet 90 percent pilot and 10 percent airplane is thus evident even though I have no reference at all to the skill with which the pilot is able to maneuver the craft. This skill must be as involuntarily available as that with which you manipulate the gears of your automobile.

"The company realizes that because of the nature of its business, the success or failure of its entire effort is in the hands of its pilots during a large percentage of the time. Not only on their skill and flying ability but on their alert judgment and mature thought depends the entire record of the company for accomplishing each and every flight which, after all, is the whole business in which we are engaged.

"There can never be excuse for any man risking his life, regardless of any influence the activities of others may exert, if in his opinion any particular flying mission due to weather or other cause gives him doubt as to his ability to get through.

"Because each pilot is so definitely dependent while in the air on his own acts

and judgment, no experience or action of any other pilot or employee must ever be permitted to influence him in his judgment to the extent that his acts become 'chance taking' rather than the execution of a task in which before he starts, he knows himself to be the master."

Returning to the attitude of the employer or administrative officer which is so important, I have particular reference to how closely such an officer may hold himself and his organization to the belief that the elimination of accidents even at the cost of the elimination of some revenue is the surest way to ultimate success. Again safety in my judgment lies in a standard of self-imposed good behavior which in this case means right thinking. Perhaps I may express this in saying that I believe that the executive of an air line who knows the importance of being able to honestly tell himself should an accident occur that nothing that he could have done might have prevented that accident will have gone a long way toward setting up for his air line a safety standard that will result in an enviable record.

To illustrate further what I have in mind. While it is true that accidents in the air have been caused by unavoidable situations resulting from bad weather, just as storms at sea cause accidents, it is true that many accidents, the causes of which have either been stated as indeterminate or the result of unavoidable weather conditions, have actually been the result of improper attitude on the part of the air line. Under certain circumstances it is no more accurate to say that an airplane accident was caused by weather conditions than it is to say that the cause of a man losing his life in an airplane accident was because he hit the ground too hard. The real cause may lie somewhere in the background having to do with the reason that the airplane found itself in a situation which eventually resulted in disaster.

Airplane engines, probably more than any other example of internal combustion engines, now have a record of freedom from mechanical failure. Nevertheless it is true that as a mechanical contrivance there is a possibility of failure which is every now and then demonstrated. So long as this is true and so long as we have not yet learned how to land an airplane when we cannot see the ground, we are not carrying out our responsibility as to safety to the fullest degree when we place an airplane without any protection for its occupants in such a position that if any part of its motive power fails it will find itself obliged to land when the pilot cannot see the ground. This statement should not be confused as having any reference to ordinary forced landings when the ground is visible. Such landings ordinarily do not present any very great hazard.

Numerous occasions have occurred when airplanes equipped with more than one engine have been flown under overloaded conditions which placed them in an even more precarious position than the single engine airplane in the same circumstances. A multiplicity of engines in that case increases the number of possibilities of a forced landing. In these cases either the administrative officers willingly permitted this situation to exist or were not rigid enough in their instructions to their employees as to the loading of the airplanes.

The above are merely examples of what I have in mind when I say that human behavior, notwithstanding all the other safeguards that may be provided, may still present in itself the most fertile field for the setting of standards which actually make flying in an airplane safe or unsafe.

Discussion

CHAIRMAN BEECROFT: In dwelling so much on the personality of the operator, I think Mr. Seymour has voiced a sentiment that has been expressed in connection with automobile accidents. In fact, only yesterday morning Commissioner Stoeckel of Connecticut, who occupies a pioneer position in the development of traffic regulation, stated that the commissioners in general had reached the conclusion that the

personality factor was the large one to be attacked, and that in efforts along that line lie the great possibilities for increasing safety on our highways.

Mr. Seymour has certainly emphasized a key point in that regard.

C. C. LANGE (Barber & Baldwin, New York City): Mr. Seymour this morning has brought out two things: first, more complete weather reporting, and second, communication systems, both in the air and on the ground. In addition, there is one more point that might be of interest. It is good fields, a multiplicity of good fields over established routes.

I have found through inspecting a lot of operating air lines at the present time and in the past two years that where communication systems were had, if a multiplicity of good fields were established, or at least fields with markings where a pilot could land regardless of weather conditions, the safety of such a line was increased probably 100 per cent. I am just wondering what your opinion is along that line.

MR. SEYMOUR: Of course, that is absolutely true. In the paper I have just read I assumed that situation because I was confined to the regularly operated routes that have been established by the Department of Commerce. Those routes are rather adequately supplied with intermediate fields now. Of course, many and perhaps most of our actual forced landings (of which we have very few now) never occur on fields anyway, but the fields are so located that between them there are areas in which it is perfectly safe to land an airplane. There isn't any particular hazard resulting from that. Of course, before you start, the field problem is one that must be settled. The route must be completely equipped with ground aids to navigation, which would include fields among the very foundations. That is absolutely necessary.

ELMER F. HARRIS (Mesta Machine Co., Pittsburgh, Penna.): I am not directly connected in any way with aviation, but I have been flying a little for the past few years and have been around the fields a lot.

In view of the fact that the public is not entirely sold on aviation, and that the point in selling them seems to revolve around the matter called safety, it occurs to me that a big step could be taken by transport lines if they assigned to some one man in their organization (even though his duties were not confined strictly to safety) a title which would include safety on the airport and of the passengers.

At one large airport in Pittsburgh I have never found a single individual whose duties have been explained to me as having anything directly to do with safety. I believe that just for the psychological effect it would have upon the minds of people, to designate one man as safety inspector, would have quite a good influence on the field personnel and on the public. If you put a safety man on a field and let the public know that such a man is there, confidence will grow instead of going in another direction.

MR. SEYMOUR: It is a very interesting suggestion.

L. R. PALMER (The Equitable Life Assurance Society, New York City): I have no title, military or otherwise. I am a past-president of the National Safety Council. I am a man who has grown up in the steel mills where they certainly needed safety in the old days. It wasn't so many years ago that they didn't have any safety men. I think Mr. Harris' point is mighty well taken. I have followed the railroads very closely in safety. It wasn't very long ago that they didn't have safety men, but if you will look through the official railway guides of today you will find that in practically every railroad system they will have listed either their "Chief Safety Agent," their "Supervisor of Safety," or whatever the title might be. It is just for that reason that we hope it will eventually come about in this, our newest industry, and that is why we have gone into the field as the National Safety Council and tried to help you develop this Section.

We know that safety is a critical subject in aviation, however, we do not want to do anything or say anything as the National Safety Council unless we are saying it in your language.

CHAIRMAN BEECHCROFT: Are there any other comments or any questions you would like to ask Mr. Seymour? If not, we will proceed.

As you may be aware, about five years ago we got the Air Commerce Act, setting forth the regulations that the Department of Commerce has since been carrying out with regard to the industry. It was rather remarkable for a young industry such as the airplane industry to say to the Department of Commerce, "Here we are. We wish to be regulated. We wish to have that regulation because of safety. We realize that we can't build an industry without safety." So the Department of Commerce has set up this very comprehensive plan for safety. This safety, however, doesn't rest only with the factors of design in the airplane.

In these factories the Department of Commerce has its representative. When the Department of Commerce is asked to approve a type of airplane, they go to the factory and see that the factory is so organized, that it is so manned, that it has the capacity for the uniform production of that plane. It is not enough that it can make a good plane, but before the product is approved it must show the capacity and the organization for the steps of manufacture and inspection and so on right straight through. The Department carries on its work over the entire field. There is not a school that isn't rated and approved by the Department; there is no damage to an airplane where the character of repair work is laid out; the character of approval is defined; the inspection program is carried out. That is enough.

Clarence M. Young was very anxious to be here today. But he has been in the west on a long trip and he isn't back yet. His associate, Colonel Harry H. Blee, has also taken a great deal of interest in this Congress meeting.

We will now ask Mr. Frederick R. Neely, who has come from Washington, to read the paper by Colonel Young.

The Department of Commerce and Safety in Aeronautics

By HON. CLARENCE M. YOUNG

Assistant Secretary of Commerce, Washington, D. C.

The question of safety in aeronautics is no different, fundamentally, from the problems of safety in any other form of transportation. There are three primary causes of accidents in any system of travel that employs vehicles: personnel failure, structural and material failure, and adverse weather conditions. Any one, or a combination of any two, or all three are represented to some degree in every accident that occurs, be it on land, sea or in the air.

When in the spring of 1926 Congress passed the Air Commerce Act and charged the Secretary of Commerce with the duty of fostering and regulating air commerce, the nation went formally on record as favoring Federal encouragement of this new science and industry. Under the provisions of the Air Commerce Act of 1926, the office of Assistant Secretary of Commerce for Aeronautics was created and the Aeronautics Branch was organized to administer the details of the Act. The foremost thought in the minds of those chosen to carry out these duties was safety, which now is the watchword of the Branch. The present gratifying condition of civil and commercial aeronautics in the United States is, to a large degree, due to the safety measures that have been and are constantly being employed.

Clothed as it is, with a number of regulatory powers, the Aeronautics Branch, acting for the Secretary of Commerce, utilizes this authority in the name of safety. Every regulation prepared and promulgated is intended to reduce the number of certain types of accidents or prevent altogether other kinds through changes in design and construction of equipment. In addition to the regulatory phase of its activities, the Aeronautics Branch endeavors to provide the greatest possible safety facilities for air navigation through the establishment and maintenance of airways. And while these practical steps are being taken, engineers and scientists of the Branch are constantly

at work, developing new methods or improving upon the old to the end that more lives will be saved and more equipment will be spared.

These activities may well be discussed in the order in which they have been assigned to the three major divisions of the Aeronautics Branch, the Air Regulation Service, the Airways Division and the Aeronautic Development Service.

Air Regulation Service

The regulation of aeronautics is divided into three main groupings: inspection service, licensing division, and engine testing section.

Examination and licensing of pilots and mechanics, rating of flying school instructors; inspection and approval of aircraft, flying schools and aircraft repair stations, and regulation of scheduled interstate passenger air lines, are the outstanding duties of the Inspection Service.

The Licensing Division, among other activities, issues and renews aircraft and airman licenses; examines student pilots as to their physical fitness for flying before they are licensed and periodically checks the physical conditions of those who are already licensed. This division also handles the legal phases of enforcing the Air Commerce Regulations, investigates violations of the Air Commerce Act of 1926, the Air Commerce Regulations, and the Air Traffic Rules, and determines the causes of civil aircraft accidents.

The Engine Testing Section conducts tests of aircraft engines which are to be used in licensed aircraft.

The duties of each of these three divisions of the Air Regulation Service of the Aeronautics Branch are directly related to safety. The examination and licensing of airmen is, perhaps, one of the most important duties of the Regulation Service and even of the Aeronautics Branch itself. When it is considered that the personal equation plays such an important part in the safe operation of an airplane, the reason for the emphasis placed by the Branch upon the proper qualification of pilots can readily be seen.

Requirements which are to be met by candidates for pilots' licenses are strict, but not unjust. The student, before beginning to take instruction in a licensed aircraft, is required to secure a student permit which is based upon the passing of a physical examination. Since a physical condition satisfactory to the Aeronautics Branch is necessary for pilots, examinations by physicians designated by the Branch are required not only of prospective students, but also of candidates for all grades of license. Further, periodic checks of physical conditions are exacted of holders of licenses and the requirements in this regard are more stringent for the higher grades.

The physical examinations of applicants for student permits are designed to eliminate those who are not physically qualified to fly. The applicant for license seemingly may be in good health, but the medical examiner is careful to make certain that there is no defect which may immediately or eventually present an element of danger should the candidate be allowed to pursue instruction. When satisfied with the condition of the applicant, the physician issues the permit and the student pilot proceeds with his flying course.

When the student has received the necessary instruction and gained the requisite experience qualifying him to take his examination for pilot's license, his theoretical knowledge and his ability to fly are tested by an Aeronautics Branch inspector. These examinations and tests vary, as do the physical examinations, with the desired grade of license. The type of flying, which a licensed airman may engage in, is definitely limited according to the grade of license he holds. There are four grades of licenses for pilots of powered aircraft: private, industrial, limited commercial, and transport.

Only holders of limited commercial and transport licenses are permitted by the regulations to carry passengers for hire in licensed aircraft. They are not permitted to carry persons or property on a commercial basis in aircraft that are not licensed.

However, the limited commercial pilot may carry passengers for hire only in certain areas and in certain types of aircraft which are specified in his license. The transport pilot is not limited as to the areas in which he may carry passengers but he also is allowed to carry persons for hire in licensed aircraft only of the classes specified on his license. The transport pilot and the limited commercial pilot are called upon to demonstrate their ability to fly each type or craft in which they propose to carry paying passengers, and are then given ratings for the classes in which they prove themselves to be qualified.

The number of hours of solo flying required of candidates before applying for licenses ranges for 10 hours for the private pilot to 200 hours for the transport pilot, and the theoretical knowledge varies in proportion. The transport pilot must pass a written examination designed to ascertain his knowledge of such subjects as meteorology, engines, technical phases of the airplane, the air traffic rules, the air commerce regulations, and other subjects which have a bearing upon his safe operation of an airplane. Each pilot also is required to show his actual ability by flying, and performing certain specified maneuvers, for an Aeronautics Branch inspector.

The minimum passing grade for any subject in the theoretical examination is 70 per cent and practical tests must be accomplished to the satisfaction of the examiner. Applicants who fail to pass the prescribed tests may apply for reexamination at any time after the expiration of 90 days, except that applicants for private pilot's license may apply again after 45 days. If the physical examination has expired for the class of license for which application has been made, a new examination must be passed.

Rules on License Renewal

Transport and limited commercial pilots are required to renew their licenses every six months, but the licenses of industrial and private pilots are effective for one year. The holder of a license may be required by the Aeronautics Branch, at any time, to undergo a reexamination in any of the theoretical or practical tests employed by the Branch to determine the knowledge and ability of the pilot. Also, in connection with renewal of licenses, the holder is required to show that he has accomplished the amount of solo flying prescribed for his license grade during the period in which his license was effective.

Prior to February 28, 1929, when authority was extended the Department of Commerce through an amendment to the Air Commerce Act to examine and rate flying schools upon their own application, the Aeronautics Branch was deluged constantly with requests for information as to reliability, adequacy and suitability of various commercial flying schools. It was impossible for official replies to be given because of the absence of a known method upon which some or all of the schools were operating. Consequently, the aspiring pilot was forced to choose for himself; sometimes he made a good choice and sometimes he did not. Such a condition did not make a very great contribution toward safety in airmanship.

Acting under the authority granted the Department, the Aeronautics Branch prepared and promulgated school regulations which deal with the suitability and airworthiness of the equipment used; the competency of the instructors and the adequacy of the course of instruction.

In order to illustrate just what qualities the Department considers are essential in a school giving instruction to students, a few of the requirements which a school must comply with before being approved, are cited:

All planes used for flight instruction must be licensed by the Department of Commerce for that specific purpose; the field must have at least 2,000 feet of effective landing area in all directions; the total number of planes in actual instruction for a given field shall not exceed 10 planes per 100 acres at any time; and all flying and ground instructors are required to hold ratings from the Department. The courses offered shall not fall below set minimum requirements. These requirements specify

the minimum number of hours of flying time and ground school work which a student must be given before being graduated.

To fly safely, even the most skillful pilot must have at his command an aircraft that is airworthy, hence the requirements of the Aeronautics Branch with regard to approval and licensing of aircraft. Only airplanes which have been licensed by the Department of Commerce are permitted by the Air Commerce Regulations to fly in interstate commerce. To be eligible for license, an aircraft is required to conform to the airworthiness requirements of the Aeronautics Branch, and in constructing his product, the manufacturer has as a guide to these requirements Aeronautics Bulletin No. 7-A, "Airworthiness Requirements of Air Commerce Regulations for Aircraft." This bulletin tells him how the plane should be built in order to receive the approval of the Branch. It furnishes formulae, design data, and engineering information in detail to aid him in his work, so that when the airplane is completed it will be in accordance with the accepted standards of airworthiness.

Two Groups of Aircraft Licensed

Aircraft are approved for license by the Department of Commerce under two groups. The first group is composed of those types of aircraft which manufacturers intend to construct in large quantities and for which approved type certificates are issued. The second class, which has been designated as Group 2, consists of those types of aircraft of which only limited numbers are to be manufactured and for which approved type certificates are not desired. However, both groups must comply with the same airworthiness requirements before being eligible for license.

Approved type certificates are issued as a matter of convenience to manufacturers of aircraft of the same type in large quantities. When the manufacturer has secured a certificate for a certain type, then each aircraft manufactured in that type is eligible for license after an inspection by the Department of Commerce. The issuance of an approved type certificate is promised also upon an inspection of the factory facilities with the purpose of ascertaining whether the manufacturer has the equipment and personnel necessary to construct aircraft of the type approved.

If the manufacturer intends to construct only a limited number of aircraft of a certain type he may obtain the Department's approval for their manufacture under the Group 2 classification. The procedure is essentially the same as that followed for aircraft manufactured under an approved type certificate except that a more rigid inspection of the aircraft is conducted by the Department if the factory facilities for production have not been previously approved.

In order to obtain an approved type certificate the manufacturer is required to submit to the Department a complete set of drawings, technical data and stress analysis. This material is carefully examined and checked for errors and if it is found to comply with the airworthiness requirements, the Department authorizes an engineering inspection, static tests, and flight tests of an aircraft built according to the designs which have been submitted.

In conducting the engineering inspection, the inspector first determines the empty weight of the airplane. If this weight added to the computed useful load does not exceed the gross weight authorized (determined by the technical data submitted), the inspection and flight test may continue, in which event the manufacturer will complete for the inspector a manufacturer's affidavit, stating that the airplane is identical with that for which technical data were submitted and approved. This airplane form will be furnished by the inspector.

A close inspection of the airplane then is conducted by the engineering inspector to determine whether it meets the Airworthiness Requirements. Among items receiving particular attention at the time are the following:

Gasoline valves should operate from the pilot's cockpit; instruments required should be installed and operating; a suitable fuel gage should be provided; engine controls,

instruments, and ignition should be plainly marked to show their functions and methods of operation; the stabilizer in practically all cases should be adjustable from the pilot's cockpit and operate easily; safety belts for both passengers and pilots should be provided; air-pressure fuel systems shall not be used; if a mechanical fuel pump is used, an emergency hand pump should be installed; hand pumps may be installed for emergency use only; filler caps should be plainly marked with the word "oil," "gas," or "water," as the case may be, and filler caps shall be attached to their respective tanks by short chains or other adequate means and shall be marked to show the capacity of the tank.

In the event an approved type certificate is desired, the inspector also conducts an examination of the factory in order to determine whether it has the facilities to produce aircraft in quantities. He investigates the efficiency of the personnel, the equipment available, whether or not the factory is equipped for exact duplication of parts and assemblies, the factory-inspection system employed, and the factory's source of supplies. He also ascertains the dependability of the organization, its attitude toward quantity and quality of production, and the shop practices employed. The primary object of this inspection is to determine whether the factory can produce aircraft in large quantities of the same standard and quality as that embodied in the aircraft submitted for inspection if an approved type certificate is issued.

Static and Other Tests

In addition to the inspection, the airplane is further examined in static tests, and designed to ascertain the strength of stationary surfaces and parts and the strength and ease of operation of moving parts of the aircraft in order to determine its ability to operate under the loading conditions for which it was designed. These tests are conducted by the manufacturer in the presence of a Department of Commerce inspector.

Generally these tests include wing-rib static tests, control-surface tests, control-system tests, and landing-gear drop tests. However, the Department may require additional tests on different parts of the aircraft where the design or data indicates the necessity. As an illustration of the procedure followed in static tests, the wing ribs are loaded with sandbags or lead shot, the amount varying with the aircraft, in order to test their strength. The strength of the landing gear may be tested, when it is thought necessary, by actually dropping the aircraft on an approved jig, to which it is attached, from a prescribed height. The control surfaces, such as ailerons, rudder, elevators, and stabilizers, are tested both for strength and ease of operation by placing weights on them and then working the controls. The control system, which includes the cables and levers which move the surfaces, is also tested for strength and ease of operation, special attention being given to ascertain amount of freedom from jamming, excessive friction, or deflection.

Reports of these tests are made by the manufacturer to the Department and are signed by the inspector who witnessed them. The results of the tests, as submitted to the Department, describe fully the method of loading, the load-distribution curves, deflection readings or curves, and include a log of the test describing all failures or repairs made during the tests. Photographs of all failures in the structure and a photograph of suitable size showing the test set-up and the points from which deflections were measured are enclosed.

In particular cases where the structure cannot be satisfactorily analyzed and static tests are submitted as the only proof of compliance with the strength requirements, such static tests are carried to destruction, or to 150 per cent of the design load, and samples of the major structural parts are included with the main test report.

In the case of structures which successfully withstand 150 per cent of the design load without failure, the auxiliary specimen tests may be waived provided the manu-

facturer submits, with affidavit, a satisfactory statement of the materials involved and the guaranteed maximum range of variation of their physical properties.

If the submitted design is found to be in conformity with the requirements of the Air Commerce Regulations and is approved, the manufacturer is required to state under oath that the airplane which he submits for inspection is built in exact accordance with the approved specifications. An inspection is subsequently made to determine that the workmanship and materials incorporated in the airplane are such as to produce an airworthy machine.

The airplane then undergoes flight tests of such a nature as to demonstrate its balance, stability, maneuverability, and general flying and taxiing characteristics. Prior to, or at the time of, presentation of an airplane to the Aeronautics Branch for flight tests, the manufacturer should submit to the Department inspector designated to make the tests, a detailed report of the manufacturer's flight tests on the particular airplane involved. The report submitted should be signed by the manufacturer's test pilot and should show that the aircraft has been fully test flown, including all the required maneuvers, such as tests for longitudinal, lateral, and directional balance and tests for stability. If the flight tests given by the Aeronautics Branch inspector are successfully accomplished, the airplane will be approved for license. If, in addition, suitable manufacturing facilities are in evidence, and the manufacturer so desires, an approved type certificate will be issued.

Airworthiness Requirements

The Aeronautics Branch inspector, in conducting the flight tests, is particularly concerned as to whether the airplane is longitudinally, laterally, and directionally stable under all power and load conditions. The airworthiness requirements state, as the minimum requirements, that all airplanes shall be longitudinally stable and at least neutrally stable both laterally and directionally, and shall be balanced. With respect to longitudinal balance and stability the requirements provide that "at engine speeds between the minimum required for level flight and 90 per cent of the rated engine speed, all airplanes shall be longitudinally balanced and stable in level flight. All airplanes shall preferably be longitudinally balanced and stable in level flight at full power, but will be acceptable if, with the stabilizer set for balance in level flight at 90 per cent of rated engine speed, they assume a stable climb at engine speeds above 90 per cent and will not stall nor fall out of control from that position. With power off, all airplanes shall be longitudinally balanced and stable at some speed between 130 and 140 per cent of the stalling speed at sea-level altitude."

A stable climb means that the airplane will not dive or stall completely when disturbed slightly from the climb position, but will return to the climb position from which it was disturbed.

Longitudinal balance means that the airplane is neither nose-heavy nor tail-heavy and that no elevator control force is required to maintain level flight. Lateral balance means that the airplane is not wing-heavy and that no pressure by the pilot is necessary to fly with the wings in a horizontal position. Directional balance is defined as meaning that no foot pressure on the rudder bar or pedals is necessary to keep the plane directionally set at cruising speed.

An airplane is considered to be longitudinally stable when it will return to its original flight path without the assistance of the pilot if disturbed longitudinally. When an airplane is laterally stable, it will return to the horizontal laterally without assistance from the pilot when displaced laterally and held on its original course with the rudder. An airplane is directionally stable when it will return to straight flight after it has been disturbed directionally, lateral and longitudinal level being maintained by use of elevator and aileron controls.

When an approved type certificate is granted, one set of drawings is impressed with the seal of the Department of Commerce and returned to the manufacturer to be

used in the construction of his airplanes. The other set is placed in the files of the Aeronautics Branch. The Department inspectors may call for, and should have access to, these approved drawings when making inspection at the manufacturer's plant to determine whether the airplanes built under the approved type certificate conform to the approved data. Only one set of drawings is submitted for Group 2 approval and this is retained by the Department, after approval is given.

Changes in airplanes constructed under designs having approved type certificates or Group 2 approvals, may be made only with the consent of the Department. When a license is issued it is valid for only one year, but it may be renewed annually upon the application of the owner and the finding by the Department that it is airworthy and is owned by an eligible owner. However, it is subject to revocation or suspension if regulations are violated. Grounds for this action include equipping the airplane with a type of engine not specified in the license; remodeling the airplane structure and flying the airplane without having it first rerated as airworthy by the Department; operating the airplane with a load in excess of the authorized useful load as specified in the license; operating with passengers in excess of the number authorized in the license; moral irresponsibility of manufacturer or owner.

Requirements of the Engine

The engine installed in an approved plane must be of a type which has been approved by the Department of Commerce, or by the Army or Navy. Before becoming eligible for approval by the Department of Commerce, engines are subjected to the Engine Testing Section. When an engine is received by this section, it is placed on a test stand at the Department's station at Arlington Farms, Virginia, across the river from Washington. Inside a small room the testing engineer, surrounded by instruments and test equipment, determines the power, measures the fuel consumption, conducts lubrication tests and investigates the adequacy of the cooling equipment. When these tests have furnished the necessary amount of data the engineer's next question is to determine over how long a period the engine will continue to give this performance. The best means of determining this is by an endurance test. After the engine has been run for a predetermined period it is taken apart for examination. If parts show signs of wear they may be replaced with others of different design and the engine tested again. The entire test consumes 50 hours, in ten 5-hour periods, with no more than three forced stops allowed.

The approved airplane must also be equipped with a propeller or propellers that have been given the sanction of the Department. This approval is given after the propeller has been tested for the particular power and speed of revolutions which are claimed for it.

Even the components and accessories for use on a licensed aircraft, which have a bearing on the safety of aircraft, cargo or passengers must be approved by the Department. In this class are included such items as landing gear shock absorbing units, landing gear wheels, and seaplane floats.

The Department also has issued a set of requirements governing alterations and repairs to licensed aircraft. A licensed aircraft which is slightly damaged may be repaired only by a licensed mechanic. A licensed aircraft which has had a major part damaged may be flown again only after it has been repaired in accordance with the requirements and the repairs approved by a Department of Commerce inspector.

Mechanics who propose to work on licensed aircraft or engines are required to be licensed by the Department. They must prove, by passing examinations, that they have actual experience in addition to the theoretical knowledge necessary to conduct repairs. Mechanics who propose to repair or maintain engines are licensed as engine mechanics and those who propose to repair aircraft are licensed as aircraft mechanics and a person may hold both types of licenses if he satisfies the requirements.

Repair stations may receive the approval of the Aeronautics Branch, if they request it and qualify for the rating desired. This approval is based upon the type or

class of work which the stations are equipped to undertake. When an application from a repair station is received, the station is inspected to determine whether or not it is equipped properly to service licensed aircraft in certain ways, typical classifications being: welded steel tube structure, wood structure (except box spars), fabric covering and doping (finishing), riveted dural structure and box spar wing work. When a repair station has been approved it is required to furnish an affidavit with each complete job of major repairs stating in effect that the particular aircraft has been repaired in full accordance with the Air Commerce Regulations, and when complete components are replaced, that such components are products of the original manufacturer of that aircraft.

Parachutes

The examination and approval of parachute is also provided for by the Department. The regulations require that each person in an aircraft performing acrobatic must be properly equipped with a parachute of a type and design which has been tested and approved by a competent agency of the Federal Government. A manufacturer applying to the Department for this approval is required to submit complete drawings and specifications of the type of parachute which he proposes to build. When he receives an approved type certificate for his parachute he is required to submit an affidavit twice a year certifying that all parachutes manufactured under a given certificate are in exact accordance with the design and specifications submitted.

Parachutes also are required to be packed or repacked at least once in each sixty days prior to being worn during flights in aircraft. This work must be done by a parachute rigger, licensed by the Department, or so designated by the Army or Navy.

The Department has also promulgated, as part of its regulations, a set of air traffic rules to govern the movements of aircraft in the air. These rules were designed with the cardinal principles of safety primarily in mind. Among other things, they stipulate that an aircraft may be flown at a height of not less than 500 feet over areas other than cities, towns or settlements, and over heavily settled portions at a height of not less than 1,000 feet. Aircraft carrying passengers for hire are not permitted to engage in acrobatics, according to the air traffic rules, and craft flying at night are required to show prescribed navigation lights. Procedure for taking off and landing at airports is outlined, and aircraft flying along airways are required to keep to the right and observe specific requirements with regard to passing and overtaking other aircraft.

For the purpose of surrounding air lines engaged in the scheduled transportation of passengers in interstate commerce with all possible safeguards and with a view to providing air transportation with virtually the same uniformity of operation as is now enjoyed by the major railroads and steamship systems, the Aeronautics Branch has prepared and promulgated a supplement to the Air Commerce Regulations requiring the operators of scheduled air passenger transport services in interstate commerce to obtain from the Department of Commerce a certificate of authority to operate such service.

The certificate of authority is issued only to those operators who affect complete compliance with the regulations. These regulations, which constitute a standard or code of minimum requirements governing the operation of scheduled interstate air passenger routes, are designed to aid operators in maintaining and increasing safety and reliability in this phase of civil aeronautics.

The inspection of the air lines that apply for the certificates of authority is minute in every detail. Air line inspectors, especially qualified for this type of work, inquire into every phase of air line operation that would have a bearing on the public safety. Perhaps unknown to the pilot or crew of an air liner, one of the inspectors will take his place in the cabin of a passenger airplane and, from the vantage point of a passenger, but from the viewpoint of a skilled airman, he will observe the operating methods of the crew. Furthermore, the inspector makes it a point to fly with every

pilot who operates between division points, and to observe not only his technique, but his general judgment, experience and ability to handle air line transportation.

At the terminals the inspector closely observes ground operations, such as clearance, methods of handling weather information and other factors entering into a successful cross country flight. At maintenance points, the inspector is particularly anxious to determine the methods employed in keeping the aircraft and engines in perfect running order. The competency of the employees, the adequacy of the shop equipment, the local inspection systems employed on aircraft and engines—all are inquired into for the purpose of seeing that they do not fall below the standards specified by the regulations.

The results of these inspections are threefold:

- (1) They give the air line management the benefit of outside expert advice and suggestions based upon personal experience of the inspectors with the lines in question.
- (2) They give the Department of Commerce evidence as to the qualifications of the air lines to carry passengers in scheduled interstate commerce for hire; and
- (3) They serve to reassure the public that the Department of Commerce and the air line operators are cooperating closely with each other for the further advancement of safety and reliability in scheduled air-passenger transportation.

Airways Division

For the scheduled air lines, and for all other flying activities as well, another phase of the Aeronautics Branch's activities constitutes a valuable aid to safety in flight. The Federal Airways System, which is a network of air routes provided with beacon lights, intermediate landing fields, radio directional and radio broadcasting service and facilities for weather information collection and distribution, is established and maintained by the Aeronautics Branch of the Department of Commerce.

Of the more than 150,000 airplane miles flown every twenty-four hours by the scheduled air services, approximately 40 per cent are night operations. Without the airways, any flying operations except those conducted in clear weather and in the day time would be impractical, but with them, aircraft may fly safely at night and thereby duplicate the performance of surface travel. By being able to operate with regularity after dark, aircraft continues to maintain its advantage of speed over surface systems, which is three to four times faster.

The Department of Commerce, because of its long experience in providing aids to marine navigation, has been able to establish and maintain the airways with the maximum amount of efficiency.

There are now 17,500 miles of airways lighted and under construction, which are or will be equipped with radio direction and communication facilities and weather reporting services. Including the 2,000 miles of lighted airways authorized for the ensuing year, the airways program now embraces 19,500 miles. In addition, there are 1,123 miles of airways which have been or are being provided with air navigation facilities for day operations.

Accurate aeronautical weather information is collected from the weather stations along the airways and distributed over the Department's 10,000 miles of automatic telegraph typewriter circuits for posting at airports and for broadcasting from the radio communications stations. The automatic telegraph typewriter stations, which are situated on the airways, also report the movements of planes, when this position reporting service is requested.

Radio directional guidance to aircraft in flight is furnished along the airways by the radio range stations which send out signals to tell the airman whether he is following the airway course or is flying to one side. The radio communication stations broadcast weather information to the airman while he is flying along the airway. These stations also may be used for the transmission of special messages to the airman while he is in flight.

Intermediate landing fields are so spaced in combination with commercial, municipal and other airports and landing fields that airmen flying along an airway are nearly always within at least ten or fifteen minutes flying of an established landing area. The intermediate landing fields are equipped with beacons, course lights, boundary lights, range lights, obstruction lights, and illuminated wind indicators.

The beacon light at an intermediate landing field is similar to those along the airways at points where there are no fields, except that its course light is green instead of red. The boundary lights are installed around the edge of the field to show its size and shape, and are spaced approximately 300 feet apart. In addition to the boundary lights, there are green runway lights at those points along the edges of the field where the principal runways begin. The best, or prevailing wind runway, is marked by two green lights at each end, and other available runways by one green light at each end. The obstruction lights are red lamps placed on buildings, telephone poles and other obstructions. The illuminated wind indicator, affixed to the beacon tower, or at some other convenient place, shows the direction in which the wind is blowing, and also gives an indication as to the wind's velocity.

The fields are marked, for landings in daytime, with a circle as the central figure, located at the intersection of the runways. The field boundaries are marked by metal cones thirty inches in diameter and twenty-four inches in height, installed immediately below the boundary light and attached to the boundary light standards.

With the Airman on Night Flight

A brief description of what the airman would find if he started out over an airway at night for a destination, say, 200 miles away, will show just what these airways and their equipment mean to the airman.

As the pilot takes off from an airport, aided by the lights that flood the field, a code message goes out over an automatic telegraph typewriter circuit operated by the Aeronautics Branch, giving his plane number, his name, destination and time of departure. This message is automatically produced on receiving machines at strategic points along the airway to be followed, so that his progress may be noted by each station as he passes over it. As the pilot rises into the air he sees ahead of him a flash of light. This is the first airway rotating beacon, and at the same time that he sees this one he may see several more ahead, if the night is clear, each flashing six times a minute.

As the clear flash of the beacon revolves, the pilot sees a red light, known as a course light and mounted on the beacon tower in close proximity to the clear light, flashing a code signal. There are two of these course lights on each beacon, one pointing forward and the other backward, along the course of the airway. The code signal indicates the number of the beacon light with respect to a 100-mile section, in this case No. 1 beacon on the first 100-mile section of the airway being followed.

Having noted the beacon lights marking the course, the pilot may then place his radio range beacon receiving set in operation and begin to receive the radiobeacon signals which mark the course he is following.

When the airplane has proceeded approximately 50 miles along its course, the airman comes upon a beacon which has a flashing green course light, instead of a red light. This indicates that there is an intermediate landing field at the site.

The pilot, not having any occasion to land, continues on his route, watching the beacon lights, listening to the radio range beacon, and checking his flight and engine instruments. Suddenly the radio beacon signals cease, to be followed by a voice which brings a message announcing the designation of a broadcasting station, the correct time, the "ceiling" above the field at which the plane will next land, whether or not it is raining, the condition of the visibility, the velocity of the wind, the temperature, the barometer reading, and all other information that would be of value and assistance to the pilot flying along in the night. The broadcaster, a Department of Commerce

employee, also gives weather conditions in general along the line of flight. The voice signs off and the radiobeacon signals are resumed.

This weather information has been collected by the automatic telegraph typewriter stations from Weather Bureau stations along the airway and at points about 200 miles to the left and right of the course. Each automatic telegraph typewriter station places on the circuit the weather information at this particular point. All this information is assembled at the radio broadcasting stations, edited, and placed on the air at regular intervals.

And these same automatic telegraph typewriter stations have been on the lookout for the plane. As it passes over each station the operator sends a message which is received automatically at the pilot's point of departure, at the points yet to be flown over, and at the point of destination.

At about 150 miles away from his point of departure, the pilot receives another radio signal from the ground which informs him that the radio range beacon beam, which he has been following, has about reached its range limit and that he should tune in on the signals that are being projected toward him by the station located about 150 miles due ahead on his course. This signal comes from what is known as a "marker beacon." The pilot tunes into the proper frequency of the new radio beam and continues on as before, utilizing the Department of Commerce aids to air navigation, until his point of destination is reached.

The airways as established by the Aeronautics Branch are for the use of every pilot and plane, regardless of the nature of their activities. Unlike railroad rights of way, Department of Commerce airways may be flown by any number of air transport lines, and all aircraft are at liberty to utilize the facilities that constitute the airways, which are established in the interest of safety and reliability.

Aeronautic Development Service

The third division of the Aeronautics Branch of the Department of Commerce which is contributing materially to the safety of air transportation is the Aeronautic Development Service. This service embraces all activities of the Department in connection with assisting communities in the selection and development of airports, the rating of airports, the promotion and correlation of aeronautics research, the publication and dissemination of aeronautic information, the publication of air navigation maps, airway bulletins, and warnings to airmen, and the general promotion work of the Department looking toward the development of civil aeronautics.

Functioning under the Aeronautic Development Service is the Aeronautics Research Division, located at the Bureau of Standards, whose object is the development of aids to air navigation and the promotion of safety and comfort in flight. The work of this division includes such activities as research on radio aids, investigations on aeronautic lighting, wind tunnel research, research on special airplane engine problems, crash-resistant fuel tanks, and investigation of the strength of airplane joints and fittings.

A combined transmitter for the simultaneous transmission of weather broadcasts by radio telephone and visual type-radio range beacon signals on the same frequency has been developed by this division, and also a pointer type indicator for use with the visual radio range receiver. Another project is a radio system for the blind landing of aircraft so that an airplane may be landed in times of low visibility, or even when visibility is zero, by means of radio signals. The development of an instrument known as a devimeter which enables the radio beacon signals emitted by the radio range beacons to be utilized at distances away from the regular course was achieved by the research division. A radio direction finder for use on aircraft has been developed, and the division now is working on radio methods and equipment that can be applied to prevent collision between aircraft in conditions of low or

zero visibility, by giving automatic warning to an airplane of the presence and approximate position of any other airplane within a radius of about three miles.

Considerable research on lighting has been done, accomplishments including improved airplane running lights and an air traffic control projector. Studies have been made of flashing characteristics for code lights, and of colored glasses for use in airway lights.

One of the aircraft engineering problems undertaken was a study of the efficiency of various types and sizes of control surfaces. A project concerned with reduction of noise in airplanes has been completed with respect to sound-insulation of cabin walls, and is being continued with respect to muffling engines and reducing propeller noise.

In its experiments looking toward the development of fuel tanks which will not burst and deluge an airplane with fuel in case of an accident, the Aeronautic Research Division has found that a new elastic and strong synthetic material, having many of the properties of rubber but insoluble in gasoline or oil, offers great possibilities when used inside the tank.

Maps and Charts for Air Navigation

A highly important activity of the Aeronautic Development Service is the preparation of maps and charts for air navigation. This work is conducted by the Airways Mapping Section, located at the Coast and Geodetic Survey. The airman flying over unfamiliar territory must necessarily place implicit faith in the accuracy of his maps, and compilation of reliable maps was, therefore, undertaken by the Department of Commerce for the benefit of aeronautics, just as a similar service has been rendered seamen for years.

Two kinds of maps are included in the present program, airway strip maps and sectional airway maps. The strip maps follow the airways and show the location of the radio beacon course along the airways, airports, towns, railroads, highways, high points, streams and other details of importance to the man in the air. Each of the sectional maps shows a rectangular area embracing 2 degrees of latitude and 6 degrees of longitude. The first map of this type covers some 50,000 square miles of territory below and at either side of the southern tip of Lake Michigan. Two others, one covering a region of similar size in the vicinity of Milwaukee, Wisconsin, and the other showing territory in the region surrounding Detroit, Michigan, and Toronto, Canada, have been prepared and the whole program contemplates 92 maps covering the entire United States. Eventually the sectional maps will supersede the strip maps, but the latter will continue to be available until sectional maps portraying the same areas are available.

The Aeronautics Branch from time to time organizes special research committees for the purpose of investigating certain problems relating to aeronautics and all of which have a distinct bearing on safety. Several of these committees now are functioning.

A committee on Airport Traffic Control is making a survey of traffic conditions at foreign and American airports with regard to air traffic conditions and means employed for controlling such traffic, with the purpose of drafting recommendations as to the extent and character of signal systems which seem necessary or desirable in connection with control of airport traffic.

The absence of uniform and thorough application of adequate drainage and surfacing for airports has been responsible for accidents in landing and taking off from airports and landing fields, for delays and interruptions in departures and arrivals of aircraft, and has involved the wastage of thousands of dollars in time and money in connection with airport projects. Therefore, a study looking to the solution of the problems of drainage and surfacing of airports, so far as they relate to airport engineering and construction, has been made by a special committee. The

report of this committee is now being prepared and will be printed and made available to all who may be interested.

A committee, organized to consider the practicality of applying the principle of automatic issue of water from sprinkler systems to control fires in airplane hangars, conducted tests of a number of types of sprinklers by starting fires in a hangar constructed for this purpose and which housed several obsolete airplanes. The committee has published its report and a limited number of copies are available at the Aeronautics Branch.

Realizing the vital importance of the application of radio to aeronautics and the necessity of coordinating governmental and industrial research in this field, a liaison committee on aeronautic radio research was organized the first of last year for the purpose of making a survey of research activities and focusing such research on the early solution of the most problems with the minimum duplication of effort.

The work of the committee is divided into three phases: A survey of research in progress on aeronautic radio problems; a survey of problems on which research should be undertaken or accelerated; and a recommendation of agencies to carry on the work outlined. It is believed this committee will render a valuable service not only to governmental and industrial research agencies, but to the entire aeronautic industry by directing research and experimentation toward radio problems the solution of which is most important to the advancement of aeronautics.

The Aeronautics Branch is dealing with safety in aeronautics from every approach that is open to the Department of Commerce. As we are charged with fostering air commerce, it is incumbent upon us to take every practicable step to bring about the further utilization of aircraft for business and pleasure. We are happy to say that we have permitted the full meaning of the word "safety" to dominate virtually every official move we have made and we want to assure you that we shall continue to function under this policy.

Discussion

CHAIRMAN BERKHOFF: Mr. Neely, we certainly appreciate very much your coming to Chicago to give this very complete and instructive and yet really brief presentation of the comprehensive program that is being carried out by the Aeronautics Branch of the Department of Commerce. I really wish that the whole National Safety Council could have heard this presentation. It is a wonderful story of what the Department of Commerce is doing and as to the future program in developing this new art and bringing safety into every phase of it. It is only after you live with it that you realize what the Department is doing.

Last July the Department met with all the manufacturers, it met with all the transport operators, it met with all the schools. They all brought in their recommendations as to how regulations might be modified to promote greater safety or to make them less irksome. The Department meets with these groups periodically. They work hand in hand so as to have the cooperative regulations that this industry is securing from the Department of Commerce.

I think it would be very much in order here if we might have a vote of thanks that would be directed to the Department for its interest and for the preparation of this wonderful document, and also for sending one of its representatives here to so ably present it.

L. R. PALMER (The Equitable Life Assurance Society, New York City): I wish to voice that sentiment and have it expressed as a motion carrying the sentiment of this meeting.

I so move.

HENRY A. RENINGER (Lehigh Portland Cement Co., Allentown, Penna.): I second the motion.

(The motion was put to a vote and carried unanimously.)

CHAIRMAN BEECROFT: I know some of you want to ask some questions and I know that Mr. Neely is qualified, as everybody in that Department is qualified, to answer questions. It is just barely twelve o'clock, so there are a few minutes left.

MR. PALMER: I want to announce that Mr. Lester D. Seymour has accepted membership on the Executive Committee of the National Safety Council. His acceptance pays tribute not only to his splendid organization but to the entire industry. We wanted someone with us who could educate us, and who could also from the inside come to know our real purpose in trying to help you in planning and carrying on the Section's activities.

The following committee is suggested in order to determine the selection of a General Chairman, possibly a Vice-Chairman and a Secretary, and these names are suggested to you for your consideration: Mr. Lester D. Seymour, Mr. David Beecroft, Mr. Clarence M. Young, and Colonel H. A. Reninger.

It is the purpose, if you agree with this and authorize this committee, that they will give consideration to the selection of a practical man from within the industry to serve as General Chairman of the Section. They will submit that selection to the members of the Section by letter ballot. Then, after authorization and election, that man becomes the definite General Chairman of the Section to carry on. In this way we won't have to carry over until next year to make any selection.

I move that this committee be authorized.

CHAIRMAN BEECROFT: Is there a second to the motion that Mr. Palmer has made, authorizing the appointment of the committee as named? Do I hear a second to that? (The motion was regularly seconded.)

CHAIRMAN BEECROFT: I should like the mover of that motion to explain quite in detail the duties you expect this committee to have, as the chairman feels his lack of capacity to express that.

MR. PALMER: Of course, as you know, each of our Sections has a duly elected General Chairman to function and make contact with the National Safety Council and with the other Advisory Committees that may have been set up for that Section. Such committees as are developed in the course of progress pass upon any bulletins or other material that the National Safety Council may develop, and function as the regular machinery directing sectional activities. For this section it would simply mean that we would have a definite service developed officially within the coming year. It is simply to provide regularly elected officers the same as we have in all Sections. The committee I have suggested would be a Nominating Committee, authorized to declare the popular selection as to official officers of the Aeronautical Section.

CHAIRMAN BEECROFT: Thank you very much. You have heard the motion, which was seconded, for the appointment of a committee consisting of Mr. Lester D. Seymour, Mr. Clarence M. Young, Colonel H. A. Reninger and the Chairman. Does anyone wish to discuss that motion?

(The motion was put to a vote and was carried.)

CHAIRMAN BEECROFT: Now we come back to the discussion of the last paper, the excellent presentation made by the Department of Commerce. Are there any questions to be asked?

R. E. DOWD (Russell Manufacturing Company): Out of curiosity I am interested to know if the Department is planning anything in connection with regulations requiring parachutes on transport lines for passengers?

FREDERICK R. NEELY (Department of Commerce, Washington, D. C.): I am sorry, but I know of no plans in that regard.

CHAIRMAN BEECROFT: Are there any further questions, gentlemen? Are there any comments on this subject?

If not, I don't want to close the discussion, but I think it would be very much in order if we might have a motion expressing our appreciation to the parties who have prepared papers for this meeting.

MR. DOWD: I make such a motion.

(The motion was regularly seconded.)

MR. PALMER: May I discuss that?

CHAIRMAN BEECROFT: You may, certainly.

MR. PALMER: It was the purpose of the National Safety Council in developing this program to get the best papers we could get. That is one reason we went to Washington and persuaded Colonel Blee to act as our chairman. We told him that we thought they were in a position down there to know the people who could best present these papers; they knew the things that were needed from a safety standpoint in the industry; and what we hoped to have here was something really worth while, which when printed in the Congress Transactions could be widely distributed in order to have a far greater scope than just in this meeting. We wanted to be of real service to the industry through this program. I think that they have done splendid work and we have already complimented the chairman of the Program Committee.

CHAIRMAN BEECROFT: Thank you, Mr. Palmer. You have heard the motion that a vote of appreciation be extended to those preparing papers.

(The motion was put to a vote and carried unanimously.)

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



A. S. S. E.—Engineering
Section

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JOHN L. BOARDMAN, Anaconda Copper Mining Co., Butte, Mont. (Mining Section.)

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G. W. COOK, Travelers Insurance Co., Hartford, Conn. (Textile Section.)

J. E. CULLINEY, Bethlehem Steel Corp., Bethlehem, Pa. (Metals Section.)

L. A. DEBLOIS, Consulting Engineer, New York City.

J. W. FOLLIN, Philadelphia Federation of The Construction Industry, Philadelphia, Pa. (Construction Section.)

DR. JAMES H. GREENE, The Studebaker Corp., South Bend, Ind.

S. H. HARRISON, Vulcanite Portland Cement Co., Phillipsburg, N. J. (Cement Section.)

ERNEST HARTFORD, American Society of Mechanical Engineers, New York City.

R. A. HARTZELL, Standard Oil Co. (Ind.), Chicago, Ill. (Petroleum Section.)

S. V. JAMES, Underwriters' Laboratories, Inc., Chicago, Ill.

A. S. JOHNSON, American Mutual Liability Insurance Co., Boston, Mass.

R. McA. KEOWN, Industrial Commission of Wisconsin, Madison, Wis.

J. M. LEWIS, Mine Safety Appliances Co., Pittsburgh, Pa. (Accident Prevention Equipment Manufacturers' Section.)

D. FRANK LORD, M. J. Whittall Associates, Ltd., Worcester, Mass. (Worcester Chapter.)

D. M. LOUGHMAN, General Outdoor Advertising Co., New York City (Delivery, Taxicab and Bus Section.)

B. B. McCULLOCH, Bureau of Safety, Chicago, Ill.

- HENRY J. MINER, The Borden Company, New York City.
 C. B. MITCHELL, Republic Rubber Company, Youngstown, Ohio. (Rubber Section.)
 H. W. MOWERY, American Abrasive Metals Co., New York City.
 ARTHUR MURRAY, Chicago Mill and Lumber Corp., Chicago, Ill. (Woodworking and Lumber Manufacturing Section.)
 A. A. OLDFIELD, Wisconsin Power and Light Co., Madison, Wis. (Electric Railway Section.)
 G. A. ORTH, American Car and Foundry Co., New York City. (Metropolitan Chapter.) (Deceased.)
 E. E. PLACE, American Mutual Liability Ins. Co., Boston, Mass. (Boston Chapter.)
 J. J. PLZAK, Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis. (Paper and Pulp Section.)
 R. E. PROUTY, Aetna Life Insurance Co., New York City. (Food Section.)
 A. S. REGULA, Industrial Relations Counselors, Inc., New York City.
 A. D. RISTEEN, The Travelers Insurance Co., Hartford, Conn.
 G. E. SANFORD, General Electric Co., Schenectady, N. Y.
 W. R. SMITH, United Engineers and Constructors Inc., Newark, N. J. (Northern New Jersey Chapter.)
 G. S. THOMPSON, Gmaw & Co., Detroit, Mich. (Power Press Section.)
 HAROLD M. TOOMBS, Armour and Company, Chicago, Ill. (Packers and Tanners Section.)
 A. E. WILLAHAN, Kansas City Southern Railway Company, Kansas City, Mo. (Steam Railroad Section.)

Tuesday Luncheon Session

October 13, 1931

R. F. THALNER, Chairman
 Buick Motor Company, Flint, Mich.

The annual meeting of the American Society of Safety Engineers—Engineering Section of the National Safety Council followed luncheon at the Stevens Hotel, Chicago, Illinois, and convened at 1 p. m., Tuesday, October 13, 1931, R. F. Thalner, General Chairman, presiding.

Report of the General Chairman

By R. F. THALNER
 Buick Motor Company, Flint, Mich.

As in the past years, each member present has before him a preprint of the reports of all of our standing committees. Under the circumstances, we therefore will not ask the chairmen of these committees to present these reports in detail. Nevertheless, as the retiring chairman of the ASSE-Engineering Section, I find it my duty and distinct pleasure to comment briefly on these reports and emphasize some of the outstanding facts contained therein.

Executive Committee Meetings. Your Executive Committee has held two meetings during the past year at which all of the Society's activities were discussed in detail. We had an average attendance of nine members at each meeting.

Membership. Our Membership Committee has been active under the capable leadership of its chairman, B. B. McCulloch. We now have 956 members. This represents a gross gain of 117, but a net loss of 72.

Regional Conferences. J. E. Culliney, chairman of this committee, reports that during the past twelve months, twenty-four regional safety conferences were organized and held under the sole or joint sponsorship of the ASSE-Engineering Section. In addition, twenty-three other safety conferences were held in which we assisted but for which we received no formal recognition. Nine of our twenty-four conferences were held in communities which never before had conferences of this nature, indicating an ever widening sphere of influence for the advancement of the movement for accident prevention.

Research, Standards and Codes. The report of our Steering Committee on Research, Standards and Codes, G. E. Sanford, chairman, is exceedingly interesting. We have four standing research committees on Static Electricity, Woodworking Circular Saws, Low Voltage Electrical Hazards, and Gasoline Blow Torches. Several of these committees will hold meetings during the week as outlined in the program; all interested members are invited to attend and participate in the discussion.

The ASSE-Engineering Section is sole or joint sponsor for sixteen safety codes, nine of which have been completed and published. Sixty-seven safety codes are being formulated under the procedure of the American Standards Association; we have 110 representatives serving on 53 of these code committees.

Perhaps our outstanding accomplishment is the progress that has been made by our special industry committees. To date, thirty special committees have been organized, and through their work twenty-six pamphlets have been completed and published; the reports of the four remaining committees are well along toward completion. Ultimately, we hope to have at least one comprehensive report or Safe Practices Pamphlet on every industry functioning in the United States. New committees will be organized just as rapidly as it seems practicable to do so. We are continually looking for volunteers to serve on the various committees. It would be ideal if every member were actively engaged in at least one activity of the Society.

Chapter Organization and Activity. Arthur Murray gives us a short report on the activities carried on by his committee during the past year. We have three flourishing chapters of which we are justifiably proud. One chapter (in Worcester, Mass.) has dropped by the wayside, but we recently received application for the recognition of a new chapter just organized in Western Pennsylvania with headquarters in Pittsburgh. Action on this application will be taken at a meeting of our Executive Committee to be held during the week. We have never made it our objective to swell our list of chapters simply through the recognition of groups that are almost sure to fall below the standards set by our other chapters. Negotiations are being continued with several strong societies in California and in other communities whose activities parallel our own.

Society Pin and Membership Certificate. Our Society has an official pin or emblem which all members are privileged to wear, as well as a membership certificate or "shingle" suitable for framing and for hanging on the wall of a member's office. Pins and certificates can be secured through the headquarters office or your order can be recorded at the registration desk in this hotel. The pin costs \$2.50, and the certificate \$1.00 each.

Engineering Colleges. The work of our Committee on Accident Prevention in Engineering Colleges, R. McA. Keown, chairman, is undoubtedly one of the most important, yet most difficult activities ever undertaken by our Society. Practically all of the 113 engineering colleges in the United States respond to our letters. Our committee has been in touch with the excellent work carried on at the University of Pittsburgh and it is through their influence that we were successful in securing Prof. Hallock to speak at our Advanced Safety Engineering Session to be held Friday of this week. Furthermore, our committee is sponsoring a conference of engineering college deans and professors to start with a luncheon following our Friday morning session.

Cooperation With Other Engineering Societies. Our Society, through the activity of this committee with A. S. Regula, chairman, is continuing its active cooperation

with the student branches and local branches of the four founder engineering societies. Liaison officers of the ASSE-Engineering Section are contacting with the representatives of the engineering societies and a good percentage of these liaison men are doing very effective work.

Industrial Accident Statistics. Our Society with the active cooperation of all industrial sections of the Council has formulated an annual report including the accident summaries of more than 4000 industrial establishments for the year 1930. This work has been ably handled by a special committee of which E. W. Beck is chairman.

Constitution and By-Laws. For the past few years it has seemed to many of our members that certain sections of our Constitution should be revised, primarily for clarification purposes. Accordingly, a committee of ten was organized, including five representatives of our Society as a whole and five representatives of the Metropolitan Chapter. This committee, with S. E. Whiting as its chairman, formulated a report including eleven "definitions" which later were approved officially by the Executive Committees of our Society, the Metropolitan Chapter, and the National Safety Council. Immediately thereafter, we appointed a special committee of which Dr. M. G. Lloyd is Chairman, to use the report of the Committee of Ten as the basis for a tentative revision of our Constitution and By-Laws. This committee's report was published in the September, 1931, issue of *National Safety News* and it will be presented later at this meeting for action.

Conclusion. In conclusion, I want to express my appreciation to our committees and membership as a whole for the invaluable cooperation which you have accorded your officers. Without this cooperation, our efforts would have been more or less in vain. In relinquishing the general chairmanship of our Society to my successor, I can give him no more heartfelt wish than to trust that he will have your active support as I feel I have had it during the year just closed.

CHAIRMAN THALNER: We will now hear the report of our committee on constitution and by-laws. The members of this committee include M. G. Lloyd, chairman, S. E. Whiting, H. S. Smith, R. E. Prouty, G. E. Sanford.

M. G. Lloyd then presented the following revisions of the constitution, which, after considerable discussion, was approved.

Constitution of Asse-Engineering Section, National Safety Council

ARTICLE I. Name, Object and Government

Section 1. The name of this Society is the American Society of Safety Engineers—Engineering Section of the National Safety Council.

Section 2. The objects of this society are to promote the arts and the sciences connected with engineering in its relation to accident prevention and the conservation of life and property, and to encourage the development of safety engineering as a profession. In the furtherance of these objects, the Society declares its proper activities to include the holding of meetings for the presentation and discussion of technical papers and for social intercourse of its members and guests; the publication and distribution of papers, reports and discussions; the development and maintenance of libraries devoted to safety engineering and the encouragement of their establishment by others; cooperation with other engineering societies, with federal, state and municipal officials, with insurance organizations and with others in furthering its objects; the consideration, encouragement and prosecution of research and other investigations including the investigation of accidents and of accident hazards; the formulation of safety codes and other standards for accident prevention and consideration of problems arising in their application.

Section 3. The Society shall be governed by this Constitution and by By-Laws adopted by the Executive Committee in harmony herewith and by the constitution, by-laws, and rules of the National Safety Council.

ARTICLE II. Qualifications for Membership

Section 1. The membership of the Society shall consist of honorary members, members, associate members, and juniors.

Section 2. To be eligible as a member an applicant shall have had ten years' experience in engineering work, including five years in responsible charge of safety engineering work. A degree from a recognized college of engineering shall be considered equivalent to two years of such experience.

Section 3. To be eligible as an associate member an applicant shall have had five years' experience in engineering work, including three years in safety engineering work. A degree from a recognized college of engineering shall be considered equivalent to two years of such experience.

Section 4. To be eligible as a junior, an applicant shall be engaged in safety engineering or allied work, or shall be in attendance at a recognized college of engineering; he shall be not less than 18 years of age.

Section 5. Membership privileges shall be personal and not transferable.

Section 6. A member, associate member, or junior of this Society shall be an individual member of the National Safety Council or shall be associated with a company or organization which is a member of the National Safety Council. An honorary member shall not be required to pay dues.

Section 7. Members and associate members shall be entitled to vote and eligible to hold office. Honorary members elected from the membership shall retain these rights.

ARTICLE III. Admissions and Expulsions

Section 1. The Committee on Membership shall examine the qualifications of applicants and report thereon to the Executive Committee, a majority of whom may elect to membership or may transfer to a higher grade. Juniors who have not been transferred to a higher grade of membership shall, after ten years, automatically lose their membership.

Section 2. Honorary members shall be nominated by not less than five members, in a written statement signed by each and specifying the grounds upon which the nomination is made. This statement shall be addressed to the secretary of the Society and shall be submitted by him to the Executive Committee for action. Such members shall be elected only by unanimous vote of those members of the Executive Committee present at one of its meetings or by the unanimous vote of those casting ballots if a letter ballot is taken.

Section 3. Upon the written request of ten or more members or associate members stating cause, the Executive Committee may expel any member, associate member, or junior by a two-thirds vote, provided such member, associate member or junior shall first have been advised of the charges made and given a hearing.

ARTICLE IV. Officers and Executive Committee

Section 1. The officers of the Society shall be a chairman, two vice-chairmen, and a secretary elected at the annual meeting for one year. There shall be an Executive Committee consisting of the officers, nine members-at-large, 1 member elected annually by each chapter, and all past chairmen who remain members of the Society. Three members of the Executive Committee shall be elected at each annual meeting from the members and associate members, and shall serve for three years. Vacancies among the officers or in the Executive Committee shall be filled by vote of the Executive Committee, except for members elected by the chapters. The officers shall perform the usual duties of their respective offices.

Section 2. The Executive Committee may appoint one or more assistant secretaries.

Section 3. The Executive Committee shall manage the affairs of the Society and have full authority except as instructed at a meeting of the Society or as to matters

upon which the Society takes action. The chairman of the Society shall be chairman of the Executive Committee, and the secretary of the Society shall act as secretary of the Executive Committee. The Executive Committee shall appoint representatives of the Society to act for it in any outside relationships, such as members of committees formulating safety codes. The Executive Committee may consummate affiliation with other engineering societies.

Section 4. Meetings of the Executive Committee shall be held upon call of the chairman or any seven members. A quorum shall consist of seven members, but a smaller number may hold a meeting, discuss business, and submit any decisions which it may make to a letter ballot of the entire committee.

ARTICLE V. Other Committees

Section 1. The chairman shall, shortly after the annual meeting, appoint from the membership to serve until the next annual meeting the following committees:

Committee on Meetings, Programs and Regional Conferences.

Committee on Membership.

Committee on Research, Standards and Codes.

Committee on Local Chapters.

Section 2. The chairman shall, from time to time, appoint such committees as may be authorized by the Executive Committee or such special and temporary committees as he may see fit. Membership on special committees dealing with technical subjects may include non-members of this Society.

Section 3. A Nominating Committee, as prescribed by the by-laws, and a Committee of Tellers shall be appointed annually by the chairman.

Section 4. The Executive Committee may at any time in its own discretion remove any or all members of any committee except a Nominating Committee; and the vacancy arising from this or any other cause shall be filled by appointment by the chairman.

ARTICLE VI. Meetings

Section 1. The annual meeting of the Society for the election of officers and transaction of other business, as well as for the reading and discussion of technical papers, shall be held during the time and at the place of the Annual Congress of the National Safety Council, unless otherwise mutually agreed to by the Executive Committee of this Society and the Executive Committee of the National Safety Council.

Section 2. Special meetings of the Society may be called at any time at the discretion of the Executive Committee, and shall be called by the chairman upon the written request of 30 persons entitled to vote. The notice for such meetings shall state the business for which they are called, and no other business shall be transacted at such meeting. Regional conferences for the presentation of papers, addresses and discussions may be arranged by the officers and the Committee on Meetings, Programs and Regional Conferences, upon authorization of the Executive Committee.

Section 3. Thirty persons entitled to vote shall constitute a quorum for the transaction of business at annual and special meetings.

ARTICLE VII. Chapters

Section 1. The Executive Committee may authorize the organization of local chapters in various geographical districts which shall not overlap, and may prescribe rules and regulations governing such chapters. Local chapters shall be governed by officers who are members or associate members of this Society, but may admit local members under conditions set up under their own by-laws, which shall be in harmony with the Constitution and By-Laws of the Society and such regulations as the Executive Committee may make. Such chapters may establish local dues

by a majority vote of the members and associate members in the chapter, but it shall be optional with the membership of this Society within the geographical district of a local chapter to become a member of such chapter.

ARTICLE VIII. By-Laws

Section 1. The By-Laws of this Society may be revised or amended by the Executive Committee. Amendments may be presented at a meeting of the Executive Committee or may be circulated to each member by mail. If favorably acted upon at a meeting of the Executive Committee they shall be submitted to a mail ballot and shall become effective upon affirmative vote of two-thirds of the entire membership of the Executive Committee. If not presented at a meeting of the Executive Committee before being circulated for a mail ballot, they shall become effective upon affirmative vote by three-fourths of the entire membership of the Executive Committee. Such amendments upon adoption shall be circulated to the entire membership or published in the official publication of the Society.

ARTICLE IX. Amendment of Constitution

Section 1. Amendments to this Constitution shall be proposed in writing and signed by not less than five members or associate members. They may be adopted as presented or as modified, by a two-thirds vote of the qualified voters present and voting at any annual meeting, provided that they shall have been presented to the secretary two months in advance of such meeting and circulated to the membership or published in the official publication one month in advance of such meeting.

Chairman Thalner then called for the report of the Nominating Committee including A. S. Regula, chairman, E. F. Blank, J. I. Banash, R. McA. Keown, and J. E. Culliney.

Mr. Regula presented this report, and upon motion the following officers were elected for the coming year:

General Chairman—M. G. LLOYD.

Vice Chairman—H. S. SMITH.

Vice Chairman—S. E. WHITING.

Secretary—W. DEAN KREFFER.

Asst. Secretary—GENE S. WOOD.

Members of Executive Committee for three years: CYRIL AINSWORTH, E. F. BLANK, J. E. CULLINEY.

Member of Executive Committee for one year to complete unexpired term of E. L. Hewitt, resigned—F. M. ROSELAND.

Report of Committee on Cooperation with Other Engineering Societies

By A. S. REGULA

Chairman

The Committee on Co-operation with Other Engineering Societies has during the past year been concerned chiefly with maintaining a close working relationship with the American Society of Mechanical Engineers through its Accident Prevention Committee, of which H. W. Mowery of our society and committee is chairman. Encouraged by the success of the Safety Session conducted under the joint auspices of the ASME and ASSE at the annual meeting of the ASME in New York in December, 1930, it seemed wise to extend the program of joint meetings to cover the regional meetings of the ASME.

Accordingly, a joint session was held in connection with the spring meeting of the ASME in Birmingham, Alabama, in April, 1931. Papers were presented by F. B.

Winslow, of the Tennessee Coal, Iron and Railroad Company, on "The Economic Aspects of Accident Prevention in the Iron and Steel Industry," and by D. S. Anderson, of the Sloss Sheffield Steel and Iron Company, on "Accident Prevention Through Engineering in the Iron and Steel Industry." The chairman of this meeting was T. G. Brabston, of the Birmingham Electric Company, who has been actively identified with local Council activities in Birmingham.

The annual meeting of the ASME in December, 1931, will be curtailed this year for economic reasons. While meetings of the technical sections have been reduced in number, the interest of the Society in accident prevention is evidenced by the fact that safety will have a place on the program at one of the general sessions on December 1st. Miss Frances Perkins, Industrial Commissioner, New York State Department of Labor, has accepted your committee's invitation to speak on "State Labor Departments and Professional Engineers—Cooperation Essential to Progress in Accident Prevention."

In considering the field of activity in advancing the cause of accident prevention through engineering societies, there are two major groups to be considered: (1) local engineering societies and local chapters of the national societies; and (2) the national societies. The former group may be and has been reached through the regional safety conferences arranged under the direction of the society's Committee on Regional Safety Conferences. As an example of how this contact works out, it may be stated that of the 42 organizations which cooperated with the Metropolitan Chapter of the ASSE in conducting the Greater New York Safety Conference in February, 1931, there were included 12 local engineering societies or chapters of national bodies. The report of the Committee on Regional Safety Conferences bears evidence of the support of engineering bodies throughout the country in these local conferences.

The second group, the national societies, offer a fertile field of activity for your committee. The experience had with the ASME during the past several years suggests the following activities as likely to create a greater interest within these national bodies in advancing the cause of accident prevention:

1. Endeavor to secure the appointment by each national engineering society of an Accident Prevention Committee.
2. Arrange for joint sessions on safety as an integral part of the annual, mid-year or regional meetings of the national societies or their divisions.
3. Contact the Educational Committee of the national societies (where such committee has been appointed) to advance the project of inclusion of safety engineering in the curricula of technical schools and colleges.

A. S. REGULA, *Chairman*
CYRIL AINSWORTH
C. B. AUEL
ERNEST HARTFORD
H. W. MOWERY
GEORGE E. SANFORD

Report of Membership Committee

By B. B. McCULLOCH
Chairman

One year ago we had 632 Members and 396 Associate Members, making a total membership of 1,028.

During the past year, your Membership Committee has secured 87 new Members and 30 new Associate Members; a gross gain of 117.

Unfortunately, however, there have been 189 resignations during the year, of which 119 were Members and 70 Associate Members. The net loss has thus been 72. An analysis of our records indicates that the majority of resignations are the result

of one or more of the following causes; company no longer a member of the National Safety Council; man no longer associated with former employer; man has moved and has left no forwarding address.

We now have a total membership of 956 of which 600 are Members and 356 Associate Members.

B. B. McCULLOCH, *Chairman*
S. V. JAMES
A. L. ARMSTRONG

Report of Committee on Chapter Organization and Activities

By ARTHUR MURRAY
Chairman

There are three chapters of the ASSE-Engineering Section that are functioning actively and making extremely satisfactory progress. These chapters are in New York City, Boston, and Newark, and the general chairmen are:

Metropolitan Chapter (New York City)—A. S. Regula, Industrial Relations Counselors, New York City.

Boston Chapter—Alexander Lackey, Consolidated Expanded Metal Companies, Boston.

Northern New Jersey Chapter (Newark)—Max S. Henig, Essex County Vocational School, Irvington, N. J.

The New York Chapter reports 181 members; Boston 165 members; and Newark 45 members.

During the past year our chapter at Worcester has been abandoned because there is an insufficient number of safety men in the community and because those who were members comprise the industrial division of the Worcester Safety Council. It thus seemed inadvisable simply to continue a paper organization which was not accomplishing a thing and doing no one any good.

Our negotiations during the year, however, have resulted in the organization of the Engineering Section of the Western Pennsylvania Safety Council. They have applied for recognition as the Western Pennsylvania Chapter of the ASSE-Engineering Section and action on this application will be taken at tomorrow's meeting of our Executive Committee.

Your committee has also continued to negotiate with several other safety engineering groups in Detroit, Springfield, St. Louis, Dayton, and California. We hope it will not be long before one or more of these groups apply for chapter recognition.

ARTHUR MURRAY, *Chairman*
D. FRANK LORD
W. R. SMITH
E. E. PLACE

Report of Steering Committee on Regional Safety Conferences

By J. E. CULLINEY
Chairman

Your committee has the pleasure of reporting that twenty-four successful regional safety conferences were organized and held during the past year under the sole or joint sponsorship of the ASSE-Engineering Section, National Safety Council.

Through the whole-hearted support and cooperation of local safety councils, industrial sections, Council members, and outside organizations, this was made possible.

In addition to the twenty-four conferences that were held under our recognized auspices, your committee assisted in formulating plans for twenty-three other safety conferences for which we received no formal recognition. These conferences included such meetings as the New York State Safety Conference, the All Ohio Safety Congress, North Carolina Industrial Safety Conference, fourteen conferences conducted by the Portland Cement Association, several organized by the National Petroleum Association, and others.

Nine of our twenty-four conferences were held for the first time in the cities of:

Fond du Lac, Wis.
Houston, Texas
Lafayette, Ind.
Lewiston, Maine
Manchester, N. H.
Memphis, Tenn.
Reading, Pa.
Shreveport, La.
St. Louis, Mo.

It is gratifying to note the new territory represented in this group, as this indicates, to some extent, the increased interest in regional safety conferences.

Thanks to the cooperating bodies, seven of our twenty-four conferences were miniature safety congresses. In the cities of Chicago, Ill., Houston, Texas, St. Louis, Mo., Fond du Lac, Wis., Newark, N. J., New York City, and Rockford, Ill., various sectional meetings were held simultaneously. Those who attended emphasized the fact that their individual problems were much more intimately discussed.

The seventeen remaining conferences were held in:

Allentown, Pa.	Augusta, Maine
Boston, Mass.	Birmingham, Ala.
Duluth, Minn.	Eric, Pa.
Lafayette, Ind.	Lewiston, Maine
Louisville, Ky.	Memphis, Tenn.
Manchester, N. H.	New Haven, Conn.
Pittsburgh, Pa.	Portland, Oregon
Powell River, B. C.	Reading, Pa.
Shreveport, La.	

The success of these conferences has been brought about through the free exchange of ideas and experience. Members of the ASSE-Engineering Section stress the fact that their superintendents, foremen and others, who attend, get the spirit of the safety movement more forcibly than in any other way.

Thus encouraged, your committee has proceeded with tentative plans for other conferences to be held during the coming year, and on behalf of our new Committee on Conferences, we bespeak your full assistance and support. If regional safety conferences are desired in your respective communities, just make your wishes known to the committee and an immediate response and offer of complete co-operation will be forthcoming.

J. E. COLLINNEY, *Chairman*
A. S. JOHNSON
H. J. MINEUR
G. W. COOK
G. E. BURNS

Report of Committee on Accident Prevention in Engineering Colleges

By R. McA. KEOWN,
Chairman

Your committee in all of its work during recent years has emphasized the importance of two major objectives:

1. To influence as many engineering colleges as possible to develop special courses in accident prevention. Each might be a one hour a week course for one or two semesters.
2. To influence each engineering college professor to inject as much accident prevention material as possible in his existing courses.

For the ultimate attainment of these objectives, your committee has continued its correspondence with the deans and professors of 113 engineering colleges. It is extremely difficult, if not impossible, to find out by correspondence to just what extent progress has been made. We trust, however, that it will not be long before a staff man can be employed to devote his entire time to the furtherance of this important work. Work of special interest is being carried on at the University of Tulsa, Colorado School of Mines, University of Louisville, Columbia University, University of Michigan, and University of Pittsburgh. These and other colleges are continuing to use our four college lectures.

The activity of outstanding interest this year is the general conference of engineering deans and professors which will be held Friday of this week under the auspices of your committee. This will give these men an opportunity to discuss our objectives in detail and we anticipate that the results will be mutually beneficial.

Our liaison officers deserve our unlimited thanks for and cooperation in the important work which they are doing with the authorities in the colleges in their communities.

R. McA. KEOWN, *Chairman*
J. I. BANASH
J. O. KELLER
A. A. POTTER
G. E. SANFORD
COL. JOHN PRICE JACKSON
ERNEST HARTFORD
A. W. WHITNEY
C. E. PETTIBONE
GEORGE T. SEABURY
DEXTER S. KIMBALL
ROBERT L. SCHMITT
F. L. HUTCHINSON
W. DEAN KEEFER

Report of The Steering Committee on Research, Standards and Codes

By GEORGE E. SANFORD
Chairman

During the past year the work of your Steering Committee on Research, Standards, and Codes has been similar to that of other years. This has included:

1. Giving advice to the Executive Committee of the National Safety Council upon subjects proposed for codes or research and to secure the approval of that Committee to proceed with proposed subjects.

2. Appointing research committees.
3. A general check-up of research, standards and code work which is in progress by members or representatives of the A. S. S. E.-Engineering Section.

At the present time there are four research committees:

1. Low Voltage Electrical Hazards.
2. Static Electricity, Thomas W. Butler, Chairman.
3. Woodworking Circular Saw Accidents, Robert McCa. Keown, Chairman.
4. Gasoline Blow Torches, S. E. Whiting, Chairman.

During the year The Effects of Annealing on Chains Committee completed its work and the final report was published by the Council. A progress report of the Low Voltage Committee will be presented and discussed at an open meeting to be held at this Congress. Work of the Static Electricity Committee has been held in abeyance pending the securing of funds for making certain tests according to a plan of procedure prepared in conjunction with the United States Bureau of Standards. The reorganization of the Woodworking Circular Saw Accidents Committee and the organization of the Gasoline Blow Torch Committee are well under way.

During the year reports have been completed by four of the twenty committees organized to study the hazards in special industries. These reports and the names of the committees under whose auspices the reports were prepared are:

- "Safety in Cordage Manufacture." Cordage Operations Committee, Sydney Ingham, Chairman.
- "Safety in Excavation Work." Excavating and Pile Driving Operations Committee, John W. Powell, Chairman.
- "Safety and Health in Job and Newspaper Printing Establishments." Printing and Bookbinding Operations Committee, John J. Lamb, Chairman.
- "Safety in Wood Furniture Manufacture." Wood Furniture Operations Committee, Robert Williams, Chairman.

In addition to the above four reports, four others have been prepared in conjunction with Committees of other Sections. These reports are:

- "Cement Mill Yards and Railroads."
- "Raw and Finished Cement Mill Grinding."
- "Industrial Power Departments."
- "Use and Care of Hotting Chains."

Drafts of reports have been prepared or are in the course of preparation by three of the special industry committees as follows:

- Lacquers and Miscellaneous Pyroxylin Products Manufacture. John S. Shaw, Chairman.
- Cigar and Cigaret Manufacture. H. P. Wurman, Chairman.
- Enameling and Japanning. K. W. Staud, Chairman.

In conjunction with a special Committee of the Cement Section a report "Cement Burring," is being prepared for members of that Section.

The A. S. S. E.-Engineering Section is sponsor or joint sponsor under American Standards Association procedure for sixteen safety codes, nine of which have been approved and published:

1. Colors for Gas Mask Canisters.
2. Colors for Traffic Signals.
3. Forging and Hot Metal Stamping.
4. Ladders.
5. Paper and Pulp Mills.
6. Piping Systems, Identification of.
7. Power Presses and Hand and Foot Presses.
8. Rubber Mills and Calenders.
9. Textiles.

The following seven codes are not yet completed but the work is well under way:

1. Compressed Air Machinery.
2. Construction Work.
3. Floor and Wall Openings.
4. Rubber Machinery.
5. Standardization of Methods of Recording and Compiling Accident Statistics.
6. Walkway Surfaces.
7. Window Washing.

The American Standards Association has Committees on sixty-seven safety codes. The National Safety Council is represented primarily through the A. S. S. E.-Engineering Section on fifty-two of the sixty-seven codes. The names of such representatives are given after the title of each code. The forty-four codes approved and published, copies of which may be obtained from the National Safety Council, are:

1. Abrasive Wheels, Safety Code for the Use, Care and Protection of—W. Dean Keefer, George E. Sanford.
2. Aeronautic Safety Code—G. A. L. Beaudoin, G. E. Peterson.
3. Automobile Brakes and Brake Testing, Safety Code for—L. M. McIntyre.
4. Automobile Headlighting, Laboratory Tests for Approval of Electric Headlighting Devices for Motor Vehicles—Walter G. King.
5. Building Exits Code—L. R. Palmer, Sidney J. Williams.
6. Colors for Gas Mask Canisters, Code on—E. S. Beaumont, V. R. Currie, R. H. Ferguson, C. E. Rice, B. F. Tillson.
7. Colors for Traffic Signals, Safety Code for—Morton G. Lloyd, Walter S. Paine.
8. Dust Explosions in Coal Pneumatic Cleaning Plants, Prevention of—
9. Dust Explosions in Floor and Feed Mills, Prevention of—
10. Dust Explosions in Starch Factories, Prevention of—
11. Dust Explosions in Terminal Grain Elevators, Prevention of—
12. Electric Wiring and Apparatus in Relation to Fire Hazards, Regulation for ("National Electrical Code")—
13. Electrical Equipment in Coal Mines, Safety Rules for Installing and Using—R. L. Kingsland.
14. Elevators, Dumbwaiters and Escalators, Safety Code for—W. E. Crippen, R. C. Stratton.
15. Explosives in Bituminous Coal Mines, Recommended Practice for the Use of—John L. Boardman.
16. Fire Fighting Equipment in Metal Mines—J. I. Banash.
17. Forging and Hot Metal Stamping, Safety Code for—H. L. Johnson, W. Dean Keefer, J. L. Thompson.
18. Foundries, Safety Code for the Protection of Industrial Workers in—F. G. Bennett, George E. Sanford.
19. Gas Safety Code—Earl J. Reeder.
20. Heads and Eyes of Industrial Workers, Safety Code for the Protection of the—George E. Sanford.
21. Ladders, Safety Code for—A. E. Davidson, H. B. Gaffers, M. C. Goodspeed, W. Newell, H. A. Schultz, H. G. Wiberg.
22. Ladders and Stairs for Mines, Recommended Practice for the Construction and Maintenance of—Carl Scholte.
23. Laundry Machinery and Operations, Safety Code for—F. F. Beik.
24. Lighting: Factories, Mills, and Other Places, Code for—W. Dean Keefer.
25. Lighting of School Buildings, Code for—G. H. Stickney.
26. Lightning, Code on Protection Against—F. A. Epps, W. R. Rooney.

27. Logging and Sawmill Machinery, Safety Code for—C. O. Hero, W. Dean Keefer.
28. Mechanical Loading Underground in Metal Mines, Recommended Practice for—
29. Mechanical Power Transmission Apparatus, Safety Code for—H. A. Schultz.
30. Mechanical Refrigeration, Safety Code for—J. I. Banash.
31. Miscellaneous Outside Coal Handling Equipment, Recommended Practice for—H. T. Bannister.
32. National Electrical Safety Code—R. W. E. Moore, George E. Sanford, S. E. Whiting.
33. Paper and Pulp Mills, Safety Code for—R. M. Altman, G. E. Burns, Holger Jensen, G. E. Williamson.
34. Piping Systems, Identification of—W. Dean Keefer, George E. Sanford, H. P. Weaver.
35. Power Presses and Foot and Hand Presses, Safety Code for—Carl B. Auel, A. L. Kacms, W. Dean Keefer, C. Van Horn.
36. Pulverized Fuel Systems, Installation of—
37. Pulverized Systems for Sugar and Cocoa—
38. Rock Dusting of Coal Mines, Recommended Practice for—Thomas G. Fear.
39. Rubber Mills and Calenders—Ernest W. Beck, R. H. Blanchard, J. E. Congdon, H. A. Dodge, A. E. Hoener.
40. Street Traffic Signs, Signals and Markings, Code of—Sidney J. Williams.
41. Textiles, Safety Code for—W. Dean Keefer, Ignatius McNulty, Harvey Saul.
42. Underground Transportation in Metal Mines, Recommended Practice in—
43. Wire Rope for Mines, Specifications for and Recommended Practice in the Use of—B. F. Tillson.
44. Woodworking Plants, Safety Code for—A. S. Regula.

The twenty-three codes not yet published and approved are:

1. Amusement Parks, Safety Code for—Sidney J. Williams.
2. Compressed Air Machinery, Safety Code for—W. Dean Keefer, C. E. Pettibone, Daniel L. Royer.
3. Coal Mine Transportation, Safety Code for—George C. McFadden.
4. Construction Work, Safety Code for—W. R. Smith, W. Dean Keefer.
5. Conveyors and Conveying Machinery, Safety Code for—C. H. Almstrad, R. F. Thalner.
6. Cranes, Derricks, and Hoists, Safety Code for—J. F. Connor, S. H. Libby.
7. Dust Explosions, Safety Code for the Prevention of—
8. Electrical Devices and Materials With Relation to Fire and Casualty Hazards, Specifications and Standards for—J. I. Banash.
9. Electrical Equipment in Metal Mines, Safety Rules for Installing and Using—L. D. Anderson.
10. Electrical Fire and Safety Code.
11. Exhaust Systems, Safety Code for—H. G. Heusel.
12. Floor and Wall Openings, Railings and Toe Boards, Safety Code for—L. E. Averill, A. W. Benz, W. Dean Keefer, E. B. Tolsted.
13. Grandstands, Safety Code for—
14. Machine Tools—Safety Code for—
15. Mine Timbering, Specifications for—P. B. Dunbar, Daniel Harrington.
16. Piping, High Pressure—H. S. Smith.
17. Plate and Sheet Metal Working—Safety Code for—
18. Rubber Machinery, Safety Code for—Ernest W. Beck, R. H. Blanchard, J. E. Congdon, H. A. Dodge, A. E. Hoener.
19. Sanitation, Safety Code for Industrial—C. O. Sappington, Harry A. Schultz.

20. Standardization of Methods of Recording and Compiling Accident Statistics—Carl B. Auel, Earl F. Blank, Lewis A. DeBlois, Elmer L. Hewitt, W. Dean Keefer, L. R. Palmer.
21. Ventilation Code—Walter J. Graves, Stewart J. Owen, Jr.
22. Walkway Surfaces, Safety Code for—R. P. Blake, A. S. Regula.
23. Window Washing, Safety Code for—G. E. Burns.

Our Society is also ably represented on seven special committees:

1. American Standards Electrical Definitions Code—S. E. Whiting.
2. Committee on Light and Safety of the Illuminating Engineering Society—Walter G. King.
3. Mining Standardization Correlating Committee—F. B. Dunbar, W. Dean Keefer.
4. National Building Codes—H. Weaver Mowery.
5. National Fire Waste Council—J. I. Banash, George Opp.
6. New York City Building Code—Lewis A. DeBlois.
7. Safety Code Correlating Committee—W. Dean Keefer, George E. Sanford.

All of our representatives on various codes and committees have contributed generously of their time and advice that the work might be done in a manner creditable to the Section. To formulate a code or a special report requires difficult and exacting work of the members of a special committee organized for that purpose. Much of the work must be done by correspondence as many meetings are held in widely scattered places and it is not always possible for all members to attend the meetings for that reason. The members of the Section should bear these facts in mind and should therefore assist these representatives as much as possible through the submission of statistics and other data. Close cooperation between the members of the Section and our representatives on the many projects is required if the desired results are to be obtained.

GEORGE E. SANFORD, *Chairman*.
J. I. BANASH
DANIEL HARRINGTON
STEWART J. OWEN, JR.
JOHN S. SHAW
R. F. THALNER

Report of the Statistics Committee

By E. W. BECK
Chairman

This committee was organized in October 1930 with the following functions, as then stated in the organization set-up:

"Recognizing that the extent to which National Safety Council members are solving their accident problems can be accurately determined only by accurate records and that such records also furnish the basis for a scientific accident prevention program, it shall be the purpose of this committee to encourage the keeping of such records. Representing, as it does, all industrial sections of the Council, it will be in a position to unify the policies and procedures relating to industrial accident record keeping among all Council members."

The statistics committee chairmen of industrial sections are automatically members of this committee and in addition the chairman of the A. S. S. E.—Engineering Section appointed nine members at large. The statistician of the National Safety Council is ex-officio secretary.

The first meeting of the committee will be held Thursday, October 15. Since its organization, therefore, our only work has been through correspondence. The members of the committee who were statistics committee chairmen in their respective sections assisted materially in the collection of 1930 accident data. Committee members were also asked for advice on certain features of the 1931 edition of "Industrial Accident Statistics." It is anticipated that next year we shall be in a position to render more effective service in improving the Council's statistical work on industrial accidents.

E. W. BECK, *Chairman*
C. B. AUEL
C. L. CLOSE
LEWIS A. DE BLOIS
ETHELBERT STEWART
WILLIAM J. MAGUIRE
W. G. WHEELER
PAUL J. BRAND
A. J. R. CURTIS
JOHN RUSSELL, JR.
IRA V. KEPNER
A. E. LUNDSTADT
A. A. OLDFIELD
W. A. SULLIVAN

BENJAMIN H. SELF
D. S. WECHSLER
W. W. ADAMS
J. L. NELSON
W. J. LARSON
E. J. KREH
E. E. GRANT
J. W. MYERS
HERMAN HILLENBACH
H. W. LOW
SYDNEY INGHAM
O. C. BOILEAU
R. L. FORNEY, *Secretary*

(A complete report of the transactions during the Advanced Safety Engineering session, on Friday Morning, October 16, 1931, which was held under the auspices of the American Society of Safety Engineers—Engineering Section, National Safety Council, and in cooperation with the Engineering Division of the Chicago Safety Council, will be found among the "General Sessions" of the Congress, published in a unit volume and distributed to all Council members.)

ADJOURNMENT

Tuesday Afternoon Session October 13, 1931

Joint Meeting of A.S.S.E. Statistics Committee with Statistic Section

DR. T. F. MURPHY, *Chairman*
Bureau of the Census, Washington, D. C.

The joint meeting of the Statistics Section with the Statistics Committee, American Society of Safety Engineers—Engineering Section, was called to order by Dr. T. F. Murphy, Bureau of the Census, Washington, D. C., who presided.

CHAIRMAN MURPHY: The first business before the Statistics Section is the election of officers for the ensuing year, and I am going to call upon Harold R. Gordon, who is chairman of the Nominating Committee, to make his report.

HAROLD R. GORDON (Health and Accident Underwriters' Conference, Chicago): Mr. Chairman and Gentlemen: With the assistance of the staff of the National Safety Council and by correspondence with the other two members of the Nominating Committee, your committee submits the names of the following persons as nominees:

For General Chairman: Dr. T. F. Murphy, Bureau of the Census, Washington, D. C.

For Vice-Chairman, E. W. Kopf, Metropolitan Life Insurance Company, New York City.

For Vice-Chairman, Leon Aronowitz, State Bureau of Motor Vehicles, Albany, New York.

This is respectfully submitted by Dr. Earle G. Brown, Kansas Department of Health, Maxwell Halsey, National Bureau of Casualty and Surety Underwriters, and Harold R. Gordon, chairman.

(Upon a motion, properly seconded and passed, the Secretary was instructed to cast a unanimous ballot for the nominees named.)

Remarks on the New International List of Causes of Death

By DR. T. F. MURPHY
Bureau of the Census, Washington, D. C.

You are probably aware of the formation and history of the International List of Causes of Death under which practically all countries in the world now classify their deaths. For about forty years, at decennial intervals, an increasing number of countries have been classifying their deaths according to this statistical method. The List has been modified from time to time and those countries using it have tried to enlarge upon it, and to keep up with the times.

At a convention in Paris in 1929 fifty-six different countries using the list were represented. Unfortunately, the weight of influence remained with the European countries. In other words, I, as a representative of the United States and handling approximately 1,400,000 mortality returns each year, had one vote; as did also the representative from Panama and from Luxembourg. The British had one vote for England and Wales, one for Scotland, one for Canada, one for Australia, etc.

Now, it is well known that the rest of the world is not as accident-minded at present as we are. Therefore, when we suggested changes in the International List that would permit us to tabulate accidents in greater detail, we met with a great deal of opposition.

The present List hasn't a logical basis. We classify some accidents as to the cause, others as to place. An illustration as to place—we say the accident occurred in "mines and quarries." Anything might have happened in the mine or quarry. The victim

might have committed suicide; he might have been electrocuted; he might have drowned; he might be crushed by falling timbers; he might be struck by the light trams that they use there, or any of those things. Still, in prior years, the accident was classed as in mines and quarries and that was all we knew about it.

We tried to get them to adopt a more logical classification and I was made chairman of a sub-committee for the purpose. On my committee were representatives from Belgium, Czechoslovakia, Poland, Russia and England. I could do nothing except to insist that with the new 1930 List as revised there should be a supplemental table, obligatory upon all countries using the detailed list, and providing certain new information. The effect of this will be to show a death resulting from a burn in an auto accident as both "burn" and "auto accident;" a death from a fall in a mine will be classified both in "mines" and "falls."

It is probable that in the next ten years the increasing auto traffic in other countries will result in a greatly increased death rate from that cause. For that reason I have no doubt whatever that in the next revision of the list you will see a much wider and clearer acceptance of our accident theory as we believe it over here.

I have taken it upon myself, being in charge of the Census Bureau mortality tabulations, to comply with the obligatory feature of the International List, but I go still further than that. I am maintaining records that tell you for instance, not only that an accident occurred in a mine, but I can tell you how it occurred. I can say the victim was drowned or he was electrocuted.

As an illustration we analyzed 2,600 certificates and found this about accidental burns. The number which I ordinarily would publish would be 112. That was the number that went out in 1929. Upon analysis, however, I find that there were 25 additional burns, and that 17 of them occurred as the result of automobile accidents. In other words, under automobile accidents, 17 people were burned to death. So my total, instead of 112 is really 137.

Under drownings, we would say, according to our prior rules, that there were 118 drownings in this particular group. Breaking down my tabulation again, I found there were 18 additional drownings occurring as a result of automobile accidents. In other words, there was an automobile accident but the man was thrown into the river and was drowned. So my total is going to be 136 instead of 118.

It is rather interesting and important to find that among automobile accidents one man was electrocuted, that another died from the absorption of poison gas, etc. If you know that 18 were drowned, 17 were burned and a dozen things happened to the others, I think that detail will be of immense value to you in analyzing the factors in automobile deaths.

Two years ago we received queries with reference to how many people died as a result of being cut or thrown through the windshield or thrown through glass. We weren't able to give it to them complete, though I gave it to them in part. I have heard indirectly that it was partly due to the information that we gave them that many windshields are now made of unbreakable glass.

There is another interesting result of our breakdown of statistics. We have each year a large number of returns which come in simply as falls. I had a couple of clerks tabulate in detail just what was placed on the certificates. Of 5,500 cases they determined that about 3,000 didn't have enough information to help us in any way, but that 2,342 of those falls occurred in the home.

When it comes to burns, a very interesting thing occurred. You probably think that most of the burns are connected with conflagrations. We analyzed a group of 4,500 cases. We found that of that total, 102 occurred as the result of upsetting a lamp, and 300 as a result of kerosene poured on the fire to expedite its lighting. Then 700 were the result of stoves and furnaces, 56 in cleaning clothes, 500 from open fireplaces and grates, and 200 or 300 in other ways. A total of 1,600 out of 1,900 occurred right in the home.

It is of vital importance that we have as complete information as possible and to

insure for the next ten years at least a comparability with all prior figures. We will now be able to give very much additional information with reference to the circumstances of accidents. The idea of the whole thing is this: We feel that statistics in themselves are valueless. It is their application to some problem that makes them of value. In other words, if I can't file or compile returns which I believe are going to serve some useful purpose, then it is quite possible I had better be otherwise employed. Don't regard the Bureau of the Census as a great, big adding machine. It is quite the reverse. It is true that we get about 1,400,000 certificates of death and about 2,400,000 of births each year. All states except Texas are in the death registration area and all, with the exception of Texas and South Dakota, are in the birth registration area. So I get 96 per cent of the population.

Suggestions we welcome. If you have an idea of how these data could be better presented to enable you to apply them to your particular group or industry or study, where they will assist in preventive accident work or preventive medicine, we should like to know it. A lot of worthless figures don't appeal to me. Figures have life just as well as anything in the animal or vegetable kingdom. What we want to do is to give them more life.

Certain details of accidents it would be almost impossible to get, from our viewpoint. A man told me today that in the month of September his city had seven auto deaths and in the month of October, two. I said, "What was the cause of them?"

He said, "The minute I got the wholesale number, I simply spotted those particular ones and found out the reasons. As to the seven in September, there was a fair in a neighboring town. These people had attended the fair and were in a hurry getting home and three wanted to be in the same place at the same time. They found out they couldn't do it."

That represents a breakdown which we couldn't get in our totals.

CHAIRMAN MURPHY: In connection with accident classification, we are very fortunate in having with us this afternoon Dr. H. B. Logie, of the National Conference on Nomenclature of Disease, New York City. Dr. Logie is Executive Secretary of a committee, which has for its purpose the development of a really scientific basis for nomenclature of disease and accidents. Dr. Logie's remarks will be exceedingly interesting because they open up the possibility of getting a tremendous amount of information which is much more detailed than ours and is applicable to any type of accident study.

A Suggested Classification of the Circumstances of Accidents

By H. B. LOGIE, M. D.

Executive Secretary, National Conference on Nomenclature of Disease,
New York City

In spite of the great volume of the statistics on accidents compiled every year by many agencies, there is no standard method which has been considered worthy of general adoption. There are almost as many ways of recording these facts as there are institutions engaged in analyzing them and, by means of this analysis, measuring mathematically the occurrence of related phenomena.

There are two tests of the value of statistics: the first, what conclusions we may draw concerning them; and the second how these conclusions influence our attitude to the phenomena so measured and compared. From yearly comparison of the death rate from train accidents we can only conclude that trains, or some circumstances connected with trains, are becoming more dangerous to life. We could meet the situation only by abolishing trains or curtailing train travel if there were no more explicit statistics to guide us in abating the menace. If we find that the increase in these deaths is largely in the subdivision "accidents at level crossings", then we have

a chance to put statistics to work. General statistics must be readily susceptible of analysis or "breaking down" to provide these useful facts. In some cases, however, the general rubric is all that is required. In the International List of Causes of Disease there are 38 rubrics devoted to "violent and accidental deaths." Almost one quarter of these are devoted to the different ways of committing suicide. No doubt psychologists can make something of a changing preference between suicide by firearms and suicide by illuminating gas, but it does not appear likely that we shall diminish the incidence of suicide by comparing "drowning" curves and "morphine" curves. On the other hand, "accidental poisoning by food" cannot be analyzed too minutely to provide the statistics to set our remedial measure in action.

It is not exact to say that the only statistics which matter are those which can be used for practical purposes. There is no telling when statistics may be needed on any phase of accident, and it is well to anticipate the needs of the future by compiling statistics which just now may be valueless. In a general way, however, we should give first place to those of present importance and analyze only as minutely as present demands suggest.

We can agree upon other fundamental principles. It should be clear, but it is not, that we can compare only those phenomena which are of the same order. I can best illustrate a current fallacy by carrying the argument into the field of medicine. It has been an almost universal practice to classify diseases as diseases of various organs or diseases of various natures. Thus we have for comparison not only deaths from diseases of the heart, lungs, kidneys and so on, but deaths from infectious diseases, deaths from tuberculosis, deaths from pneumonia, and deaths from cancer. When we consider that tuberculosis may affect almost any organ and that it is also an infectious disease, that pneumonia is both an infectious disease and a disease of the lungs, and that cancer may be a disease of the kidney or any other organ, we find ourselves caught in a tangle of overlapping rubrics, the only way out of which is by means of confusing exceptions.

For example, death from rheumatic heart disease is a death from heart disease only when the rheumatic fever itself is not active at the time of death; gonorrheal heart disease causes death from gonorrhea infection. This necessity for exceptions not only causes confusion, but actually vitiates statistics, because each of these cases subtracts from the true number of cases of heart disease. Similarly we do not derive the true number of diseases of the lungs if we exclude tuberculosis of the lungs. These inaccuracies are, as a rule, of minor importance because the figure for tuberculosis and cancer is correct, and the figure for heart disease only slightly inaccurate. The figure for diseases of the lungs, however, is so far from correct that it has to be qualified by the phrase "excluding tuberculosis of the lungs." The statistics on diseases of the various organs, when cancer, tuberculosis, and many other infections of them are excluded, are of little significance. It is clear, of course, that the less important groups of diseases are sacrificed to the more important. The necessity for some sacrifice is apparent from the fact that a death from tuberculosis of the kidney cannot be numbered in both the deaths from tuberculosis and the deaths from disease of the kidney; there would then be two deaths for one patient. It has been found necessary to balance statistics at all costs, and indeed at a cost that physicians are not prepared to pay. It has been found necessary and possible to overcome this difficulty by means which I shall explain presently.

The same principle has guided the compilation of statistics on accidental deaths. The rubrics in the International List are themselves mutually exclusive if certain rules are followed. The deaths by intention are put in the various rubrics under suicide and homicide, so that "Suicide by jumping from high places" (169), is clearly distinct from "Accidental traumatism by fall" (186); and "Homicide by firearms" (173) bears no relation to "Accidental traumatism for firearms" (184); but one must not examine too closely the term "accidental." The distinctions are not always so

easy to draw: "Accidental mechanical suffocation" (182) must be distinguished sometimes from "Accidental traumatism by landslide" (186), and sometimes from "Cataclysm (all deaths)" (187). More difficult than that is "Accidental asphyxia" (under 182) and "Asphyxia by vomiting" (under 194 "Other Accidents"). It is this rubric 194 which seems most confusing. If death was due to luxation of a vertebra it would be classed here, unless it were due to a felony, a fall, crushing or landslide, a cataclysm or an attack by an animal. The total number of deaths due to luxation of a vertebra would then not be very accurately represented by the statistical figure. Then a man crushed at a fire or killed by a jump from a burning building died from the fire, and his death is not listed either as a crushing (186) or as a fall from a height (186a). In the supplement, which one must not ignore, is another aspect of the accident. Here are asphyxia, falls, crushings, explosion of gasoline tanks (not to be confused with burn by gasoline in 181), explosion of boiler (to be distinguished from burn by steam) and a very conflicting arrangement of the agencies and modes of accident.

It would be futile to illustrate further the confusion of the International List. It may be more profitable to examine the List for reasons for the confusion. The International List grew from small beginnings and its basis has been changed in the last revision. It has become necessary to break down the major rubrics; here the elements of each began to meet: suicide by poison overlapped accidental death by poison. Still the rule of priority held. With the amplification of the List, and the emphasis on causation and mode, new elements crept in. It was these new elements that gave life to the List because they allowed more exact analysis and stimulated preventive measures.

At present the International List sets out rubrics that are of so many different orders that comparison is often impossible. There can be no comparison of deaths from fall and deaths from broken neck, deaths from firearms and deaths from perforation of the chest. When general causes are analyzed into their elements, the same particular element may appear in several general causes. A fall from a height or a broken neck may easily be a common element of many general causes (so-called). Already it has been found necessary to attempt to graft a cross-reference system into the International List, little as that is adapted to it. Indeed the point has come where the International List is unable to bear the burdens which are placed upon it by the diversity of facts which statisticians require. It cannot be remodeled without becoming confused and cumbersome. Moreover, it was not intended to be reduced to a code-system comparable with the systems in use elsewhere, in business offices and libraries, for example. It was certainly not planned to facilitate the mechanical sorting of punch-cards. The digits in its code-system are meaningless. If the code of "suicide by hanging," 165 bears any relation to that of "suicide by drowning," (166) it is purely fortuitous; "infanticide" is 172 and "accidental absorption of poisonous gases" 178; "injuries by animals" is 188, and (death by) "hunger and thirst" 189.

The striking defect of the International List and lists modeled after it, is that the rubrics are not mutually exclusive. Analysis of these lists show that the rubrics contain, often without any clear definition, as many as four different elements in the accident: (1) the clinical result (broken neck); (2) the agent directly responsible (as in suicide and homicide or attacks by animals); (3) the means by which the accident was produced (as a weapon or an automobile); (4) the mode of production of an accident (as a fall, or an explosion). To this may be added a fifth which is commonly required, namely, the circumstances or environment of the injured person at the time of an accident: traveling in a train, living at home, working in a factory.

In any accident one or more, occasionally all five, of these are recorded, depending on the use to which the record will be put. If the record is for a physician or a hospital, the important fraction of the complete record is the clinical diagnosis; a

broken leg is not quite sufficient for clinical purposes, because the mode does affect the severity of the injury and the possibility of complications. All other elements, however, are subordinated to the clinical diagnosis.

From the legal standpoint, the agent, if there is one, is the most important and all other facts are supplementary. For purposes of compensation, the indirect agent must be determined, as well as the nature of the injury and certain facts in regard to the circumstances and environment of the injured.

From the point of view of prevention of accident, many of the elements that entered into it are important. In fact these are more far-reaching than any simple system of classification can encompass. Causes must be traced to their beginning. The clinical diagnosis is of minor importance because the nature and severity of the injury are often no indication of the general seriousness of the hazard.

If a common system of recording the circumstances of accidents is to be used by all those interested in injuries, it should be set up in such a way as to provide for these five elements. Records prepared by different agencies would then be comparable. To provide for elaboration in any direction it should be elastic; that is to say, susceptible of amplification without interference with general rubrics. To provide this elasticity, the code system too should be elastic, like those in use in business offices and elsewhere.

The International List is not suitable, not only for the reasons set out, and not particularly because it is basically a classification only of fatal accidents, but because it is absolutely inflexible unless a decimal system is grafted onto a code-system which is not decimally arranged. It is true that the International List has been amplified, for use in this country particularly, until the rubrics include many diseases and injuries that do not cause death. In order to provide for statistics on the industrial and other circumstances of the injured, a cross-reference system has now been supplied. Certain of these amplifications are arranged decimally, although the List itself bears no semblance of a decimal arrangement.

There are in existence a number of clinical classifications of diseases and injuries. The National Conference on Nomenclature of Disease has almost completed a classification to which a descriptive decimal code has been adjusted. By "descriptive", I mean that the code defines the disease and that not only do diseases and injuries of the same organ bear the same code indication of the site of the disease, but diseases and injuries of the same nature bear the same code indication of the cause or nature of the disease. I present this summary because it illustrates in a simpler way just what I am venturing to propose as a method of classifying the circumstances of accidents.

Since all diseases of the kidney bear the same "topographical" code-number, they may all be readily assembled in hospital records and in statistical computations, especially when the punch-card is used. Tuberculosis of the kidney has, in addition to the code for kidney, the code for tuberculosis. Hence this disease, besides falling automatically with diseases of the kidney, falls automatically with tuberculosis of any other organ. Thus statistics on tuberculosis of all organs can be compiled from the addition of all that bear the code for tuberculosis; and statistics on tuberculosis of the kidney by the segregation of those "tuberculosis" records (or punch-cards) that bear the code for kidney. This principle is applied to every disease and injury.

This method has solved the problem of deciding whether tuberculosis of the kidney is "tuberculosis" or a "disease of the kidney." Of course, it is clinically both, but statistically it had to be one or the other. It no longer has to be, statistically any more than clinically. Suppose the records of death in four cases show (1) infection (unspecified) of the kidney; (2) cancer of a bone; (3) tuberculosis of a bone; (4) bullet wound of the kidney. According to the International List these deaths are recorded as (1) disease of kidney; (2) cancer; (3) tuberculosis of bone; (4) injury. According to the dual method to which I have just referred, there are two cases of death from kidney disease (or injury), two from bone disease, one from infection

unspecified, one from cancer, one from tuberculosis, and one from injury. Thus the record shows eight causes of death for four deaths. It will be readily seen that, by this dual method, the causes of death will always be double the number of deaths. This is not only a statistical convenience but a clinical necessity, since disease is defined, if not always in words at least in sense, as a dual entity, namely a morbid process in a certain organ or tissue.

This principle can be readily applied to the classification of the circumstances of accidents, with the difference that instead of being dual the system must be at least quadruple. It is suggested that the clinical diagnosis be divorced from this classification, since it is already provided for. That leaves, then, the four elements which I have mentioned: (A) the agent; (B) the means; (C) the mode or manner; (D) the circumstances of the injured (Tabulation appended).

The suggested arrangement is modeled in its content after the International List of Causes of Deaths, with the Census Bureau's amplification, but with due regard to the statistics compiled by the National Safety Council and other organizations. Each composite rubric in the International List has been broken down into its elements. Thus "Suicide by jumping from high places" (169) becomes a compound of 01 in Column A ("Self intentionally") and 02 in Column C ("fall from height"); its code is therefore 01 00 02. "Accidental traumatism by fall" (186) becomes simply "Accident due to fall from height", again 02 in Column C. The nature of the traumatism is set out in the diagnostic code. Thus both the suicide and the fall are recorded without prejudice to either. The total injuries due to fall from height thus include all injuries so caused and do not exclude those of suicidal or homicidal nature. In the same way all suicides are recorded and may be tallied by adding all records that begin with 01. This principle is followed throughout. For example if a workman were injured by being pushed from a height by a fellow workman and falling through a glass roof, A would be "fellow employee intentionally" (16), B "glass" (04), C "fall from a height" (02), and D "engaged in industry" (70), more specifically the building industry (72), if amplification of this rubric were required. There would be no difficulty in deciding whether the death was to be recorded as murder (except the legal one), as due to a fall from a height, as due to injury, or as death in industry.

No part of the International List is sacrificed. It is merely reduced to such simple terms that there can be little difficulty in recording the circumstances of any accident. These elements can then be combined in any desired way by those who are accustomed to determining the groupings, and who know whether suicide by fall is a suicide or a fall. Moreover, if the basis of the International List should be again changed from proximate cause to locale, statistics compiled in the simplified fashion could be assembled accordingly. Therefore statistics in any year would never be lost. By the International List an accident by mining machinery is not recorded in the same way when proximate cause rules as when locale rules. It is lost from locale if it is recorded according to proximate cause, and *vice versa*. By the method suggested it would be recorded for all time in both ways and could never be lost. This perennial comparability is aided by the fact that the code need never change except to be amplified by decimal subdivisions and the addition of new columns to the old constant ones. The International List of 1929 fails in very many places to provide comparability with the 1920 List either by rubric or by code, statistics based on it are largely being begun anew, and punch cards of 1928 are so differently coded from those of 1931 that there is an absolute break in continuity. It is suggested that the time has arrived for a stable system with an unchanging foundation.

Certain gaps will be observed in the lists suggested. These are to provide for additions. In Column A, 04 and 05 might be used to distinguish between fatal and non-fatal self-injury; and 10, 11 and 12 might particularize non-fatal injuries resulting from the act of another. Each of the columns A, B, C and D can be enlarged up to 99, and then extended decimally as far as desired.

The attempt has been made to condense the locale and the circumstances of the injured into one group (Column D) composed of two columns on the punch card, with an optional third. The difficulty here is that the injured may have been employed or unemployed in the street and that he may have been in a motor car in the street (although he would not be in a motor car in a bath-tub, or in a bath-tub in the street, except possibly in ancient Athens). This is the reason for the cross-reference. It is thought, however, that the arrangement would be simplified if the facts concerning employment were separately stated in a fifth group. The difficulty will still remain that accident occurring, for example, when the injured was at a railway crossing would not bear the same code as accidents occurring while the injured was in a motor car at a railway crossing. Hence the sum of accidents at railway crossings would have to be compiled and would not appear automatically from the punch-cards. It might be possible, however, to arrange the codes in such a way as to overcome this difficulty, but a little more space would be taken up on the punch-card. This is the only case in which it appears to be necessary to include more than one rubric in any column, and all because, contrary to physics, a man may be in two places at once.

I hope it will be clear that there need be no statistical falsification. The less important rubric will not be robbed to provide accuracy for the more important. In the composite code-number of the accident a record should be made under each of the four rubrics. If the workman who fell through the roof had not died from glass cuts, but had been crushed on the ground, there would be no need of entry under B (Means). In that event the columns devoted to B should be filled out with zeros. In this way if two workmen were killed by the glass roof and two by contact with the ground, all other circumstances being identical in each of the four, there would be 4 deaths produced by fellow workmen, 4 deaths by a fall from a height, 4 deaths in industry, 2 by glass and 2 by means unspecified. Thus the 4 deaths would be recorded 16 times. If the two in which the means were unspecified had not been recorded as such, there would have been only 14 records. Statistics can be made to balance in this quadruple fashion only if an entry is made in each rubric. I am not quite sure how necessary it is to have statistics balance; I only assume the necessity from the pains statisticians have been at to avoid the record of a death in more than one way. At any rate this method of "quadruple balance" is offered for what it is worth.

It is unfortunate that one must dwell upon the shortcomings of the International List without being able, as a part of the argument, to refer to its great usefulness in the past. It presents a method of making those distinctions in circumstances of external violence which have until recent years occupied the attention of statisticians. From its very inflexibility it has had to be more or less disrupted every time it has been revised. It is now so confusing that one has quite often a choice of two or even three rubrics for the same cause of death (or illness).

It must be remembered that, whereas those who are accustomed to use the International List can no doubt pick out the appropriate rubric for each cause of death, all those who may have occasion to use it will not find it easy to apply. The method used should be so simple that any intelligent physician, record-clerk, or factory boss could use it without hesitation or confusion. According to the proposed method, there are four primary questions to be asked: (1) Was any person or animal responsible for the violence? (2) Did any particular object inflict the injury? (3) What circumstances directly produced the hazard? (4) Where was the person and what was he doing when he was injured? The various answers to these questions are to be found respectively in Lists A, B, C and D. It is very much easier to classify elements than composites, and very much easier to interpret them. Once these four elements are recorded, either positively or negatively, the expert combines them into the groups which make statistics live. No element would be lost or submerged and statistics would be infinitely more reliable at their source and much more accurate in their summations. This is, after all, the test of any statistical scheme, for it must

be simple and reliable and must set forth clearly the conditions which constitute hazards to life and limb, so that measures may be taken to ameliorate them.

It has been argued, as it will be till the millenium, that we must not make a breach with the past nor destroy the comparability of statistics from year to year. It is true that with the change in codes a certain confusion might result for those who make the estimates mathematically; but it is not true that we should not be able to compare statistics compiled on different bases. The summations by the suggested plan would correspond with the summations by the previous plan, because we wish to know just the same facts about accidents as we did last year. If any of those are of no further value they can be dropped; as new demands arise they can be readily incorporated in the elastic system suggested.

The decimal system is centuries old; the decimal system of record-keeping is not new; and the punch-card has already become a necessity, particularly in the compilation of such enormous statistics as those we are concerned about. We shall have to get off the coach and into the motor car sooner or later, and you may agree that the sooner a change of some sort is made the better. Far be it from me to maintain that the method herein suggested is without a fault even in its general principles. It has been my hope to suggest one way of bringing the method of recording accident statistics more into line with modern methods of keeping records of related events.

It is this attitude which alone gives me the courage to present these suggestions to you; statistics is a field with which I am none too familiar. In the National Conference we have elaborated a method of compiling morbidity statistics similar to this method of recording the circumstances of accidents. It is our hope that the record of the latter may be so easily blended with the record of the clinical condition that hospitals will find no difficulty in recording those very facts which you require. The National Conference believed that we should make what suggestions we can for the blending of these methods of recording facts which are of such great concern to us as well as to you.

Figure 1 Composite of Sample Punch Cards

	Diagnosis	A	B	C	D
1.	0 1 0 3 1 6	0 1			5 0
2.	2 1 0 4 1 6	0 3	7 1	0 3	
3.	4 1 0 4 1 4	0 6	0 6		6 7
4.	0 1 0 4 0 4	0 8	5 2	0 2	7 3
5.			6 1	2 1	0 3

- Punch Card
- Interpretations
1. Arsenical poisoning; suicide, in the home
 2. Fracture of skull; jumped, from hay-mow, during fire
 3. Penetrating wound of heart; pistol wound, by another intentionally, in a duel
 4. General crushing; (pushed) by insane person, from a height, (fell into) machinery, in a mine
 5. (Any diagnosis); a train, in collision with motor car, (caused injury to person) in motor car

TABULATION

Suggestions for a Classification of the Circumstances of Accidents

- A* Agent
- 00 Not specified
- 01 Self intentionally**
- 02 Self delirious or insane

*In punch-cards the letters are printed at the tops of the appropriate columns.

**The definitions of intentionally and unintentionally are to be determined, to distinguish, if necessary, between felony, negligence, etc., and between intention with and without culpa-bility.

- 40 Public place
- 41 Street or highway
- 42 Intersection of streets
- 43 Railway crossing
- 44 Bridge
- 46 Public building
- 47 Public elevator
- 50 Home
- 51 Bed
- 52 Bath-tub
- 60 Play, sport, or competition
- 61 Play
- 62 Baseball game
- 63 Football game
- 64 Foot race
- 65 Wrestling match
- 66 Boxing bout
- 67 Duel
- 70 In industry
- 71 In construction work
- 72 In building trade
- 73 In a mine
- 90 Miscellaneous
- 91 In war
- 92 As civilian during war
- 93 Handling objects
- 95 During birth

Note—To each of these, where applicable, are crossed:

- 1 In course of employment
- 2 Not in course of employment
- 3 On street in course of employment
- 4 On street not in course of employment
- 5 At intersection of streets, in course of employment
- 6 At intersection of streets, not in course of employment
- 7 At railroad crossing in course of employment
- 8 At railroad crossing not in course of employment

R. L. FORNEY (National Safety Council, Chicago): I sent advance copies of Dr. Logie's paper to several people, including Mr. H. W. Heinrich of the Travelers Insurance Company, who is here and who, I'm sure, has something to say.

Discussion re "A Logical Classification of Accidents"

By H. W. HEINRICH

Assistant Superintendent, The Travelers Insurance Company, Hartford, Conn.

Dr. Logie's paper embodies a straightforward, frank and accurate statement of facts. It is of value not only because of its constructive criticism of existing statistical codes but also because it contains suggestions for improvement.

Dependence is placed on accident codes and classifications to provide reliable data for the establishing of rates, frequencies and for prevention and other purposes. The immense amount of work and the tremendous cost already entailed by the preparation and use of existing codes in itself justifies the attempt at this time to make them workable and of value.

Dr. Logie states the fundamentals of code building. I agree with him when he says in effect that:

General statistics must be readily susceptible of analysis or "breaking down", etc.

We can compare only those phenomena which are of the same order.

Present rubrics $\times \infty$ are of so many different orders that comparison is often impossible.

Codes should be so designed as to facilitate mechanical sorting of punch cards.

Rubrics should be defined to avoid confusion and inaccuracy.

Rubrics should be mutually exclusive.

Code systems should be elastic or susceptible of amplification.

It is much easier to classify elements than composites and much easier to interpret them.

According to the analysis of existing codes which Dr. Logie has made the rubrics contain five elements which he lists definitely as:

- 1—The clinical result
- 2—The agent
- 3—The means
- 4—The type or kind of accident
- 5—The circumstances or environment

For the purposes of the particular codes which Dr. Logie discusses, I agree that all five of these elements are important and should be coded.

Attached to Dr. Logie's paper I find what I assume to be a tentative form of a code such as he advocates. He has, of course, not yet had the opportunity to build up a complete coding system which meets all of his own objections to the existing codes. For example his rubrics or elements have not yet been clearly defined. This lack of definition still permits unlike data to be grouped. Under the rubric MEANS for example, a study of the tentative list of items indicates the intention to specify the inanimate object, as Glass, Stove, Machine, etc., also its action if of interest, as Thrown Object, Exploding Dynamite, Etc.

Such definition, however, is lacking and so we find two or more places to record one death, injury or accident. Glass may fly and thus permit coding as Glass or as Flying Particle. A Stove may Explode and again two places are provided to record the accident. Some of the Means are tied in with a form of action and others are not. If Means is to be defined as including both an object and its action it would be necessary to consider that several forms of action may relate to one object and to provide for this in the code.

I do not advance the foregoing thought, however, as a criticism but rather as an illustration of the soundness of Dr. Logie's guiding fundamentals. All in good time, minor points such as I bring out here, and which I am frank to admit also may be merely the result of misunderstanding, will undoubtedly be taken care of.

May I add further that it is a pleasure to endorse Dr. Logie's presentation of a most difficult subject because it is so clearly in line with work which is now going on under the direction of the American Standards Association. A sectional committee on statistics in this organization has set up a sub-committee on the revision of the Accident Cause Code. This sub-committee of which I have the honor to act as chairman meets this week and has its work in such shape that we hope to present our report before the end of the year. Although the scope of our code is limited only to industrial accidents and to only such circumstances attending the accidents as are of value chiefly in accident prevention, yet the fundamentals or elements in code building in general obviously apply to our work as well as to the codes Dr. Logie discusses.

We have set up our rubrics and we have so clearly defined them that a place is provided for all essentials, overlapping is practically eliminated, items are not combined but can be combined at will, rubrics are mutually exclusive; design is suitable for punch cards and provision is made for coding the proximate cause.

In the code we have constructed all of the fundamentals which are essential in Dr. Logie's opinion have been incorporated.

I should like to add here that the term "cause" generally seems to be a bit confused because it is more often than not taken to be applicable to the entire code system. We call it the cause code and yet we use that cause code for tabulating the various

elements that enter into an accident or accidental injury. There is room for a better definition of the term "cause." Our committee has made such a definition and it has provided a single column in our code system for coding nothing but cause.

Our rubrics include—

- 1—The agency (object, material or substance which is chiefly involved in the accident)
- 2—The part of agency (gears on lathe, etc.)
- 3—The kind of accident which we term "Manner of Contact" (fall, struck by, etc.)
- 4—The manner of performance (Transporting, repairing, etc.)
- 5—The proximate cause (unguarded machine—disregard of instruction, etc.)

As ours is an accident code we are not concerned with the clinical result which is recorded elsewhere.

By use of a code of this kind it becomes possible to determine all of the Falls in a given period of time and at a given locality. These Falls further may be broken down as to agency, part of agency, manner of performance and cause. It is likewise possible to determine all of the causes of a given class and then to find how many result in Falls or some other kind of accident. The same thought applies to each rubric.

If such a code for industrial accidents is adopted its scope may perhaps be extended to include nonindustrial accidents. Its principles likewise may be adapted for use in disease and fatality codes or in nature of injury classifications.

There is a vital need for more uniformity in accident and injury code usage. I subscribe to Dr. Logie's fundamentals and sincerely trust that we are approaching a time when logic, definition and uniformity will play a greater part in code building.

CHAIRMAN MURPHY: I doubt if there is another man in his capacity as state health officer who has done more in the line of accident statistics than Dr. Brown of Kansas. I am sure he has some remarks to make upon the suggestions that were made by Dr. Logie.

DR. EARLE G. BROWN (Kansas State Board of Health, Topeka, Kansas): I also had an advance copy of Dr. Logie's paper which I have read and re-read. He has given us a world of information that should be of great value. There are certain things, however, which make me wonder whether his suggestions could be properly applied in a state health department.

In insurance companies, where all information is absolutely required and where there are agents to secure the information if it isn't on the written report, and in industries where such a report is also required, it is possible to carry this complete coding through. But when we depend on the physicians and coroners and others to send in death certificates, even after an intensive two-year program of work in Kansas, in death certificates, even after an intensive two-year program of work in Kansas, we can't yet secure 100 per cent reporting. That is quite true in the United States, generally, that is, in reporting to the health departments.

If this 100 per cent reporting could be secured it would be different. I should say this: If the certificates were properly filled in by the physicians and coroners and others who are authorized to sign certificates, then the information could be completely coded in the manner suggested this afternoon. The possibilities of accident prevention work are greatly amplified by the correctness of the data which can be secured by those who sign certificates. I believe that a plan of this kind would require an educational campaign among physicians in the furnishing of correct information.

Here is one other consideration: This would entail some additional help; it would entail some additional expenditures. I don't believe that those of you who are not dealing with legislatures realize the great difficulty in securing adequate appropriations to make the department completely function.

R. L. FOWNEY (National Safety Council, Chicago): Dr. Brown has made a mild

criticism: that the use of this recommended plan would be made difficult by lack of information. I wonder whether the proper handling of this more detailed coding system would require any more information than is now ordinarily reported.

For instance, Mr. Heinrich, in the work that you have done, would it have been as practicable to classify in this fashion as by the method that has been formerly used?

MR. HEINRICH: Yes. I would say that it is largely a matter of difference in method of classification rather than more information. It would be a harder task undoubtedly to correctly classify each accident. I would look at it largely as an educational procedure in which the labor departments and the industrial commissions of the states could play a large part, so far as industrial accidents are concerned. The problem would be largely one of asking leading questions, instead of leaving the matter of accident description to the individuals own idea of the language and terminology to use.

CHAIRMAN MURPHY: I thoroughly sympathize with what Dr. Brown has said about getting the material, by and large, from all over the country. We have been trying for thirty years to get states simply to record deaths. You can imagine how far in advance we would be if we ask them for all the information required in this plan. We should have to educate not only the coroner and the registrar, but the whole medical profession.

DR. BROWN: I should like to illustrate just one point. Just a few days ago I was preparing a report on infant deaths for a state health department. Of some 3,000 infant deaths reported in that state, there were 856, I believe, where the cause of death was unknown or ill defined. In our own state I think we report something like 50 as ill defined or unknown, out of approximately 1,800.

I should like to say this, too: In our accident work we have been using the supplemental report blank as put out by the National Safety Council. I would say that of 1,600 fatal accidents during the year 1930, we queried over 1,200 of them to secure additional information. Of course, our queries went into family details, number of dependents and other data. I believe that it would be necessary, to get the details necessary for this system, to query at least 50 per cent of the reports.

CHAIRMAN MURPHY: Take into consideration, also, that just to get the regular information necessary to tabulate the certificates we queried nationally over 100,000 cases last year.

DR. LOGIE: Mr. Heinrich speaks of flying glass as an item in the code. It might be hard to know whether to classify flying glass as "glass" or "flying particle." But details like that I think can be solved by amplification.

I suggested in my correspondence to Mr. Heinrich and I should like to state it again here, that unless the idea of agency is subdivided into living agency and inanimate agency, or means, as I call it, there is likely to be overlapping. It is not only necessary to know that a man fell from a height or that he cut himself or was hit by a bullet, but that there was some human agency behind it.

I have as one item, the exploding stove. I have listed separately several exploding things, and we could have as well as exploding dynamite, exploding stove, exploding gasoline tank. Some injuries caused by a stove would fall into two separate lists, both under means, of course. That is, burns by stove and injuries by exploding of stove. I don't think there would be any necessity for listing all stove injuries together.

It was most encouraging to find that I wasn't the first person working along these lines. What I tried to say in my main remarks was that this sort of thing ought to be done. Whether my particular plan is of any use doesn't really matter. I think from what I have seen of Mr. Heinrich's sub-committee's plan that perhaps my suggested scheme might be blended with his to some extent, particularly in the matter of the agency, and that from the two some workable plan might be evolved that would suit not only the particular work that Mr. Heinrich and his people are doing but the work that all of us are doing.

I think that Dr. Brown is needlessly alarmed because he asks a question which

shows that he has not perhaps grasped the point I was bringing out. He says, "How are you going to get all these facts?" That doesn't apply here any more than to any other system. If you can't get your facts you don't put them down. You can't go beyond the information that is given you. Whether people are ignorant or whatever it is, the same handicap applies in every case. What you do get you enter, only in this case you enter it more simply.

I was thinking about that, too, when Dr. Brown was asking, "Why do doctors not give these reports?" I know why I will not give reports many times.

If an automobile accident occurred, the car went over a hill and crashed and the man was smashed like a pancake, I would say there was certainly a crushing. If I see in the International List or some other classification "Death by crushing," I would say that is where it goes.

But I look down the list and see "Motor accident." It is a motor accident. What am I going to do about it. Well, that is past human faculty. I don't know whether these officials in Washington want to call it a motor accident or a crushing accident. I say to myself, "When they give me something specific, some information as to whether they want it as a crushing accident or a motor accident, I will send that in."

The point that I should like to make for Dr. Brown and others is that I don't think we are making things any more difficult for the doctors and coroners and policemen. We are making them simpler. Instead of calling for extra help to untangle all these returns, instead of sending out 100,000 letters a year to find out what this was, we say, "Give them simple questions to answer." You get a high percentage of correct answers when you ask a man questions like, "Where was the injury? What hurt him? What hit him?" Who can't answer those? That is the way to get people to answer.

Dr. Murphy asks about omissions of information. I have tried to answer that just now. When a card comes in and there is something you can't code from it, you assume, for instance, that there was no means. We can make no assumptions but we can say that according to the report the accident had no means involved.

CHAIRMAN MURPHY: We have had presented a subject which we can well afford to take home with us and study, one which will undoubtedly continue to be discussed at every meeting of this sort.

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TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



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Health Committee—DR. A. F. LECKLIDER, Fisher Body Corporation, Detroit, Mich.

Tuesday Morning Session

October 13, 1931

HOYT L. FRACHER, Chairman

Director of Personnel, Detroit Steel Products Co., Detroit, Mich.

The first session of the Automotive and Machine Shop Section convened with General Chairman Hoyt L. Fracher presiding.

CHAIRMAN FRACHER: It is with pleasure that I call to order the meeting of the Automotive and Machine Shop Section at this Twentieth Annual Safety Congress. I wish to thank all Committee Chairmen for the loyal support that they have given me this year. This has been a trying year for all of us. We have had problems that we never thought were going to come up, but we faced them and here we are.

The first speaker is one for whom we in Detroit have a high regard, a gentleman who deals in materials—not the same kind that you and I deal with, but with the human element. It is with a great deal of pleasure that I introduce to you Mr. Percy Angove.

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"Human Engineering"

By PERCY ANGOVE

Assistant Superintendent, In Charge of Education, Wayne County Training School, Northville, Michigan.

I am interested in the subject of safety because I am interested in man, and anybody that is not interested in man or the human side of safety has no business in the safety movement. That is a radical statement, but a basic principle upon which my remarks will be founded.

Inasmuch as 85 per cent—at least—of safety must be put across in terms of education, I do not feel out of place before you as an educator, because in the school business we try to stress safety education in everything that we do, thinking in terms of the conservation of human resources, and the same principle of education always applies no matter what the subject or whether or not the recipient be child or adult.

Man is never trained to his fullest extent. Education is a continuous life-building process from the cradle to the grave, and the same fundamental principles apply to the man in the factory as to children in our schools.

We are attempting in our most modern schools to teach safety practices as a unit of instruction from a social-economic point of view. We believe that if we can get across to our children in the schools proper work attitudes and habits, they are going to be better and safer workmen when they later engage in industrial pursuits as workers of the nation.

But we do not treat the subject from that standpoint alone. We even go into the matter of safety education as a means of conservation, protecting the rights and property of others, and to eliminate or ameliorate physical want and suffering.

You have undoubtedly discovered that safety is not an easy subject to teach. The man will have his own ideas. I stepped into one of my classrooms just recently and observed a safety lesson in progress. The teacher was telling the children how they should handle themselves in a boat; that they should always sit down in the boat. A little snapper sitting in the back raised his hand eagerly and said, "Teacher, George Washington stood up in his boat when he crossed the Delaware", pointing to the picture of Washington crossing the Delaware, that hung upon the wall.

When you get a little child as eager as that child was to get back at his teacher, you know that it is a serious matter to sell the idea of safety, not only to the plant superintendent, not only to the man at the gate, not only to the employment manager, (and God only knows they need it), not only to the foreman, but down to the man himself upon whom the machine is dependent—a man who has his own ideas, likes, dislikes, and attitudes, a man who has played an important part in the molding of his own life. Only in and through this man can you ever hope to eliminate industrial accidents and maladjustments. All other means must be to this end.

Sad to relate, we have had safety a long time, still we are getting lots and lots of accidents. I would like to be able to say, as some safety engineers have said to me, that the time is coming when there will be no more industrial accidents. I pray for that time. I am not going to make such an optimistic statement, however, because you don't always know what personal worries the man is living under which tend to lead his mind away to something far from his job, and furthermore, you don't always know what a cold-blooded machine will do or how a cold-blooded system affects his thinking or acting.

I recently read an article in which the writer stressed talking safety in terms of dollars and cents instead of in terms of humanitarian impulses and values. I want to tell you gentlemen that if you eliminate the personal equation, your work is doomed to failure. You have to start with the man. You have to carry your

message through the whole organization, always with the man in mind, and you have to finish with the man. Only through this means can you talk in terms of dollars and cents, because the man is not alone a producer, the man is also the consumer. Without the consumer there would be no need for production, and what's more, the man today knows it. Only when you consider the man can you talk in terms of dividends.

I believe I know the problem that you men face in your work. I shall not assume, however, to talk to you upon the technical phases of safety practices. I am not qualified to do so. I can only talk to you from the standpoint of my observation, and in doing so, I must think in terms of humanitarian values, because you can safeguard machines, you can make working conditions sanitary, but that alone will not solve the problem.

We are inclined, sometimes, to narrow our efforts and keep them within the confines of our own office and our own shop; we are wont to think in terms of machines and buildings, those soulless things, those material things. We have been more interested in keeping things out of the red in order to talk dollars and cents to the management; and in doing that we are very likely to lose sight of the man who has a soul, who has feelings, who has emotions, the man who is a member of a family, the man who is a member of a community, the man who is a member of a state and a nation—a man who, with you and me, must live in and through each other, and, gentlemen, this man cannot live an adequate social, up-and-coming life, to say nothing of his dependents, unless he is a fit and self-producing member of society.

It has been my experience within the last few years to return to remunerative employment over 2,000 handicapped persons, vocationally disabled by industrial accidents, public accidents, disease and congenital conditions at birth. I have seen them lifted out of darkness and despair, up over the hill-tops to light and happiness, carrying the torch of courage in their hand, made fit to produce again and consequently live normal lives, rather than to exist upon the production of others; and, gentlemen, let me tell you here and now that no man has a right to live off of the production of others, to depend upon charity for a living. No man has a right to be institutionalized for the rest of his life, unless of course, his mentality or physical condition is such that he would be a detriment to society and right living.

Most men who work for you, or rather with you in your plants, are men who have a right to live, and not merely exist; men who have a right to remain assets and not become liabilities; men who have a right to control to some extent at least what they shall become and what they shall not become, and who have a right to provide adequately for their loved ones. Yes, the personal element cannot be left out of safety; and if it is not left out, you will not only have safer workmen, but better producers, more loyal workers, and better consumers, to say nothing of better husbands, fathers, sons, daughters and sweethearts. That is the message, in a nutshell, that I aim to carry across to you tonight.

Two and a half years ago it became my privilege, while working with some of the industrial plants in Detroit and vicinity, to make contact with two men, safety engineers. How they heard of me or the work I was doing, I do not know, but I was invited to lunch with them, and I was thoroughly imbued with the fact that these men were not only applying safety in their work but they were living safety. They were proud to show me tables and graphs demonstrating that this month surpassed the last month in the reduction of accidents within their plants. It was through contact with these men that I began to think seriously in terms of accident prevention. That is why I became interested in the subject of safety, since safety is a great preventive medicine. I went with these men, and what a glorious time we had in some of their plants. Following a day's work, the workmen would congregate,—not only the safety engineers and the plant superintendents and the foremen and the safety committees, but the workmen, the men who are held respon-

sible for the output of that plant when it comes to brawn and muscle, were gathered around the machines, and I derived much joy and pleasure in sometimes standing on a table or on a box or on a machine and trying to drive home to these men that it was *their* responsibility to themselves, to *their* employer, to *their* loved ones, and to society in general to become careful, safe workmen.

Accidents are of two kinds; those involving danger to the man on the job, and those involving danger to others. These may be classified as due to any one of four causes; namely, ignorance, carelessness, accidents, or occupational dangers. Occupational dangers come under those trades or work activities that cannot be followed without subjecting the worker to danger. After all precautions have seemingly been taken, and the workers are seemingly fully instructed in safe practices, there are still certain dangers that go with the job. Such occupational dangers more often involve the worker himself than others.

Then there are the purely accidental dangers; those that cannot be foreseen but seemingly arise out of some unexpected situation. If a belt that has been properly inspected breaks, causing injury to anyone, this is an accidental danger and involves not only the workman but others as well. The belt may snap through no fault of the man. That is what I mean by accidental dangers.

Then there are the dangers due to ignorance, or through lack of education as to what the possibilities of danger were, and of course, these are no fault of the man if he has not been told. Such accidents can be prevented by training the worker so that he will use the proper precautions to avoid them.

Then there is that serious type of danger due to carelessness, wherein the man knows the necessary precautions to take, but does not. He knew but "didn't think," or he knew but "took a chance." These accidents are likely to occur even with experienced men. With efficiency, they are wont to become careless. Such dangers are likely to bring injury to the man on the job as well as to others.

What does this mean? It merely means that safety education must be a continuous process of education. Any type of education is habit formation. Whether it is with children in the schools, with young men and women in the colleges, or selling safety or teaching trades within your plant, any type of an education is a habit formation. We become efficient or inefficient according to the type of habit which we have formed. It is your job to see that workmen are inculcating the right kind of safe habits, and to make it a continuous process of education.

The safety man or foreman who can combine the heart and the mind with manipulative skill in getting the message of safety across to the worker makes such a lasting impression that he is never going to that machine unless he thinks in terms of himself, in terms of the loss to the management, and in terms of the loss to his loved ones at home. In other words, touch the vital chord and draw upon his very heart strings, if necessary.

You may talk about leaving out the sob stuff all you want, you cannot get safety across and eliminate that. We all like it; we all thrive on it. We are born with a heart and with a mind which represent our feelings, and those are the things that are trainable; things sink deep home to us when they touch the vital spot—the sensitive chord. Somehow, somewhere, and in some way man can be appealed to, and the first step is to gain his confidence and respect, discover his interests and make the right appeal.

There are three pieces of social legislation which I consider the greatest pieces of humanitarian legislation ever enacted on behalf of the worker, and they started with safety. Years ago, without scientific methods or processes, in a somewhat rather haphazard way, we began to practice safety by making working conditions safe and sanitary. That was not enough, that did not stop industrial accidents; so then we passed compensation laws to partially, at least, compensate a man during the period of recuperation, but such laws cannot compensate for loss of life and limb.

How many of you men would sell me your good right hand for all the money that is in the world? Not one of you. Compensation legislation will never compensate a man for the loss of a right hand, or for the loss of a finger, even, but it is a fine piece of legislation within itself, and a decided step forward because it tides the man and his dependents over that crucial period of recuperation when he is very likely to become mentally stagnated and sometimes degenerate into a social menace.

But what happened until you became educated yourselves, until the employment manager became educated? The man was left out in the cold. He was not rehired because he was thought to place the employer under great liability should he be employed if handicapped by the results of an industrial accident. That is not true. We have figures to dispute that inference. Now, compensation is a splendid temporary form of relief at the time when the injured man and his family most need it, but rehabilitation, vocational rehabilitation, steps in and completes the cycle and says: "Safety is fine; compensation awards over a period of inactivity are all fine, very needful; but what is going to happen to the man and his family if he cannot get back on the job?"

You gentlemen know, as well as I do, that there are a thousand and one jobs within your plants that handicapped people can do just as efficiently, just as effectively, as can physically normal individuals and not place the concern under any greater liability. We can produce figures to show that a second injury seldom occurs. In one large industrial state, where a survey was made on second injury occurrences, only two second injuries occurred during the same year that the investigation was being made. In Michigan, the employer is safeguarded because in case of a second injury the first is not taken into consideration when it comes to compensation awards.

Now, why do I talk about rehabilitation here, returning the handicapped man to employment? Because it is a safety measure. When a man is properly rehabilitated and returned to remunerative employment, placed on a job adapted to his needs and abilities, on the basis of sound vocational guidance and counselling, as *physically normal* workmen should be, he is a safe workman.

The reason that you have accidents within your plants, gentlemen—you know as well as I—*is* mostly through carelessness, and carelessness is brought about, very often, because a man does not like his job, has no interest in his job, and is merely working for a salary. His job is a drudgery to him. But when a man is on the job because he likes his job, is placed on the job in consideration of job characteristics and his own personal characteristics, in consideration of his likes, dislikes, his aptitudes, attitudes, and his abilities, and a job analysis is made of the job and then the two pieced together, you have a man there who is more likely to be properly placed, who is happy in his work, who feels he is a part of the organization and who very seldom is going to meet with an industrial accident. Those of us who have practiced human engineering on a sound educational basis know this to be true.

I made a statement that rehabilitation is a safety measure in itself; not only safety for the man, because he is trained and placed on the job again, but safety in terms of his fellow employees. When they see within their midst the result of an industrial accident, it tends to make them more careful. When they see that they are working for a concern big enough to return these formerly handicapped men to remunerative employment again, they are going to put the best into their job; they are going to avoid accidents if humanly possible to do so; they are going to feel that they are a part of the great machine; they are going to love their job and not be waiting to pull their overalls off five minutes before the whistle blows. They are going to feel themselves a part of every product turned out. These are the things that count in safety. They can apply, but only on the basis of sound vocational guidance and counselling and a constant process of education and human engineering.

I have told you of the cycle of the three greatest pieces of human legislation.

Of these three, which is the greatest? *Safety*. Greater than compensation? Yes. Greater than rehabilitation? Yes, with all its humanitarian aspects. Why? Because safety implies prevention. Safety, realized, would eliminate the necessity for the others.

Modern industries are scientifically enlarging their activities in order that so-called waste and by-products may be salvaged and utilized to bring the most economic returns. This is necessary and very commendable, but what of the human product? Will a new science of human engineering be developed in which trained minds will, through research, study and planning, exercise the same degree of thought and energy in adapting workers, the human products, to a more useful and a more practical service in the production scheme? In this connection I raise the question—eliminating sentiment and humanitarian impulses—is not the one proposition as economically sound as the other?

An analysis of the various tasks and their component parts should, as far as possible, be made to render available the type of work that can best be done by certain types of individuals. The employer today recognizes that a well man is a safe man. In this day and age of industrial efficiency, you would not think of using a three-inch shaft to transmit the power that could be transmitted by a one-inch shaft. You would not think of using a twelve-inch "I" beam when an eight-inch "I" beam would carry the load, or of using a five horse-power motor when a two-horse-power motor would produce enough power to run a given machine safely and satisfactorily. Why? Because it involves more expense. Would it not be just as sound to apply the same principles to the proper placing of men? Considering it from a purely mercenary motive, such a procedure would assure safer, better and more loyal workmen, better, and greater economic production because individuals would be suited to given tasks.

Men, can you see the value of applying the same practices and principles in terms of human engineering to the human soul, the greatest of all God given gifts? You cannot sell safety, by merely starting with the safety engineer, working through the foreman. The man at the gate has to be taken into consideration, the employment manager has to be taken into consideration, and all along down the line, because if the man feels that he is not being considered from a humanitarian point of view, with what has preceded, how do you expect to get him vitally interested in safety?

How often have I gone to an industrial plant to gain admission and heard men being accosted by the man at the gate with nothing but a mouthful of sarcasm. How often do we hear: "Well, what do you want? This is no place for you to loaf. No, you can't see the employment manager. He's busy." And had I not known the men inside, I would have been given the wrong impression of that plant right away. That is the same impression that is given to workmen.

Well, the man may or may not get in. I have followed the fortunate ones to the employment manager's office; and here is a line of men, ordinary men, with God given souls, just like you and me, sensitive men, emotional men, men who have some brain of their own to think, men who have loved ones dependent upon them, and who by some means or other gain admittance to the Czar's office. "Well, what do you want?"—knowing that the man wanted work, of course. "Where did you work before? What were you fired for? Lazy?" Not realizing that the man may have been laid off for justifiable reasons, such as lack of work, sickness, etc.—"Well, what can you do? You can, eh? Well, I'll soon find out." Gives him a slip to the Medical Department.

Nothing but inhuman methods and expressions of sarcasm from start to finish. And you know what I am telling you, gentlemen, is true. I don't know if you have this in your own plant or not, but I have seen it in Detroit and within the vicinity of Detroit. I went into an employment manager's office one day when a man was being questioned ridiculously for a job, and the employment manager said, "Well,

I guess we'll try you and see *what you're made of*." The fellow looked up to him and said something like this, "As bad as I need a job, I guess I'll try some other place, and you can give your job to somebody like yourself."

But some men put up with a lot to get a job and do get in under the most trying circumstances. How do you expect that man is going to feel when he is placed on the punch press and started to work, and then you come to him and try to sell him safety? Is he going to have the same impression of the safety engineer as he has had of these others up the line? To my way of thinking, the man at the gate, and the employment manager, should be imbued with the spirit of human engineering and the practicability of human psychology; they should be God given men; they should be men with a heart; they should be men who understand human nature; they should be the kind that gives the individual proper consideration, whether they can offer him a job or not; and, incidentally, I wonder which method sells automobiles.

I was addressing an audience at one time in the Capitol City of Washington, and I expected that an industrial executive from the city of Detroit was going with me. He was interested in the subject of rehabilitation. He could not go, and just before it came my turn to address that large group I received a telegram from him, and I read it to the audience. The telegram read something like this:

"I want the members of your conference to know that we are for them and with their work 100 per cent; that we treat our men like human beings. Twelve per cent of our handicapped people were not injured in our own plant." Now, I knew this concern and that the telegram spoke the truth, but what did it do? Right after that meeting—it happened to be an automobile plant—one of the audience of that conference came to me and said: "Mr. Angove, what kind of a car does that concern produce?" I told him, and he bought one that very day. Of course, he was in the market for a car, but that telegram sold him that particular make of car.

Does it pay in terms of dollars and cents to treat men right? Of course it does. Does it pay to treat men right from the standpoint of consumers just as well as producers? Of course it does; because if you do not have consumers, you cannot sell your cars. It reverts back to the consumer every time, gentlemen, and that is why the man must be considered a human being.

How many times have men come to me outside of the plant, commenting on conditions under which they have to work and relating what they have had to contend with. A lot of it is true; a lot of it is not true; of course, because they have been prejudiced and have acquired undesirable mental attitudes due to an industrial accident.

A man goes from the employment manager to the medical examiner, or medical advisor. What does he do? They do a wonderful piece of work—I am not disparaging that fact. It is a commendable service. We must have medical examinations—not to exclude workmen, however, but rather to better fit them in the scheme of production at tasks adapted to their needs and physical condition. Lots of medical departments examine a man with the idea of excluding him from work, when the idea should be to place him on work for which he is fitted. I think the time is coming when we will have to place men just as scientifically as we place machines.

Men, you cannot only think in terms of machines, you cannot think only in terms of the four walls of a plant; you must consider the man from every angle. You have to go back with that man into his life and into his home, and above all recognize him as a human being.

I wish I had time to enter into a discussion of vocational guidance, but time will not permit. There are certain characteristics of human nature which require definite placement. If a man should come to me for employment, at least if I had the time, I would try to discover whether he is mental or manual, whether he is an indoor type or an outdoor type, whether he is settled or roving, whether he is

static or dynamic, etc. All these things apply to certain characteristics within a given job, and if the characteristics of the man can be pieced together, you will have men better placed; and because of men being better placed, there will be less carelessness; and because of less carelessness, there will be fewer accidents; and because of fewer accidents, well and happy home relations are maintained; and finally you have a bigger output and better and bigger sales for your products.

What do I mean by the human touch? Perhaps it is a little off the subject, but I must relate it to you. You know and I know that most men can be led and not driven; that there is something within us somewhere, some spot of interest, that can be touched which would make you and me friends for the rest of our lives. That is what I mean by human engineering, personal touch, personal contact from the management right down to the man on the machine, or the man operating the truck, or the man running the elevator.

I shall never forget one day, when out giving a series of lectures, driving with another school man who had become quite prominent. We were driving out in the country, and as we came to a little country schoolhouse he asked me to stop the car. A thoughtful expression came over his face. He got out of the car, took off his hat and reverently raised it to the schoolhouse. He got in the car and we drove away in silence. I was very much concerned and curious over the incident. I thought it such an unusual thing, so I asked him what he did that for? He said: "All I am that is good and all that I ever hope to become that is good is due to one personal contact made in that school building when I was a boy."

Then he told me the story of his boyhood life. He was considered the bully of the community, a good-for-nothing, perhaps nothing more or less than a Tom Sawyer or a Huckleberry Finn or a Mickey Walker.

The teacher, who taught in that schoolhouse, is long since dead. She was the only one who could see through this bad boy. In him she kindled the flame of goodness, ambition and service; instead of bawling him out, one day, she called him aside after school was over and knelt by the side of his desk and prayed for him. Such a prayer he had never heard before or since. He said: "From that time on, I have been a man. Nobody taught me or told me how to be a man before, because I was always considered a bully. I was cuffed here and cuffed there; but there was one spot, one place in my life, where I had a little personal consideration; so I never pass this schoolhouse without raising my hat in the most profound reverence."

You men are doing that all day long and you don't know it. I know it. I have a friend here listening to me now. When I went out in a factory with him one day a certain man came up to me and said: "Where did you get acquainted with Mr. So-and-So?" I told him. He said: "I owe a lot to him." I asked him why, and he told me the story of how, through personal consultation, this man had made him see the light of day in terms of his work and his relation to his employer and to his home and to himself.

Is safety socially and economically sound? Is it? I think it is. I think that if I were going to get out of the school game tomorrow, I would want to get into the field of safety education, because I think it is a field of service, pregnant with possibilities for the future. Do you know, gentlemen, that a little more than 25 per cent of tramp life, homelessness and begging is brought about through ill health, industrial accident, industrial maladjustment? That is a fact. Figures can be produced to show it.

In one of the largest cities of our country, an investigation showed that 60 per cent of the families who appealed to relief agencies for immediate charitable assistance were forced to come because of ill health and accidents—not all due to industrial accidents, but a great portion. What does it mean? It means that when a man is injured in industry, the spark of ambition is run down and sometimes destroyed. He goes home to his family feeling licked. He has not been able to

get employment back in the plant where he was injured, and when he goes to another plant and applies for a job, he is turned down, because naturally the other plants will think, "Well, if you are any good the concern where you were injured would have been the one to take you back; it's their responsibility. Anyway, you were injured there. We have our own to take care of." He is buffeted from door to door, looking for work. What happens? He degenerates more or less into a social menace, and his loved ones are the losers. Sometimes juvenile delinquency is a resultant evil, and oftentimes the self-respect of the family is entirely lost.

Oh, I have seen the sad and pitiful results of industrial maladjustment. I have seen homes go wrong, as wrong socially as it is possible for them to go. I have seen a well-respected, community respected, husband-loving wife go wrong just to make a little money for the husband and family. I have seen children going around the streets with feet out of the shoes, deprived of a public school education, without the proper food to eat and the proper clothes to wear, all on account of sickness, injury, and industrial accident. Is it any wonder, then, that I appeal to you men on the basis of human engineering; is it any wonder that I stress that particular point with you here tonight?

I would like to go back a little and talk about this matter of proper placement within a plant. I know that the employment manager sometimes has not the time to make personal contact with every man who applies for the job. I know that to be emphatically true; but I do think that the employment manager often can do a little better than he has done. I have in mind now a man coming to a neighboring town in Wayne County from the state of Kansas. He had done nothing but farming all of his life, and he is a man now, I think about forty-five years of age. He was hired as a punch press operator. He had done nothing but outdoor work all of his life, mind you. Placed on a punch press, the first day he was injured, losing both hands.

It seems to me that you men have a job on your hands, first, to sell safety to some of your employment managers. Otherwise, you are going to have these problems to contend with which are truly and duly no fault of your own. I have in mind a boy employed under age, ignoring Child Labor laws—put on a punch press, he lost both his hands. I know these to be facts; and if you and I ever stop to think, I wonder what would happen to us tomorrow if we lost our hand, if we lost our sight? Can we put ourselves in the position of handicapped men? Is it any wonder that such a man becomes mentally stagnant and feels down and out, that there is no use for him again in the world? I think it is an easy matter for us to put ourselves in his place. Incidentally, you will be interested to know what happened to that little boy? Had it not been for the rehabilitation service, what might he not have drifted into? Training was provided for him, and today he is using his feet instead of his hands, on a vaudeville circuit, putting on step dances, making \$75 a week.

Gentlemen, a man is not down and out merely because he meets with an industrial accident, if you get at him soon enough, but your job and my job is to get at him before the accident occurs—and if we do not do that, we are under a moral obligation to that man, to society in general.

I have no patience with that college professor who wrote in a magazine, "Admit to our colleges and universities only the physically fit." Can you imagine such a statement coming from a college professor? And he would have the same thing apply to industrial management; that is why I just briefly touched upon the value of medical examinations, for the proper placement of men with physical handicaps, rather than turning them away from employment. Every man has a right to live, and not merely exist; every man has a right to an education, and every man has a right to employment, if, within the limits of his ability, some form of work that he can do as well as the next man can be found for him.

Who are the unfit? That college professor forgets that the great Socrates was

a physical wreck, yet a mental giant; he forgets that Alexander Pope was a physical wreck, yet a mental giant; he forgets that those two great philosophers, Voltaire and Kant, were physical wrecks but mental giants; he forgets that Robert Louis Stevenson was a physical wreck, yet a mental giant; he forgets that Heinrich Heine gave birth to his poems while lying on his mattress grave.

He forgets that these men, coming to our colleges and to our factories and work shops and our stores and offices every day, have potential values. I wonder what might have happened had George Westinghouse not been permitted to live until he perfected the air brake, the greatest of all safety devices. Some of you may say, "Well, perhaps somebody else would have taken his place." How do you know? Have you a right to assume that?

I wonder how farming and food commodities would have been affected had it not been for Madame McCormick who, when her husband and son gave up, stayed at night and laid out a row of scissors; placed the blades at right angles to the board, and tied a string to each of the other handles, pulled the string and saw them all work together. This was the development of the great mowing machine which has made living conditions for you and me much better and reduced the cost of food products. It is hard to talk about reduced cost now, but what would the cost have been had it not been for such a machine? You say, "Yes, but somebody else might have done that." How do you know? No one knows.

What has this to do with safety? Only this. It is or can be the means of saving great potential values. The past unites with the present in demonstrating that some who might be termed the unfit are contributing materially to the wealth and welfare of the nation.

I was called to the bedside of a young girl a few years ago who was injured. She went back and sought her position again, and was told point blank that they had no use for her. Her misfortune developed through a blow on the leg. Disease set in, which necessitated one amputation after another until the leg was taken off at the hip. When I visited her at her bed-side I called her by her first name; we soon became acquainted. She looked up with tears in her eyes and said, "Mr. Angove, of what use am I to society? I know that the doctors have done wonders for me here, but the place where I worked does not want me any more." She was wanted; there was something for her. Tears came to my eyes as I saw the joy expressed in her face over the fact that something could be done for her. She was trained as a teacher, and taught school for several years. She is now married and is the mother of two beautiful children. Who are the unfit?

I recall another young lady who was injured in a public accident. She was trained as a bookkeeper, and passed a civil service examination over numerous other contestants. She is now in Washington, D. C. in the visa department of the Immigration Bureau, in charge of thirty-five girls and earning about \$50 a week. Who are the unfit, and what about potential values? Shall we save and conserve them, and is it socially and economically good business to do so?

You all appreciate a gift I am sure. You treasure it because you respect and love the giver. It may be a simple thing, given to you on the occasion of your birthday, or at the Christmas season. It may be a cigar holder, a cigar lighter, or a picture that hangs upon the wall. You regard and keep it with jealous and zealous care because you do not want it to meet with an accident. If this gift falls to the floor, or for any other reason becomes damaged, you seek to repair it in an effort to restore it, in so far as possible, to its normal status. But what about the human soul, the greatest of all God given gifts?

CHAIRMAN FRACHER: In that message we got a lot of new ideas about our jobs. If there was any ego in us, I think it was taken out. I thought I knew something about safety, but I learned a lot this morning.

It gives me a great deal of pleasure to call on Mr. Marvin A. Heidt, director of personnel, Budd Wheel Company, Detroit, who will address you.

Is Accident Prevention the Responsibility of the Management or of the Employee?

By **MARVIN A. HEIDT**

Director of Personnel, Budd Wheel Corporation, Detroit, Mich.

As long as mental and physical labor have been combined to produce, the questions of safe operation and accident prevention have been uppermost in the minds of most industrial leaders. However, the consciousness that such a program was necessary and vital to the economics of industry has grown to its present proportions mainly in the last twenty-five years. Among executives today, safe operation is an essential factor in the sane and economical maintenance of any industry.

During this period, the employee has been gradually taught that safety is a necessary and vital spoke in the wheel of production. Without it, the wheel is weakened, eventually gives way, and allows the chassis of industry to settle on the axle of waste and dissatisfaction.

With this thought of safe operation absolutely fixed in the minds of the employer and gradually being sold to the employee, we have accomplished much toward making it a reality. But the actual accomplishment must rest with one group. A successful movement must always have a powerful leader with the courage of his convictions. Safety in industry is indeed an essential factor which must be recognized by management and workers alike, but the responsibility for that safe operation—for that clean slate at the end of each month, absolutely must rest in one quarter. I feel that the logical and fitting center about which the whole movement revolves should be focused at the door of management.

As a general, planning his campaign to lead his troops forth to victory, so should the executive feel in this campaign of safety. The responsibility of the success of his battle and the fate of his soldiers rests with him. A good general surrounds himself with officers to lighten his burden, to help him carry out his schemes, and to carry his commands to the various detachments stationed on the outskirts of the camp. A successful executive has his safety man with his staff, the foremen, and various gang bosses to help him carry out his program. With this nucleus having the power, initiative, and conviction to enforce a practical plan, the outcome must be success.

The preparation for this battle of safety against carelessness proceeds as any other. The general plans the attack, lines up his force, and reviews the moves with his staff. So should meetings of the executive with his safety men take place frequently. Foremen's meetings for the discussion of safety should occur regularly. Each man should know his duties and should have the ability both to obey instruction and use initiative in the proper place. With such competent supervision, the rank and file are bound to follow without faltering.

Of course, there will be infractions of orders—rules seem to have been devised for the pleasure of breaking them. That is why there are military police in the army and that is one of the duties of the safety men and foremen (of course to a much lesser degree) in industry. Of course, labor is not dealt with summarily and hauled off to the guard house to peel potatoes for endless hours for rule breaking—sometimes, though, when I have seen men clipping rims without goggles and carelessly placing their hands under the die of a press, I've wished sincerely I could give them K. P. duty.

The duty of management is to direct labor in safe operating. Each man should know the whys and wherefores of his particular job. He should be warned of its hazards and instructed in the proper way to avoid them. Safety instruction should be provided in such a way that the employee accepts it willingly and appreciates that it is in his interest and for his protection.

a physical wreck, yet a mental giant; he forgets that Alexander Pope was a physical wreck, yet a mental giant; he forgets that those two great philosophers, Voltaire and Kant, were physical wrecks but mental giants; he forgets that Robert Louis Stevenson was a physical wreck, yet a mental giant; he forgets that Heinrich Heine gave birth to his poems while lying on his mattress grave.

He forgets that these men, coming to our colleges and to our factories and work shops and our stores and offices every day, have potential values. I wonder what might have happened had George Westinghouse not been permitted to live until he perfected the air brake, the greatest of all safety devices. Some of you may say, "Well, perhaps somebody else would have taken his place." How do you know? Have you a right to assume that?

I wonder how farming and food commodities would have been affected had it not been for Madame McCormick who, when her husband and son gave up, stayed at night and laid out a row of scissars: placed the blades at right angles to the board, and tied a string to each of the other handles, pulled the string and saw them all work together. This was the development of the great mowing machine which has made living conditions for you and me much better and reduced the cost of food products. It is hard to talk about reduced cost now, but what would the cost have been had it not been for such a machine? You say, "Yes, but somebody else might have done that." How do you know? No one knows.

What has this to do with safety? Only this. It is or can be the means of saving great potential values. The past unites with the present in demonstrating that some who might be termed the unfit are contributing materially to the wealth and welfare of the nation.

I was called to the bedside of a young girl a few years ago who was injured. She went back and sought her position again, and was told point blank that they had no use for her. Her misfortune developed through a blow on the leg. Disease set in, which necessitated one amputation after another until the leg was taken off at the hip. When I visited her at her bed-side I called her by her first name; we soon became acquainted. She looked up with tears in her eyes and said, "Mr. Angove, of what use am I to society? I know that the doctors have done wonders for me here, but the place where I worked does not want me any more." She was wanted: there was something for her. Tears came to my eyes as I saw the joy expressed in her face over the fact that something could be done for her. She was trained as a teacher, and taught school for several years. She is now married and is the mother of two beautiful children. Who are the unfit?

I recall another young lady who was injured in a public accident. She was trained as a bookkeeper, and passed a civil service examination over numerous other contestants. She is now in Washington, D. C. in the visa department of the Immigration Bureau, in charge of thirty-five girls and earning about \$50 a week. Who are the unfit, and what about potential values? Shall we save and conserve them, and is it socially and economically good business to do so?

You all appreciate a gift I am sure. You treasure it because you respect and love the giver. It may be a simple thing, given to you on the occasion of your birthday, or at the Christmas season. It may be a cigar holder, a cigar lighter, or a picture that hangs upon the wall. You regard and keep it with jealous and zealous care because you do not want it to meet with an accident. If this gift falls to the floor, or for any other reason becomes damaged, you seek to repair it in an effort to restore it, in so far as possible, to its normal status. But what about the human soul, the greatest of all God given gifts?

CHAIRMAN FRACHER: In that message we got a lot of new ideas about our jobs. If there was any ego in us, I think it was taken out. I thought I knew something about safety, but I learned a lot this morning.

It gives me a great deal of pleasure to call on Mr. Marvin A. Heidt, director of personnel, Budd Wheel Company, Detroit, who will address you.

Is Accident Prevention the Responsibility of the Management or of the Employee?

By MARVIN A. HEIDT

Director of Personnel, Budd Wheel Corporation, Detroit, Mich.

As long as mental and physical labor have been combined to produce, the questions of safe operation and accident prevention have been uppermost in the minds of most industrial leaders. However, the consciousness that such a program was necessary and vital to the economics of industry has grown to its present proportions mainly in the last twenty-five years. Among executives today, safe operation is an essential factor in the sane and economical maintenance of any industry.

During this period, the employee has been gradually taught that safety is a necessary and vital spoke in the wheel of production. Without it, the wheel is weakened, eventually gives way, and allows the chassis of industry to settle on the axle of waste and dissatisfaction.

With this thought of safe operation absolutely fixed in the minds of the employer and gradually being sold to the employee, we have accomplished much toward making it a reality. But the actual accomplishment must rest with one group. A successful movement must always have a powerful leader with the courage of his convictions. Safety in industry is indeed an essential factor which must be recognized by management and workers alike, but the responsibility for that safe operation—for that clean slate at the end of each month, absolutely must rest in one quarter. I feel that the logical and fitting center about which the whole movement revolves should be focused at the door of management.

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The duty of management is to direct labor in safe operating. Each man should know the whys and wherefores of his particular job. He should be warned of its hazards and instructed in the proper way to avoid them. Safety instruction should be provided in such a way that the employee accepts it willingly and appreciates that it is in his interest and for his protection.

We all know that constant and routine service on one operation is apt to make the process rather automatic. This is one of the things which management must watch. More accidents occur while the employee is thinking of last week's fishing or next evening's party than faulty machinery could make in twice the time. Management must be an ever vigilant watch dog to guard against the thoughtless operation of plant machinery.

Management is responsible for the condition of equipment. What a useless thing after an accident is the excuse, "I knew that that bar needed tightening but, with production as it is, I couldn't tie up the job." How many of you have had that said to you or have actually used it as an alibi yourself? An executive should never feel that he has the privilege to allow a faulty operation to continue. Stop the job—tie up production if necessary. Harsh words for this kind of a tie up are easier to stand than the accusing eyes of a widow or a permanently crippled man.

Management is absolutely responsible to the *nth* degree in applying guards and modern safety devices to every machine which is not safe without it, or where there is the slightest hazard to the operator. Routine inspection of all machinery and guards should be made daily practice. Guards mysteriously disappear sometimes when their use hinders the speed of production. An employee has the right to expect a perfectly running machine without defects before he can be expected to be absolutely sold on the integrity of the accident prevention plan.

We will take as a basis for our contention, that management is responsible for quality and for the upkeep of the production schedule. The actual accomplishment of both the necessary quality and quantity depends on the employee. The good will of the employees, their feeling of responsibility on their particular part of the whole program, the knowledge that they are being protected and helped to the utmost by the management—these things are going to grease the wheels of production and help achieve its proper quality and quantity.

I feel strongly that management should be at the helm of this great movement, a guide post showing the way to advance—a boost of encouragement on a long journey—a sign that successful accomplishment is close at hand. The responsibility must be management's—it cannot be thrown at the door of the employee as his task. If left the responsibility of both—neither one nor the other will shoulder it and it will remain a fact unaccomplished.

Good safety organization work is a great training opportunity toward better leadership, as it requires team work, a common ground on which to meet your men, consideration of and for your men, better shop discipline, and all of those things that tend to better conditions generally in a shop.

At this time, when industry is striving to regain her feet after experiencing a marked recession, management has an added responsibility. In many instances, our rank and file of workers have experienced financial difficulties and, in being called back to work and suddenly placed on high speed production, are physically unfit for their task. Labor is existing on short time, production is being achieved with the fewest possible men, production is fast and the employee must be on his toes every minute to keep up with the rest of the gang. These men, with their minds on the bills they owe, the last baby, and on their stomachs which are often empty, cannot be expected to work 100 per cent efficiently. To watch these men, to try to give them a break if possible, to help them with their financial and social problems through the welfare division—all this to the common goal of desired production and A-1 quality—this is the responsibility of the executive. On no other shoulders can it be conscientiously placed.

A strong executive can induce the men in his employ to do as he wishes, providing his object is a good one, regardless of their private opinions of the work that he is carrying on. Accident prevention is something from which both the executive representing management and the employee derive benefit. Good will and content-

ment on the part of the employee leads to quality production which benefits industry as a whole.

The executive in selecting his associates in the safety program must appreciate the important part that these persons will take in this work and should select them on merit only. Too frequently the superannuated employee is selected to function in safety work. Though these men believe in the movement themselves, they just don't seem to be able to get the idea over to the men or impart the proper enthusiasm to them. If an executive has clear vision and is right in his demands upon those coming under his direction, the entire organization will be efficient and will cooperate toward the common goal—that of accident prevention.

Management must teach the employee to think, talk, and—greatest of all—act safely. In this lies the very root of accident prevention.

Again the responsibility of safety lies with the management in that insurance rates are based on experience in the plant. The only person who is in the position to control the experience of that plant is the employer himself. He alone can decide whether the various operations in the shop shall be conducted with all possible safety or whether it shall be run with other considerations in view, that will push a safety program into the background. This is not compatible with a program economically planned.

At the beginning of the safety movement it was generally supposed that making a plant safe would slow up production to such an extent that there would be an economic loss; that goggles and other safety clothing, caution in the performance of the employee's work and other safety measures would slow up production and thus be less efficient than the original way with no accident prevention. Exactly the opposite has proved to be the case. The safe factory has proved to be the efficient factory. An efficient plant will always have a prescribed and successful safety program.

Efficiency in production, safety, health, and good morale are the elements necessary to have a perfectly functioning organization and should be encouraged in every way by management.

An accident prevention program, as a superficial item carried on without the supervision of the managerial organization, is doomed to failure through lack of leadership and inspiration. Education of the men, and the perfection of the function of the machinery, with the control and supervision of the management over all, will accomplish the safety campaign.

Remember that the employee in the shop is a human being and reacts to the same stimuli that you and I do. He appreciates being trusted and likes to feel that he is necessary to the organization. These men are working for the necessities of life for themselves and their families, as we are, and will turn out 100 per cent better work if they like their work and are happy doing it. Industry and labor must work hand in hand to assure mutual success—management must lead the way and labor will follow. As in all other steps throughout the production methods of the plant, management is responsible for the accident prevention program originally, and must see to its efficient execution finally.

CHAIRMAN FRACHER: Fellows, this *ought* to be a subject where there should be some discussion. I know Mr. Heidt will be very glad to enter into the discussion with you, or answer any questions.

R. A. SHAW (Murray Corporation of America, Detroit, Michigan): I would like to ask Mr. Heidt if he finds the same cooperation and readiness to adopt the safety rules in European plants? Are they as readily received and sponsored as they are in the United States?

MR. HEIDT: Mr. Shaw, I would say not. It has been my privilege this last year to be in Europe seven months for my company, to look after personnel work in three plants, in England, France and Germany. It is a hard proposition over there.

compared to our American methods, or the mental attitude of the average American worker.

In the first place, labor over there to a certain extent is very communistic. They resent being bossed, or being told; men in every vocation, from laborer to punch press man, have their leaders or spokesmen and you are supposed to recognize them. If you try to put over something which you think is beneficial to them, you have to talk to their mouth piece first.

We went over there for the purpose of putting this work on a real American basis. The first thing we did was to run into these so-called leaders, who were going to tell us how to work. We had several strikes, and a lot of excitement. For example, in the French plant, which is not controlled by the Budd Company, but by the Vitro-Lane Company, 85 per cent of their accidents ended in infections. Figure that out. It was terrible. One of the first things to do was to correct that condition. The only thing we could do was to be tough; if they struck, we kept them out.

We were very much disliked, but when we left, we had things pretty well in control. We had adapted our methods of accident prevention, dispensaries, and so forth. Any one that thinks he can go over there and educate those people over night is crazy. Their attitude and work conditions do not compare with the American workmen in any respect.

CHAIRMAN FRACHER: We will pass to the next order of business, which is the report of the Nominating Committee. Mr. Arthur Williams will preside while the report is being made. Mr. R. A. Shaw is chairman of the Nominating Committee.

Report of the Nominating Committee

R. A. SHAW (Murray Corporation of America, Detroit): The Nominating Committee consists of Carl L. Storck, Earl F. Blank.

The committee has recommended the following officers:

General Chairman, C. M. Dotterer, Graham-Paige Motor Car Corporation, Detroit.

Vice-Chairman, Carl L. Storck, of the General Motors Corporation.

Secretary, E. C. Walker of the Dodge Brothers Corporation.

George E. Sanford, General Electric Company, Schenectady, New York, chairman of the Poster Committee.

S. H. Reamer, Cadillac Motor Car Company, Detroit, chairman of the Program Committee.

W. A. Bechill, Chrysler Corporation, Detroit, chairman of the Membership Committee.

C. W. Bishop, Lycoming Manufacturing Company, Williamsport, Pennsylvania, chairman of the Publicity Committee.

Robert B. Murphy, Briggs Manufacturing Company, Detroit, Michigan, chairman of the Statistical Committee.

Dr. James H. Greene, Studebaker Corporation, South Bend, Indiana, chairman of the Engineering Committee.

Marvin A. Heidt, Budd Wheel Co., Detroit, Mich., chairman of the Slides and Safety Kinks Committee.

K. A. Callan, Kelsey-Hayes Wheel Corporation, Detroit and Jackson, Michigan, chairman and editor of the News Letter.

Dr. A. F. Lecklider, Fisher Body Corporation, Detroit, Michigan, chairman of the Health Committee.

Executive Committee, members at large: L. E. Averill, C. H. Dockson Co., Detroit; Hoyt L. Fracher, Detroit Steel Products Co.; R. A. Shaw, The Murray Corporation of America, Detroit; and R. F. Thalner, Buick Motor Co., Flint, Mich.

The above named we respectfully submit as your presiding officers for the coming year.

ACTING CHAIRMAN ARTHUR WILLIAMS: Gentlemen, you have heard the report of your committee. The Chair will entertain a motion to accept the report and discharge the committee, and at the same time thank them for their efforts.

V. I. TROTTER (Detroit, Michigan): I move that we accept the report, and discharge the committee, with thanks.

(The motion was seconded.)

CHAIRMAN WILLIAMS: All in favor of the motion will signify by saying aye. Contrary, no. Inasmuch as the motion was unanimous, the Chair will consider that it carries with it the election of these officials. I think that is acceptable, and I wish to extend the thanks of the Section to the committee for their interest.

(Mr. Fracher returned to the Chair.)

CHAIRMAN FRACHER: The next paper will be by Paul J. Brand, chairman, Statistics Committee of the Automotive Section.

Accident Experience of the Section Members During 1930

By PAUL J. BRAND

Chairman, Statistics Committee

Many members of the automotive and other sections are particularly interested in industrial accident experience during 1930 because of the business depression. While some factors may affect injury experience adversely in such times, it is generally held that low production schedules favor low injury rates.

So far as frequency rates are concerned our section has moved in accordance with this expectation. In 196 three-year identical plants, with an exposure of about 600,000,000 man-hours, a rise in exposure of 18 per cent from 1928 to 1929 was accompanied by an increase of about 10 per cent in the frequency of lost-time injuries, and a decrease in exposure of 27 per cent from 1929 to 1930 was followed by a decline of 32 per cent in frequency. Severity, on the other hand, has risen from year to year; little change occurred in the rates from 1929 to 1930 in spite of the decrease in operations.

The records of over 1,500 companies in all industries, however, show reductions in both rates, amounting to 28 per cent in frequency and 8 per cent in severity. Industrial activity during this period, as indicated by the number of hours worked in these plants, rose 8 per cent from 1928 to 1929 and decreased 17 per cent from 1929 to 1930. While most of the decrease in injury rates occurred during the period of reduced working time, small reductions in both rates were made during 1928 and 1929 when employment and working time were increasing. This improvement, under varying conditions, has resulted from reductions in fatalities and temporary disabilities. There has been no steady improvement, however, in the frequency and severity of permanent partial disabilities.

In our industry, however, rates have suffered on account of increases in both fatalities and permanent disabilities. The increase in our fatality rate during 1930, particularly, can be traced to the automobile and railway car and equipment divisions of our section. There has been no change in the fatality rate of identical establishments in the machinery industry during the last three years. With respect to other serious injuries (permanent partial disabilities), however, 36 identical automobile companies with an average exposure of approximately 165,000,000 man-hours, show a decrease in their severity during 1929 and 1930. The drop in temporary disability frequency, on the other hand, was very large, being 41 per cent.

Injuries of this type, among 141 consistently reporting establishments in the machinery industry, declined much less in frequency, 14 per cent during 1930 in comparison with 1928. Operations according to man-hours worked, were at a much higher rate than in the automobile industry. Machinery manufacturers, in common

with many other industries, had varying success in reducing the frequency and severity of permanent partial disabilities.

The small number of consistently reporting plants among our railroad car and equipment group makes their experience, as indicative of the record of that division, questionable. Our experience during the last three years, in general, can be summarized by higher severity in 1929 and 1930 than in 1928 due to more fatalities in 1930 and more permanent partial disabilities in 1929; and a rise in the frequency of temporary disabilities in 1929 followed by a sharp decrease during 1930.

For 1930 alone, however, the experience of our section is based on reports from 474 establishments whose employees worked over 1,000,000,000 man-hours. These plants averaged 13.87 for frequency and 1.10 for severity; rates which are much lower than the corresponding ones for industry as a whole. In comparison with 28 major American industries, our automobile manufacturers, with an average frequency rate of 12.83, ranked seventh; heavy and light machinery companies ranked eighth with a rate of 14.31, and railway car and equipment companies were seventeenth with a rate of 20.23. In severity, however, machinery manufacturers, with a rate of 1.02, were lowest in our section and ranked seventh among other industries; the automobile industry ranked eighth; and railway car and equipment manufacturers were in twenty-first place. The effective safety work which the cement and steel industries have been doing for years gave them standings of first and fifth in frequency during 1930, but in severity they were farther down the list than any division of this section except railway car and equipment companies.

In the automobile industry, plants producing automobile stampings had the highest frequency rate during 1930, 22.60, and accessory plants had the lowest, 9.31. Body plants had the lowest severity .69, and automobile stamping plants the highest, 1.50. Plants engaged in the general manufacture of motor cars, the largest group, had the next highest severity rate, 1.20, but their frequency rate 11.73, is below the average of the entire industry.

Injury rates among different kinds of machinery manufacturers vary widely. Rates increase, in general, with the size of equipment produced. Thus, companies manufacturing electrical appliances and machinery had a frequency rate of 8.60 whereas the manufacturers of construction, conveying and other heavy machinery, had a rate of 26.24. Severity rates ranged from 0.50 in plants manufacturing light machinery and instruments to 1.94 for agricultural machinery and implement companies. Serious injuries, both fatalities and permanent partial disabilities also occur oftener, in proportion to exposure, in plants manufacturing the heaviest type of machinery.

Companies engaged in the manufacture of special equipment for railroad companies have about the same frequency rates as those manufacturing railway cars. Severity, on the other hand, is considerably higher among car and locomotive manufacturers, being 2.72 in comparison to 1.59. Although the frequency of fatalities and permanent partial disabilities is highest among car manufacturers, temporary disabilities among equipment companies result in a larger number of days lost per injury.

The average injury rates of plants in each group in the section depend, to a large extent, on the type of employee, type of operations, and the progress which has been made in safety during previous years. Consequently, individual records in the same group also vary widely. For example, frequency rates in plants manufacturing and assembling automobiles ranged from 0 to over 60.0, and severity rates, from 0 to over 10.0. Plants manufacturing agricultural machinery and implements have rates from 0 to over 70.0 in frequency and from 0 to over 5.0 in severity. Regardless of differences in operations and hazards in the various types of plants, however, the leaders have achieved about equally good records. In other words, many of our members whose operations involve more than average hazards are demonstrating their ability to achieve injury rates equal to those of plants under fewer handicaps.

The 1930 records show that large plants are safer than small ones. In other

words, small establishments with less than 500 employees have farther to go in the reduction of accidental injuries than larger concerns. The smaller plants with less than 250 employees, average over twice as many lost time injuries per million hours worked as larger plants. Differences in severity rates are not so marked but are generally higher in small organizations. On the other hand, the records of numerous small plants clearly demonstrate that this situation need not continue to exist. Ten plants out of 72, ranging in size from 7 to almost 800 employees, did not have a single lost time injury during 1930. Small plants had some of the best records among manufacturers of any machinery.

The outstanding features of our experience during 1930 and previous years are: (1) the upward trend in our severity rate since 1928, in contrast to a downward trend for industry as a whole; (2) lower frequency in 1930 than in the previous two years, but more fatalities. Does not this situation, together with no change in the reduction of permanent partial disabilities during the last three years, indicate the need for concentrating attention on the prevention of serious injuries? Such injuries occur infrequently and often result from unusual causes. Consequently, knowledge of the circumstances involved in their occurrence should be general throughout all branches of the section. This requires wide publicity for each case through our news-letter and should result in the prevention of similar cases in other plants.

Only about half the members of the section reported for 1930. The officers of the section appreciate the cooperation of these members in the development of our statistical service. The support of the other half is necessary for the growth of this activity. We hope that every member will send figures for 1931; they are due in January and February of next year.

ADJOURNMENT

Wednesday Afternoon Session

October 14, 1931

HOYT L. FRACHER, Chairman

Director of Personnel, Detroit Steel Products Co., Detroit, Mich.

The second session of the Automotive and Machine Shop Section convened with General Chairman Fracher presiding.

CHAIRMAN FRACHER: I am going to ask the first speaker, Mr. W. Graham Cole to deliver his address.

The Accident-Prone Employee

By W. GRAHAM COLE

Director Safety Service, Policyholders Service Bureau, Metropolitan Life Insurance Company, New York City

We are frequently liable to consider that the meaning of a word is that meaning which common use, particularly in our general field of interest, gives to it. It is generally advisable, however, to turn to the dictionary and ascertain what the given definition really is. In preparing this paper, I looked up the meaning of the word accident in my desk dictionary. I found that an accident is "something that happens undesignedly" or, it is "any non-essential circumstance." These meanings are slightly broader than those generally considered by the safety engineer or accident preventionist. It is customary to think of an accident as a circumstance which results in a personal injury. If no one is hurt, we sometimes classify an accident as a "near accident."

There is no contradiction to the statement that a personal injury is something that happens undesignedly nor that it is a non-essential circumstance. On the other hand, personal injuries are not the only incidents which occur in an industrial plant without design nor are they the only non-essential circumstances incident to plant operation.

A few years ago, I was visiting the system shop of one of the country's large railroad properties. As we entered the machine shop, we noted that the employees were in considerable turmoil and soon found that the confusion resulted because a pair of engine frames weighing approximately seven tons had fallen from a crane and were lying broken in two across the main aisles of the shop.

The cause of this unfortunate incident might well be classified as lack of proper supervision. The frames had been cast in another shop and shipped to this particular property on a flat car which had been pushed into the shop. The foreman responsible for the unloading of heavy material had assigned the task to two young employees who had no experience in moving material heavier than light motors. The ten ton crane was sufficient to do the work. The cables and slings which were used had all been tested. The cranes fell, however, because the rigging material was applied improperly by the employees who had not been taught proper methods, and who were not supervised properly by their superior.

The result of the incident was of considerable importance to the railroad company, and the cost which resulted in loss of efficiency, waste and economic loss, was rather serious.

The 600 men employed in the machine shop at the time quite naturally stopped work to see what had happened. It is doubtful whether they returned to their regular occupations within 10 minutes, perhaps much longer. It is easy to figure the amount of unproductive wages paid by the railroad during this period, brought about through

natural curiosity. 250 men worked on the aisle fed by the over head ten ton crane which was the only crane on the runway. As the engine frame fell the cable was pulled out of the crane and the motor and carriage badly damaged. The crane was out of commission the whole day, during which time all the material used by the 250 men had to be moved by hand truck. This factor in itself seriously decreased the efficiency of this group of employees. In addition, a foreman and crew of men were required to give an entire day's work to the repair of the crane, and considerable expense was involved in securing replacement and repair material.

After the crane had been repaired, it was necessary to reload the broken frames and ship them back to their place of origin for recasting. It is easy to realize that this item in itself entailed considerable cost.

Perhaps the most outstanding phase of this incident, however, was the fact that it was not an accident in accordance with the usual terminology nor in accordance with the Interstate Commerce Commission, to whom the railroad was required to report its accidents. Although the frames fell directly in front of the tool room door, it just happened that only one employee was standing at the location and he was not even scratched. In other words, the incident was not classified as an accident because very fortunately no one was injured. It was a costly incident, however, and its cost was perhaps many times the cost which would have been involved in settling a serious accident claim. The fact that no one was injured had nothing to do with the cause of the accident. The lack of personal injury simply resulted because no one happened to be under the frames at the moment. It is easy to conceive that under similar conditions several employees might have been injured seriously or perhaps killed.

Although this is rather an extreme illustration, it is true and points out in a forceful manner the fact that personal injuries do not always occur in connection with accidents nor are they always the most important phase of the accidents when considered from an economic point of view.

Recent studies conducted by one of our large casualty insurance companies resulted in the statement of a theory that the indirect cost of accidents was four times the direct cost, the latter including payment of insurance premiums or compensation and medical expenses. This study, however, was confined to a review of accidents in which personal injuries occurred. It did not cover that large field of industrial accidents in which no personal injuries occur. If it had been possible at the time to cover this field the ratio undoubtedly would have been much greater than four to one.

We need but reflect for a few moments on our own industrial experience to remember many incidents which were so called "near accidents", simply because no one happened to be in a position to be injured or because the employee was able to jump out of the way quickly. Perhaps we patted ourselves on the back and said "that was a close one" and felt very much relieved and quickly forgot the incident. From the economic viewpoint, although many "near accidents" may cost very little, their frequent repetition entails considerable expense. From the accident prevention standpoint they deserve just as great a study as do the other accidents which unfortunately result in injury or death to fellow employees. The importance of this latter statement is emphasized by the fact that in the majority of cases the same underlying causes or circumstances which result in personal injury accident also result in non-personal injury accidents. The difference between these two types of accident is usually some small circumstance which is entirely independent from the basic or underlying reason for the occurrence of the accident. It might be said, therefore, that a personal injury is simply the result of an accident in which an individual happened to be involved.

Perhaps the one outstanding reason why industrial accident prevention in the United States has not progressed further than it has, is because the accident preventionist has not considered sufficiently the broad definition of accidents. In many instances, he has endeavored to "sell" industrial management the need of industrial

accident prevention work entirely in terms of the savings to be expected by the prevention of personal injuries. He has frequently failed to "sell" the idea on the broader viewpoint that the prevention of accidents means the prevention of inefficiency, waste and loss to industry.

Considered from this broad approach, we might define an industrial accident as "any non-essential circumstance" or undesigned incident which occurs in an industrial plant and results in the damage to tools and equipment, the spoilage of raw or finished material, the unnecessary interference with economic operation, the decrease in plant efficiency and/or the injury of employees.

My dictionary further convinced me that prone means "having a strong tendency toward." In combining the two definitions, therefore, we might say that an accident-prone employee is one who has a tendency toward damaging tools and equipment, toward spoiling raw or finished material, toward interfering with plant operation, toward decreasing plant efficiency or toward becoming injured. The accident-prone employee is thus not simply the so-called "accident-prone repeater" nor the one who is looked upon as the hard luck employee unable to carry on his daily work without becoming hurt.

If we confine our study of the accident-prone employee simply to the "accident repeater", we may find, in some instances, that he is not very conspicuous; or in other words, that the problem may not appear to us as a very great one. For instance, George E. Sanford, of the General Electric Company, in an address presented before the Massachusetts Safety Council, stated that in a recent study made of the lost-time accidents in one of their plants, 936 lost-time accidents occurred in 30 months. Only eight men, however, had been injured more than once and none of them more than twice. In other words, the number of men prone to lost-time accidents was small. In contrast, however, he mentioned that in another plant during a period of 27 months a study of minor and major accidents revealed the fact that 128 employees had been involved in two or more personal injury accidents.

In a study made of a street car railway property, it was found that approximately one-third of the employees had been involved in two-thirds of the accidents, incident to street car operation. In this case, however, the broader definition of the word accident had been applied; one-third of the employees thus were responsible for two-thirds of the accidents, which involved property damage, personal injuries to employees and the public, and interference with operation. A further study revealed the fact, however, that of this group of high accident men the majority of them utilized more than the average amount of power in operating their cars. In other words, the high accident men were the non-efficient men.

In a study recently completed among a group of taxicab companies, it was found that 10 per cent of the employees were involved in more than 32 per cent of the accidents, 20 per cent were involved in more than one-half of the accidents, and 30 per cent were involved in 65 per cent of the accidents. Again we find that a small group of men were responsible for a large percentage of the company's accident experience. Furthermore, we find that this same small group of men were rated as the low producers of company's business.

In our search for the accident-prone employee, therefore, we frequently find the employee who because of his method of work is more of a liability than an asset to his employer. In recent studies, it has been ascertained that a man is an accident-prone employee because of certain characteristics, habits, lack of training or attitude. These various undesirable attributes might be classified under three general headings; physical defects, lack of training and personal attitude.

Physical defects may be subdivided into two classes; those resulting in physical disabilities, and those resulting in mental disabilities. In the first class is a group who, because of physical defects, are not capable of conducting the work to which they are assigned in a safe and efficient manner. For instance, a man with defective vision does not usually make a safe and efficient operator of a motor vehicle. An

employee who has difficulty with the muscles of his back is not a safe one to assign to the lifting of heavy materials. These facts if observed are usually ascertained by physical examinations and proper remedies can usually be applied.

The second group are usually more difficult to determine. They include employees who fail to give proper attention to their work because of some physical impairment. This may not actually interfere with their work but in many cases causes them to worry. The case of a motorman interviewed during the study referred to above is an example of this type of accident-prone employee. This employee had suffered for several years with a slight hernia. Several years before he had been refused employment. Following a physical examination, he had been successful, however, in securing a position on the railway property and it was considered that his physical condition would not interfere with the operation of a street car. This man, however, was attempting to support a family and give proper medical attention to a crippled daughter. He had been told that eventually the company expected to remove from its payroll all employees who were found to have physical disabilities. This was not the intention of the company, but he believed the statement, and, therefore, it was a fact to him. In reviewing his accident experience an unusual condition was found, namely; that 50 per cent of his accidents occurred during the first hour he was at work and 40 per cent during the first half hour. With this information and an actual knowledge of his physical condition, it was easy to ascertain that a small physical inconvenience noted shortly after he arose in the morning produced a worry as to what would happen if he should lose his job. With exercise, the physical inconvenience was overcome within an hour or so, at which time he apparently ceased to worry and concentrated his attention on his daily work. From that time on he was a very efficient motorman.

The second major class of accident proneness is that resulting from defective training. To say that an employee has had 15 years of experience in his particular work does not justify the statement that he is qualified to do it efficiently and safely. Improper training at the time of his apprenticeship combined with 15 years of improper habits, would easily explain his present proneness to accident. It is frequently found that an employee may know how to do a large portion of the work to which he is assigned but he is not qualified to undertake some particular phase of it. For instance, street car motormen have been found to be capable operators in nearly every particular but have never learned the secret of operating an air brake properly. The fact that their experience shows they are frequently involved in collision accidents is a check on this phase of accident proneness.

The third group as classified under the heading of attitude may be subdivided into those who have an unfavorable attitude toward the public, those who have the wrong attitude toward their employers, supervisors or fellow workers, or those whose attitude is the result of worry brought about through home, financial and other purely personal conditions.

The first of these groups are usually fairly easy to determine and includes those employees who do not recognize their responsibilities to society generally.

The second subdivision are those who are disgruntled with their work, and have antagonistic attitudes toward their supervisors, or are dissatisfied with the conditions under which they work or the compensation paid to them. Employees of this group do not usually produce the most efficient work nor are they those whom you would expect to find in the particularly low accident classification, unless their attitude has by some means been changed.

The third sub-group may involve some of the best workmen on the industrial payroll who, however, because of their permanent or temporary conditions producing worry, are not capable of carrying on their daily activities in as efficient and safe manner as might be expected of them. It is difficult sometimes to determine the men in this group, or after having determined them to ascertain the real underlying reasons for their attitude of mind which produces their apparent accident-prone condition.

The first problem confronting the individual who would study accident proneness among his employees is that of determining who are his accident-prone employees. The introduction of a properly maintained recording system aids in locating the accident-prone employees, or in other words, the men who are subject to frequent personal injuries. For a thorough study of this phase of the problem, however, it is required first of all that records be kept of all injuries no matter how slight, as frequently we find that the underlying causes of the minor injuries are as important as the underlying causes of a major injury or fatality. The problem of ascertaining who are the accident-prone employees, when we do not confine the meaning of the word accident to "personal injuries", is a more difficult one. It may involve a study of the men's operating efficiency measured in proper terms; as, in a street car railway, his power consumption, in a taxicab organization his record as a revenue producer, in a machine shop his production record, etc. In addition, it involves a fairly intimate knowledge by the supervisor of each man under his jurisdiction, including a knowledge of their ability both physically and technically, a knowledge of their attitudes and impressions toward their work and frequently some knowledge of their home conditions and environment. This does not mean necessarily the development of a comradeship but rather a proper relation between employer, supervisor and employee.

The second important problem involved in the study of accident prevention is the development of proper methods and treatment. In a great many accidents, the "accident repeater" when his "disease" has become sufficiently pronounced, has been treated by removal. This method rather follows the old theory that a square peg cannot well be placed in a round hole. A little study, however, frequently shows that to send a square peg to a carpenter shop and have its edges turned off, so it will fit the round hole, is cheaper than to buy a new round peg. Translated into industrial terms, it is frequently more economical to retain an employee whose hiring, training, etc. to date represent a definite investment to the company and to treat his accident-prone characteristics, than to discharge him and employ a substitute who may develop just as bad or perhaps worse characteristics. Viewed entirely from an economic standpoint and forgetting for a moment the humane viewpoint, it is simply a matter of dollars and cents. How much will it cost to correct the accident-prone characteristics of a given employee and make him a safe and efficient workman? Will this cost be greater than to hire a new man and give him the necessary training?

In general, the method of treatment may be classified under four particular headings as follows:

Physical correction: Initial and periodical physical examinations are considered desirable by many industrial executives. From these examinations an estimate can be obtained of each employee's physical condition which would indicate the need of corrective measures. The general physical examination may also indicate the need of more specific examinations of certain individuals. The determination as to who, the employee or employer, should be responsible for the expense involved in the corrective measures is one which can be determined only by a review of the individual case.

Retraining: It may frequently be necessary to provide retraining measures in the case of certain employees. In some instances, this may take the form of a reinstruction class to be conducted in connection with the apprenticeship school, although experience has shown that this method has proved the least desirable as it may be a source of embarrassment to the employee involved. Perhaps a better method is to assign the retraining to several of the first grade employees by having each of them work close to the employee requiring the training, watching his activities and guiding him in his future work until such time as it is felt he is capable of carrying on his work unaided.

Adjustment of conditions: A study of accident prevention among employees will frequently indicate certain conditions of employment in which a man is working which

decreases his attention and causes him to be inefficient and, therefore, accident-prone. After such conditions have been determined, it is usually a fairly easy task to develop methods for adjusting these conditions. It may require the transfer of a man from one department to another where he is either better suited to the work or where his temperament will allow him to work better under the new foreman or supervisor. In other instances, it may be necessary to change his time of work. For instance, in studying the case of a taxicab driver who had a large number of accidents it was found that he was working on night turn and that in the day time he conducted a chicken farm located on the other side of the city. As a result, he spent the day in working on the farm then rushed across the city in order to take his car out for night duty. He was a high accident man and a low producer. The company had him transferred to day work and told him he would have to choose between operating a chicken farm or a taxicab. He chose the latter and he became a much better revenue producer.

Change in attitude: This is frequently the most difficult phase of treatment in connection with accident-prone employees. It may involve considerable effort on the part of supervisors and executives. It requires the development of some method to bring the particular employee into closer and yet respectful contact with his superiors, and to educate him gradually as to his duty to society and to his company. Frankness and honesty in treating such cases is usually of paramount importance.

In closing I trust I have not painted a picture of a phase of accident prevention work which the average employee will consider impossible of application. It is easy for us to think of the correction of accident-prone characteristics as the third step in the development of safety work: the first being the correction of mechanical defects, and the second the mass education of all employees. As in the cases of the first two steps, it will take considerable time before employers generally appreciate the value of studying accident-prone characteristics and of taking corrective steps. There are many perhaps who will feel that in its present development it is too theoretical for their consideration. There are others who will feel that it is difficult and expensive for their application. On the other hand, summing up, the study of accident proneness and its correction in reality involves simply a better knowledge of the working force and a realization of the problems confronting them.

Discussion

C. D. CLEVERGER (Bankers' Indemnity Insurance Co.): How do you go about making these studies of individual employees so as not to antagonize them?

MR. COLE: That is an important phase of having employees. If you go at them rough shod and convince them they are about to be discharged, you will likely antagonize them. It is a matter of proper relationship between the employee and the supervisor. We have had little difficulty in that regard. In a few instances, men have become a little disgruntled, but we have proved to them we are not interested in separating them from the job but rather in making them better employees. It takes time to convince them of that fact, but the results are good; even the most hard boiled will come around sooner or later if tackled right.

MR. CLEVERGER: Can this be done by direct discussion between the employee and his foreman?

MR. COLE: Yes, after having ascertained the facts. You can call the employee in, preferably through his superintendent, and sit down and discuss it with him. If he has done a thorough job in examination, you have the facts. The facts are usually sufficient to convince the man you know what you are talking about. It is a personal matter between the employee and the man making the investigation.

E. D. KOPPELMEYER (Illinois Manufacturers Mutual Casualty Association, Chicago, Ill.): We frequently make analyses and give a great deal of importance to the fact

that some group of employees have been on the accident list more frequently than others. We went down to Kewanee and approached them on that subject, and the superintendent said, "Our best employees are hurt the most." They are in the clothing industry. They found the best sewing machine operators were injured most. I would like to hear a word about that with reference to the accident-prone employees.

MR. COLE: The high accident man is the low producer or the inefficient employee. Extreme production or earnestness on the part of the worker will produce more accidents; piece work might cause some employees to be injured more frequently than others. On the other hand, before granting that, it might be well to look into the efficiency of the man as a producer. He may be producing momentarily, but how about the quality? I do not say it is a fact, but a matter to be looked into, as well as the production of the product.

ROY D. NESTER (Peoples Motorbus Company, St. Louis, Missouri): I would like to ask the speaker what he would recommend to overcome mind wandering, where the employee is operating his machine, but his mind is on other things.

MR. COLE: Have you found out where his mind was?

MR. NESTER: Yes, he was wondering if Mable and Fred go to picture shows every night, or what made the superintendent look at him like that.

Reasons for Inattention

MR. COLE: Very few of us have an absolute vacuum up here unless we are behind the bars in an insane asylum. When you say a man is not paying attention to his work he is paying attention to something, but not the particular job for which you hire him. It is a matter for individual consideration; it is a matter of finding out what that man is giving major attention to, and taking steps to remedy the condition; or find somebody else to give maximum attention to the job.

We had a street car motorman under investigation. He had a very high accident record early in the morning. In analyzing his situation, we found he was playing poker into the wee small hours of the morning. The company did not object to his playing poker but they did object to his playing poker so long that it did something to his work the next day. They convinced him he had to play poker at a more suitable time or give up driving street cars.

C. A. MONTGOMERY (Western Electric Company, Hawthorne): What would you say about recommending the study of psychology to offset the detrimental effects of improper thinking or lack of thinking?

MR. COLE: I think the study of psychology by safety engineers or others dealing with this problem is very desirable. On the other hand, I think we may allow ourselves to be so absorbed in that interesting study that we may overlook the practical application of it in our daily work. If we study it with our fingers crossed and one eye on the practical side of it I think it should be very valuable to us in accident prevention work.

I do not think it is a subject to recommend to the general run of employees as a means of preventing accidents; but I do think it is a subject which can be well recommended for study by the safety engineer or his immediate supervisor.

H. C. WINFIELD (Olds Motor, Lansing, Michigan): Isn't it a fact that the man that plays poker most of the night is the exception rather than the rule? Doesn't the man that works on the same job a certain part of the time become automatic?

MR. COLE: The man that played poker was just one of a number of cases. In each case studied, we found that some very definite cause was at the base of his accident-proneness.

CHAIRMAN FRACHER: Mr. Cole, we are grateful to you for your efforts, and wish to assure you that the National Safety Council thanks you.

It gives me a great deal of pleasure to introduce to you Mr. Ray H. Sullivan, who will now address you.

Accident Prevention from the Viewpoint of an Executive

By RAY H. SULLIVAN

Personnel Director, Fisher Body Corporation, Detroit, Mich.

There are probably many different pictures appearing before different minds when we consider an executive.

To some of us, an executive takes the form of one of those persons in the organization who may take afternoons off for golf, leave early to attend football games, and enjoy similar seemingly unrestrained liberties not common to the rest of us.

To others, the executive appears as a sort of lucky individual who, through some pull, or at least not because of any outstanding ability, got a promotion.

It seemed to me quite necessary, therefore, for us to have a sort of common understanding of what we consider an executive before we can safely look at accident prevention through his eyes.

For our purposes, an executive is a person responsible for getting definite results from the efforts of others in the operation of a business.

Even definite results may be open to various interpretations. Some executives consider they have accomplished definite results when instructions are properly carried out. Others would not consider results complete unless their own foresight and initiative were applied to that part of the business for which they are responsible.

So we will definitely fix this executive's job, the job of this person who accomplishes his results through the efforts of others. It is axiomatic that the successful executive must operate in such a way as to obtain and retain the business for which he is responsible. Easily stated but somewhat involved.

There have been many discussions as to the real objective of a business itself. Is a business organized to render a desired service, or is it organized to make a profit? Most of us would probably say both. We would also be likely to place its profit making purpose first. But after all, there would be no business unless the service rendered were required, or at least desired, by some customers. There would certainly be no automobile business if people did not want automobiles, and of course no chance for profit. Without attempting to decide whether or not any business is organized for profit or for service, I think we can safely say that the personnel operating a business is distinctly selected for service. The objective of the executive is decidedly to render service. He is on his job because it is assumed that he has certain knowledge and experience necessary to supervise and guide the efforts of those persons in his jurisdiction toward some usable service or product.

I realize that such a conception may be construed as opposed to the thought that each of us is on our present job because of the financial return, but I'm sure we will all agree that the real reason we are on our jobs is because of the belief on the part of our employers that we have certain knowledge and experience which is required to run our part of the business.

From this base, it should naturally follow that the business operated by executives with complete knowledge and experience would be profitable.

To do his job properly, the executive must operate to the satisfaction of all parties concerned. The parties concerned are the buyer of the company's services or product, the seller, and the public.

From the buyer's viewpoint, the services offered must be what he wants, be promptly available to him and procurable at a fair price. Probably the buyer's first consideration is price. The services or product of the executive's company must be priced as low or lower than similar service or product could be purchased elsewhere.

The responsible executive then is immediately faced with the economic problems of his job. He must execute that part of the business for which he is responsible at a cost which will permit him to be on a competitive basis with others. There are two methods at his disposal for this accomplishment.

First: the dissemination of his own knowledge and experience to those in his jurisdiction by direct contact and instruction. This method presupposes his ability to direct the efforts of others so that they in turn will properly perform their jobs at a competitive price.

Second: the purchase of sufficient knowledge and experience by employing executives of lesser grade to do the actual directing and supervising of workers. Obviously, the breadth of the executive's operation is a factor in the decision as to which method will be used. The manager of a large industry necessarily could supervise and direct the workers in that business only through the medium of superintendents and foremen. These superintendents must have sufficient knowledge and experience in their particular branch of the business, and in turn may require foremen with sufficient knowledge and experience to assure the performance of their particular responsibilities. The differences between executives' responsibilities are only in size and scope, not in nature, regardless of their grade. The foreman, within his own jurisdiction, has exactly the same general responsibilities as the manager within his. The manager's responsibilities are the sum of those of the other executives.

The executive, from the foreman up, is faced with the necessity and responsibility for supplying sufficient knowledge and experience to execute satisfactory service to the buyer, either from his own efforts or by surrounding himself with an organization having sufficient knowledge and experience to provide it. The ability of the executive, then, to satisfy the buyer or perhaps, indeed, his ability to even sell his product to the buyer depends upon the degree to which his own and his purchased experience is effective. This is true whether it concerns the application of the foreman's knowledge applied to the superintendent's jurisdiction, or of the worker's knowledge and his willingness to produce applied to the foreman's jurisdiction. To whatever degree this supervisory knowledge and experience is effective, will depend the ability of an executive in satisfying the first requirement of the buyer which is that he be able to purchase the product or service at a fair price.

In many cases the cost of operations from an executive's standpoint and the price of a product or service from a buyer's standpoint are the factors which determine the possibility of selling the product or rendering service, at all.

An executive, assuming the organization responsible to him has sufficient knowledge and experience to enable them to properly make a product or render a service, must be certain that his organization is able to make this product or render this service at a favorable cost.

In a general way the cost of a product or service can be said to consist of direct labor, indirect labor, materials, burden or overhead.

The cost of direct labor can be seriously affected by the possibility of accident. Because the performance of direct labor is probably the best understood of the factors entering into costs, and oftentimes, indeed, the executive's appointment has been a result of his job knowledge or knowledge of direct labor application, it isn't so difficult for the executive to control. This applies to all activities of direct labor, including accident liability.

The first consideration on any job, from the worker's standpoint, is money possible to be earned. Theoretically, these earnings should be determined by his relative ability to do a job. If there is sufficient knowledge with relation to any job as to what could and should be produced by an average person, working comfortably, and this knowledge is used as a basis for setting up a task which, in turn, determines the price paid for that task, and there were no other factors involved, it would be easy to believe that the worker would be paid in proportion to his ability to produce. The method of wage payment, under this assumption, would not affect the fact. It is clearly the accepted duty of the executive on the job to see that the worker is earning and receiving proper pay for his work.

There may be many reasons for a worker's inability to earn average earnings on a job. His failure may be due to belief on his part that he can cause an increase in

piece price to be paid by holding back, and that his very failure to earn will cause such an increase as indicative of the impossibility to "make out." Special conditions surrounding a job at a given time, such as non-uniform materials, lack of materials, lack of tools, and many others may be the cause.

His failure to earn, however, can be caused by accident hazards on the job. The presence of an accident hazard may cause a legitimate lowering of production due to the degree of care in operating to avoid accident. Perhaps fear of accident causes the operator to slow down. Without attempting to inject the controversial question as to whether or not accident prevention devices may slow down production, this result surely can follow the lack of such devices in many cases, and an increased direct labor cost surely follows. Personally, I would like to see an operator on a hazardous operation, thoughtful and careful enough to avoid risks of accident, slow down his production, rather than attempt to maintain a speed sufficient to distract his attention from the danger of accident and make him forget necessary care. It isn't difficult to visualize the devastating effect on a business if a large number of workers simultaneously slowed down for fear of accident or any other cause.

A person who has been injured on an operation, even though only slightly, will naturally, if he is at all careful, slow down in the performance of the same operation and in the presence of the same accident hazard. Even a slight scratch, particularly if it requires a bandage, and on a job in which a bandage might be in the way, would certainly slow down the operation.

There is then a very definite necessity for the executive to adjust his viewpoint toward elimination of accidents from the very first consideration of labor economies, which may seriously affect both the buyer, who will buy only at a right price, and the seller, (or part of the seller, the workman), who will not, perhaps cannot, produce to his capacity, thus making the direct labor cost high.

Without going into tangible figures, the executive's viewpoint with relation to the economic effect on the direct labor worker's morale, as a satisfied seller of his labor, is important. Even if only considered from the standpoint of effect on morale of the worker whose earnings might be seriously affected on account of lack of safe working conditions, there would be sufficient justification for decisive action on the part of the executive.

Indirect labor may follow most, if not all, of the trends of direct labor. In fact, in so far as the executive is concerned, much labor charged indirect from an accounting standpoint is quite direct from a supervisor's standpoint. Truckers, for example, require a very direct supervision. The tasks imposed on indirect labor may be just as definitely set as for direct. The slowing down due to presence of accident hazards may be similar. For our purpose, I believe we can group indirect labor with direct, and the economic factors will be found to be identical.

For our purpose also, we may consider the item of materials entering into costs to have been carefully studied. At any rate, we need not consider materials, except their handling, for exposition of the executive's viewpoint and therefore will not spend time on such consideration.

Burden or overhead, however, is more illusive. It is composed of many different factors. Some of these factors, such as rent, insurance, depreciation, etc., are not completely controllable by executives. There are many factors entering into this burden or overhead, however, which are controllable. The consideration of these factors is often the most troublesome with which the executive has to deal in the study of his costs. Many factors entering into the burden or overhead are greater or less in accordance with the understanding and actions of the human factors in the organization.

Some of this overhead consists of compensation costs, medical costs, rehabilitation, safety inspection and other items directly dependent upon the degree to which the individual worker operates without accident. It becomes decidedly the duty of the executive, then, to be certain that his workers are intelligently and effectively doing their work with a minimum of cost which might arise from such things as accidents.

It was undoubtedly this consideration and the efforts to minimize expense due to accidents which were responsible for the inauguration of safety engineers, etc. in industry. Responsible executives attempted and are attempting in this way to eliminate or minimize the expense or costs which arise from the failure on the part of the workers to work safely. It is surely his job, no one else is there to do it.

The enormous cost of industrial accidents reflected in overhead expense has done much to stimulate a lively interest among higher executives in the promotion of safety and safe working conditions. Executives carefully examine accident reports and causes in an effort to devise ways and means to reduce the expense of accidents. A compelling reason for this is because the possibility of eliminating or minimizing accident cost presents to him a means for reducing his overhead or burden. All expenses brought about because of accidents or unsafe working conditions are naturally distasteful to an executive, but he is of necessity obliged to recognize and reduce this type of expense because of its cost.

From the executive's viewpoint, it is possible that costs because of accidents alone could be of such magnitude as to create such a great differential between the costs of his product and that of his competitors as to make it impossible for his company to sell their product. From his viewpoint, therefore, it is immediately evident that he must, if for no other than economic reasons, be certain that his operations are safely performed. He recognizes that he cannot exist or hold his job unless this is accomplished.

I like the definition of an executive which does not stop at the mere statement that he is responsible for getting definite results from the efforts of others, but adds, "without the use of authority to offer hope of reward, or fear of punishment."

If we assume that the worker as part of the seller must be satisfied, and further, this satisfaction should come without resorting to the use of authority to offer hope of reward or fear of punishment, it follows that the conditions surrounding him must be such as to make him feel safe and happy. The executive, being responsible for both the buyer and the seller, must naturally ask himself—what it is that may be necessary in order for his workers to feel safe and happy, and what must be, the executive, do to accomplish this.

In this discussion we have not attempted to show the economic results of the effect on the morale or spirit of workers in an organization where this group of workers are working with poor spirit or low morale. It was not considered because the amount of this effect financially is so intangible as to leave it open to dispute. It would seem to me, however, that intangible though it may be, the depressing effect on spirit and morale in any organization due to accidents and lack of safe working conditions would be sufficient without any further consideration to cause the executive to so organize his jurisdiction as to provide safe working conditions. Certainly he must do so if he is to satisfy the seller.

We have only briefly touched on outstanding economic factors which are the foundation of the executive's viewpoint with relation to safety. Another serious consideration and one which to my mind is perhaps the most serious one affecting the executive's viewpoint is that of human pain and suffering caused by accidents.

Even without consideration of the financial angle, I believe any executive must be impressed with the physical pain and suffering accompanying accidents. Certainly, successful executives are unanimously impressed with the necessity for maintaining their responsibilities without accidents because of humanitarian consideration only. Undoubtedly, the very consideration from a humanitarian standpoint which these executives use in organizing to prevent accidents indicates the reason for much of their success in handling wage questions and other problems which are definitely tied in with the handling and with the control and direction of the labor of human beings.

The third party to the transaction, the public, must also be satisfied if any business is allowed to continue. Perhaps the public may not know the economics of any business, but they surely will get to know of the prevalence of accidents, and the

formation of unfavorable public opinion will follow. The public may only measure a business in terms of pain and suffering because of accidents to its labor, but the executive in a business will find his tasks immeasurably harder when this public loses faith in his ability to safely operate his business, and his business must suffer when this public confidence is gone.

The executive cannot "duck" his responsibility to the buyer, the seller, or the public, without disastrous economic results.

What executive is there who will not, from a purely humanitarian standpoint, eliminate or minimize accidents when he pictures in his mind's eye the items shown in accident reports. What executive is there who can visualize a bowlful of eyes, or a basket of fingers, or a truckload of limbs without a firm determination to put a stop to the causes of such things. The executive knows that the responsibility for these things is on his shoulders and consideration of the factors entering into accident prevention definitely molds his viewpoint. From his viewpoint, they are an economic drag on the business, they are a scourge to human beings and they must be eliminated or minimized if the executive is to continue as such.

CHAIRMAN FRACHER: Mr. Sullivan has given you a very good idea of executive viewpoint on accident prevention. He has given you a picture where it reflects in the cost, and I think he will be very glad to answer a limited number of questions.

V. C. KELSEY (Commercial Casualty Insurance Company, Chicago): I know of an outstanding case where the National Safety Council's program had a very direct influence on production cost. It is so outstanding that I think it might be well to mention it. Some time ago we were called upon to accept a risk. The plant had actually been out of operation for about ten days; that is, where any machinery was involved, due to the fact that there were no insurance companies willing to carry it. One of our engineers went out there and made an inspection, and had a discussion with the management. They agreed to do the things that we suggested. I might say the program was quite intensive. They actually rearranged the shop and machinery. In about two or two and one half years they have only had a half dozen minor injuries involving cuts and scratches, and have increased their production twenty per cent.

CHAIRMAN FRACHER: Do you think that was due also to the backing of the management? You mean it could not have been accomplished otherwise?

MR. KELSEY: Absolutely. The management had to agree to operate and do all they could.

CHAIRMAN FRACHER: Mr. Sullivan, we are deeply grateful to you for your efforts this afternoon. It gives me a great deal of pleasure to call on Mr. Samuel Morgan, who will now address you.

Safe Practices in Machine Shops

By S. MORGAN

Director of Education, Buick Motor Company, Flint, Mich.

It was a difficult task for the pioneers in the Safety Movement to put their ideas across in placing the mechanical appliances on the machines. The shop men jeered at the devices they designed. It was much harder to convince the shop men than to guard the machines, but they kept at it so persistently that they finally achieved their goal. I think that in the beginning the humanitarian side was stressed but later the economic side of the picture presented itself. Many of us remember the effect that a maimed man had on the morale of the entire force when he came back to work with the promise of a job for life. It might be good practice to appoint a Supreme Court Judge for life, but it is certainly bad practice in industry. Much has been done to rehabilitate these men, but a much greater work has been done through accident prevention. Comparing the machine shop of today with that of 25 years ago,

we find that there has been a marked improvement in the matter of safety devices, so that it is more difficult to become injured today than it was then.

At this point I would like to mention the very fine work that has been done by the machine tool manufacturer. There has been a tendency on his part to keep the safety of the operator in mind, in order that the user of the machinery may have protection for his men against accidents.

One of the most striking cases that comes to my mind as a hazard on a common type of machine tool is the old style of feed mechanism at the end of the cross rail on a planer. For years, the type was used where there was a mechanism on the end of this rail consisting of two or more gears, which ran in engagement and were operated by a control on the end of the rail near the gears. The moving of this control would cause the gears to feed intermittently through a ratchet and cause the tool to travel across the bed of the machine. Many times the operator of this type of feed has reached up to disengage the gears, without looking, and thrust his fingers into them. No attempt was made to correct the situation, as this design seemed to be a common standard and was placed on nearly all the planers that were manufactured. Since then, a new type of feed mechanism has been brought out where the gears are encased in a housing, making it almost impossible for the operator to become injured, even though, he reaches up to make the engagement without looking.

This just brings out the point in the evolution of safety devices being built into the machine tool. Today with the modern designing, the safety factor is brought in right on the drawing before the machine is built. They do not wait until the machine is finished and then walk around it and pick out the hazards. With this in mind, we can see that there is a tendency on the part of the machine tool builder to make safety a matter of forethought rather than one of afterthought. This is giving safety first consideration.

Take another illustration—the grinder. The first guard was nothing more than a piece of sheet metal wrapped around the wheel and bolted on to protect the operator's eyes. If an emery wheel would burst, something usually happened, but no thought was given to that phase. Today we have safer wheels and the guards are designed strong enough to keep the pieces in the case so they cannot fly around the shop in the event of a broken wheel. In the grinders that are being built today, the matter of safety is regarded as a prime factor.

A great deal of attention has been given to hydraulic pressure on machine tools to cause motion rather than mechanical devices. This is true in the later designing more than in the earlier. The use of hydraulic pressure eliminates the gears and levers that have been the cause of some of the shop accidents. It has a tendency to eliminate the hazards, as the fewer gears you have, the safer the machine.

In the handling of materials, boxes, pans and crates are used, rather than piling them. This has probably been done for two reasons—safety and economy in handling. This prevents the accidents that might happen to the passerby from falling stock. The method of handling material on conveyors is being used quite extensively. They add a feature of safety to the shop by carrying the parts on well constructed and substantial lines overhead and even on the outside of the building. During the development of mechanical devices, the manufacturers of cranes and chains have put much thought into their product in developing material that will stand up under the service that is expected of it. But, with all these mechanical appliances, there is always a chance for the operator to make a slip and be injured.

This brings me to the human factor of the subject. Some time ago I read an article by Curtis Billings which in part stated that the most effective safety education work has logically been done by and through the schools. Despite the increase in automobile accidents in 1929, fatal accidents of all kinds to children of school age decreased 11 per cent. This in itself is proof that education and training is a very important factor and might well be applied in the machine shop to a much greater advantage than it has in the past.

Quite recently I heard of an accident where a man lost both hands on a press where a mechanical device was placed on the machine which necessitated his using both hands to engage the clutch. But after performing this operation, he saw the work out of place on the die and reached in with both hands to adjust it. The result was disastrous. It seems to me that here the slogan "Safety First" failed and turned out to be "Safety Second." We all know that in operating an automobile the movements become involuntary and we do not have to stop to think before we move the foot from the accelerator or the brake. In other words, we have formed the habit, and I am sure we can form safety habits the same as any other if we put enough thought into the matter. I am quite sure the accident I mentioned would not have happened if the safety impulse would have registered first. We will never be able to explain or understand why and how the human mind reacts, but we can do much in the way of training and helping the man to form habits, so that, we can feel reasonably sure that the impulse or involuntary movement will be in the safe direction. Then "Safety First" will be more than a mere slogan. The question of the proper impulses governing a man's actions will depend on the habits he has formed. If he has been trained and instructed to do his work in the safe way, when the occasion requires him to do something unusual, his habit of safety will regulate the impulse which is about to manifest itself. When he has acquired these habits of safety, he will then become what we might term, "safety conscious." That is, whatever his actions may be, his first thought will always be, "Is it safe to do what I am about to do?"

This safety consciousness must find its way into a man's mind through instruction of some type. Various forms of instructional methods have been used both singly and collectively—mass meetings of employees, wherein information is imparted with regard to hazards in their work—posters placed in different locations, pointing out the hazards—meetings at which motion pictures are shown—special safety articles prepared for the factory paper, and instruction by the foreman are the most popular forms.

The foreman has always been considered the "key" man in industry because he is the contact man between the employee and the employer. It has only been in recent years that very much attention has been given to training programs that would aid him in the discharge of his duties. At intervals, campaigns have been put on where stress has been laid on one of his functions, such as, safety or the elimination of waste, and at the close of the campaign he would settle back to his previous status. Campaigns are simply bolsters for the weak foreman. When he has learned to delegate the responsibility of the machine to the operator for both quality and quantity, he will find time enough to perform all of his other duties. Then safety will be given the time and attention necessary without submerging any of his other duties and safety campaigns will not be necessary.

Inasmuch as only 10 per cent to 15 per cent of all accidents can be eliminated by mechanical means, it therefore becomes necessary to direct our efforts of accident prevention mainly against the 85 per cent to 90 per cent class. This effort calls for education of the individual man to see that he performs his work in the proper and safe manner. This educational work can be most easily accomplished through the instruction of the foreman, because he should know the hazards of the methods of operation of machines and equipment under his jurisdiction. By imparting that knowledge to the men and then being sure that the man is following his instructions, he can materially reduce this large percentage of accidents.

Our foremen have always been vitally interested in accident prevention and in the past ten years according to the figures of our Safety Division, he has been instrumental in reducing the frequency rate (number of accidents per million hours worked) 70 per cent. In a like manner they have reduced the severity rate (number of days lost per thousand hours worked) 50 per cent. In September, 1930, the responsibility for accident prevention was placed more definitely on the individual

foreman. He has been held more strictly accountable for unsafe conditions that exist and for accidents that occur in his department. As a result of placing this responsibility directly upon the foreman, a further decrease in accident rates has been noted. Comparing the nine months from September, 1930, to May, 1931, with a similar nine months from September, 1929, to May, 1930, the frequency rate has dropped from 13.71 to 10.92 accidents per million hours worked, while the severity rate has dropped from 0.98 to 0.91 days per thousand hours worked.

Every foreman is held strictly accountable for the condition of his department. It is his job to see that all safety devices are in good working order and that equipment, such as chains, cables, ladders and ropes are not likely to cause injury through failure. It is also his job to see that his men are properly equipped with protective clothing wherever it is necessary, according to the standards recommended by the Safety Division. In this sense, he is really a representative of the safety engineer and is responsible for the man's safety in addition to his other duties. Supervisors are appointed in the factory who periodically inspect the plant. Rotation of these men injects new blood and is productive of new ideas as their work progresses. A copy of their recommendations is sent to the factory manager, the foreman and the safety engineer and when the foreman has completed the work, he in turn sends a memorandum to the same parties stating that the request has been complied with.

Safety is again brought to the foreman through our executive training program. This course is carried on by the conference method where the foreman has an opportunity to bring his problems up for discussion. This method is working very satisfactorily in our plant and I feel that we are amply repaid for the time and money that is being spent in this way.

ADJOURNMENT

Thursday Morning Session
October 15, 1931

Joint Meeting of the Automotive and Machine Shop and Power Press Sections

WALTER J. GRAVES, Chairman
Michigan Mutual Life Insurance Company, Detroit, Mich

The joint meeting of the Automotive and Machine Shop and the Power Press Sections was called to order by Walter J. Graves, Michigan Mutual Life Insurance Company, Detroit, who presided.

CHAIRMAN GRAVES: Following the usual custom, we have this morning the joint session with the Automotive and Machine Shop groups. The general subject of the meeting is "Machine Guarding." It is an old subject but there are always new and important problems. We have often heard the saying that if you have good supervision, guards are not necessary. That is hardly true because you cannot always count on the supervision. There are always lapses; in fact, we all have lapses, and to take care of that, guarding is very necessary.

The first speaker is Mr. E. J. Smith of the Hawthorne Works, Western Electric Company, Chicago. Mr. Smith has the background of one of the largest and probably the finest factories in Chicago or middle west, with a very large machine problem and where things are very highly developed. For that reason he should be able to bring us some very interesting things this morning.

Recent Developments in Power Press and Machine Shop Guarding

By E. J. SMITH

Director of Safety and Health, Hawthorne Works, Western Electric Co., Chicago

As your chairman pointed out, there have been plants that have been almost accident free with very little guarding because of close supervision. You want to remember though the statement made yesterday by a speaker that 85 per cent of accidents are due to the human element. The guarding only represents 15 per cent of accident prevention work; but he failed to say how this would average if we had no guards. I can see a wonderful value in building safety into a die or tool. I can see not only its practical value, but also its psychological value, and I hope to be able to impress upon you this morning that if we have done nothing else but the building of guards on our machines, we have created in the minds of the workmen the thought that the management is doing everything in its power for their protection.

I heard another speaker yesterday give his three fundamental rules for safety. They were engineering, education, and enforcement. He called them the three "E's." I want to add another "E." It is one that I have preached every time I was on a platform, and that is "Enthusiasm." You must have enthusiasm in this work. You must be sold on it, and you must be a part of it. I don't care how much fire and vim you get into your body when you go away from this meeting—if it doesn't become an integral part of your soul you will not be a safety man. It has got to be a part of your every-day life, just as much of your duty to yourself and those reporting to you as any production order you have in your files. That is the kind of enthusiasm that is going to put across a safety program. That is the kind of thought I want to leave with you this morning.

I have eleven typical slides, and I think a cross section of the guarding system at Hawthorne. You are welcome to anything we have. If you get any idea that is going to prove valuable to you in your work just drop us a line and we will be glad to tell you all about it. There is no charge for that service and that is what we want to do to help the cause.

Now, in presenting these slides it is my purpose to give you the picture from the safety engineer's or layman's point of view. I probably could have had one of our mechanical engineers go into the matter more thoroughly from the technical standpoint and give you the intricate workings of one of these safeguards in detail, but my purpose is to show them to you and explain what they are doing for the safety movement.

They are typical of those used on all punch presses throughout our plant. That they, along with our safety educational program, have accomplished their purpose is exemplified in the fact that punch press accidents have become negligible. In fact one of our press departments employing a large number of women operators has not had a serious accident within the past five years.

Slide No. 1—163625: Now, slide number one is a No. 20 Bliss Press equipped with front and side guards. The fan shaped swing guard in the foreground consists of light fiber sheet mounted on a light steel frame. In addition to sweeping careless hands out of danger, this solid faced guard arrests flying pieces of fractured dies or broken work more effectively than the open wire type formerly used. The guard is actuated by the operator's foot pressure upon the treadle. Both it and the two side guards are interlocked with the press tripping mechanism so that the clutch can not be engaged until all three guards are in the protecting position.

The combination of individual motor drive and solid flywheel is also, we think, a step forward in construction for safety. No unguarded spoked wheel is allowed lower than six feet from the floor at Hawthorne. The splash guard protects the operator's clothing from grease and oil and at the same time affords an excellent background for safety propaganda. The shaded lamp is concentrated on the work. These machine lamps operate on 25 volts, greatly reducing the possibility of injury from electric shock.

This operator is feeding blanks into the press with a conventional type of tweezer from a supply pan, conveniently located in front of the bolster plate.

Slide No. 2—163695: This is the adaptation of an enveloping and telescoping type of guard to blanking work. This set-up is in a No. 21 Bliss Press and, as in the previous picture, the solid flywheel, splash guard and the lamp are in evidence.

Slide No. 3—163698: Perforating operation on small sheet metal parts in a No. 19 Bliss Press. The blanks reach the die by a slide feed and the finished parts are removed manually.

Slide No. 4—131427: This is the first draw on a telephone transmitter face, a part with which all of you are familiar, the operation being performed on a No. 83 Bliss Press. The feeding is done by a combination magazine and slide and finished parts are ejected by a die pad and knockout.

Slide No. 5—153051-A: This is a kick press equipped with two-hand release. The handles actuate pawls which engage with the ratchet on the ram. It is quite simple and effective.

Slide No. 6—149655-A: This is an automatic Baird punch press covered at the rear and sides by a single guard unit composed of several sections hinged to permit access to machine parts. A number of separate guards would actually impede the efficiency of the machine, make accessibility to machine parts difficult, and add greatly to the cost of making the machine safe. Roll stock is fed automatically from reels, seen in the background. Parts fall into the pan below, while scrap is collected on a take-up reel.

Slide No. 7—139730: This slide shows a semi-automatic dial feed with gravity operated magazine. Parts are threaded in a stack on to rods made for the purpose

and set in place in the holder over the dial as shown. Weights at the top of the stack exert steady pressure so that parts slip one at a time into the depressions on the dial, and are carried under the ram. At the completion of the stroke a blast of compressed air ejects the part from the die into the chute emptying into the container below. Although there is no necessity for an operator's hand to approach the punch and die, they are protected by a screen guard. Two magazines are provided so that they may be refilled alternately and the machine need not be halted.

This is a stamping operation and the set-up is in a No. 18 Bliss Press.

Slide No. 8—139736: Here is a combination magazine and gravity feed set-up on an inclined press. Parts release from the magazine one at a time by the action of a cam, slide into the die beneath the punch, and are ejected by air at the completion of the stroke.

This is a forming operation. It is being performed in a No. 21 Bliss Press.

Slide No. 9—171124: Here is an automatic dial feed with hopper magazine used in connection with a regular No. 18 Bliss punch press. The operator keeps the hopper filled and the machine does the rest. Parts descend the miniature conveyor in close order, enter the die spaces in the rotating dial, and are carried under the punch. As in the case of the semi-automatic gravity dial feed, at the end of the stroke parts are ejected by compressed air into the chute leading to a container. The chute may be seen as the light projection in the lower left hand corner. Again as in the case of the semi-automatic dial feed, even though there is no occasion for an operator's hands to come in proximity to the punch, it and the die are protected by a guard. This guard is hidden by the conveyor in this view.

The seeming proximity of flywheel to curved guard at left end of hopper is not as close or hazardous as it appears from the angle in which this picture was taken.

Slide No. 10—170837: This, and the slide which follows, show a heavy Cincinnati Bending Press equipped with a combination hand operated trip and pipe rail guard. In this view the guard is shown in the upward or non-operating position.

Slide No. 11—170837-A: Here you see the same guard in the outward or operating position. The clutch does not engage until the pipe rail has assumed this position, keeping the operator a safe distance away. You will note a sheet metal guard at either end of this rail. These guards protect bystanders as well as machine setters from the ends of the descending ram.

CHAIRMAN GRAVES: The next speaker is a man who is so well known through his long activities in various sections of the Council that he hardly needs an introduction. I would emphasize that his connection with the Buick Motor Car Company over many years has given him a wonderful background and knowledge of mechanical guarding problems. I am glad to introduce Mr. R. F. Thalner.

Recent Developments in Safeguarding

By R. F. THALNER

Safety Director, Buick Motor Company, Flint, Mich.

When your program committee asked me to participate in this program I was just a little dubious as to how far I might go in showing slides that might not exactly come under the subject at hand. I realized that there were three other men on the program and knew that we undoubtedly would get a very fine cross-section of mechanical guarding principles, and so with that thought in mind I have not confined myself entirely to recent developments in guarding.

I will show slides which deal with recent developments in our plant. One shows the extent to which an employee may become safety-conscious. Another slide shows the extent to which a foreman may become safety-conscious.

Still a few more are on housekeeping, from possibly a newer angle; another

is on what I might term an isolated department or one not in our manufacturing process, and another on fatigue.

With the kind assistance of my good friend M. J. McCarthy, from the Fisher Body Corporation, we will proceed with the slides.

This is the first slide, which shows a real safety-conscious employee. The article which is being manufactured is an axle for a large truck, to haul a ditch digger, and this employee, wanting to be sure that he or nobody else became injured (although the motion of the lathe which was used for this purpose was very slow) took it upon himself to have a temporary gate guard installed and hung up in front of this machine so that it would be absolutely impossible for him, through a fainting spell, sickness, or a mental lapse to become caught between the revolving axle and the bed of the lathe, both of which came very close to each other in the rotation of the work.

The next slide shows a view of what we term a "Big Bertha." It is a machine used for rough and finished turning, the pins on our crank shafts facing the cheeks and so on, all in one operation. The machine has eight different cutter arms which operate at the same time, all being fed hydraulically by about 120 pounds of pressure, the operation of the machine from the front being relatively safe.

A condition did arise, however, which was discovered by the foreman, brought about by visitors coming through our plant. The back of this machine faces on the main aisle and there are two doors which can be opened for inspection of the working parts, and as this machine operates the various reciprocating arms present a hazard which would tear a man's hands in bad shape if he were not familiar with what was going on. It became a practice for visitors who came through to want to look into this machine, and the foreman, seeing that this curiosity was difficult to curb, had a glass plate put in the door and an electric light switch put on the outside with an incandescent bulb on the inside. The doors were then closed and remained closed and all visitors who came through after that time could observe the actual working of the machine by peering through the glass and turning on the switch. This seems to be a relatively simple thing and it is, but it just demonstrates the extreme to which a foreman can be safety-conscious and be looking for accidents which might be happening in out-of-the-way places, where we are not ordinarily expecting them.

The next slide shows the same doors in a closed position and the glass for looking into the inside.

This view is one of the housekeeping slides and has to do with the use of a cooling compound. Formerly on this machine four barrels of compound were used to cool the tools. A large tank was set on the floor to contain that compound, taking up an unusual amount of room. The foreman on this particular job (and all due credit goes to him) conceived the idea of having a basin with an intermediate basin, one having a solid bottom and the other one having a screen bottom. The compound comes over the tools and works down through this chute—this being merely a splash plate—falls into the chip box, drains through into the container below and then is pumped back up through the system. The chips collect in the first container, with the result that when any changes are necessary with regard to cleaning the machine, the machine just has to be stopped for a minute until the compound drains out of this container which is then placed on a truck. A new container is then put in its place. This has reduced the use of compound from four barrels to three gallons. It has made it possible to get around the machine to the working parts much more easily; it has given more floor space to the shop; it has made it impossible to have scrap hidden in the shavings because the container is so small that no large number of pieces can be hidden; and it has, of course, improved the house-

keeping condition by keeping the fluid confined to the tanks and not splashed about upon the floor.

This slide shows another application of the same process, only it is used on a drill press. This apron is lifted and the box is pulled out. Whatever shavings might have accumulated on the drill press table are scraped into the box and a new one is then substituted. In this particular box a partition near one end and a small baffle plate in the bottom separate the shavings from the place where the pump takes the fresh supply of cooling compound, an overflow or sump system being used. It is surprising to know that on this machine, in place of using two hundred gallons of cooling compound, they now use six gallons for the same amount of work. With this system it takes two minutes to clean the machine and remove the shavings, whereas with the old system it took forty-five minutes of a man's time.

In addition to the housekeeping effects that I have already stated, it is a time saver as far as the service of the machine and the man are concerned.

Here is a drill press showing you the small amount of compound needed in this container, using from five to eight quarts. It formerly used approximately three or four gallons on the job.

This is an operation which was performed in our sheet-metal plant and is the retaining wall for the trunnion bearing in the front of the motor. This work was formerly done in six operations and was made by putting it into the die of a press. In addition to having the hands exposed between the dies in an unsafe manner, the extra operations were costly. By having two operations before it came to the roll machine, and then inserting it in the roll machine, the number of operations was reduced from six to three and the cost of producing it, in labor, was reduced 54 per cent in addition to making the job almost fool-proof.

This is a forming operation. It forms the steel backing for the main bearings. The piece is laid in where you see it and is then pushed through by hand to the first operation in which the ends have been turned up. This arm is designed to remove the piece after it has been formed, as shown in the next slide.

By pushing in this piece, it in turn pushes the piece ahead of it for the first operation and the descending punch forms the piece and takes it back up with it, and as the hand slide pushes through, the arm removes the piece which has just been formed.

I spoke of the hazard that is sometimes contained in an isolated department and I referred to our cold room in the experimental laboratory. We have a cold room into which a car can be driven and subjected to all the rigors of the north pole. The extreme temperature of 30 degrees below zero can be maintained in this cold room and a wind velocity of perhaps 50 miles an hour can be set up. It is necessary that mechanics work in this cold room to observe the condition of the car while it is in operation.

There are certain hazards connected with it. There is the possibility of leakage from the ammonia coils. There is the possibility of leakage of exhaust gas from the car through the piping that is supplied to remove it. There is the possibility of the man becoming chilled and faint or becoming ill. A small switch is installed on the side of one wall with a button and a lever attached. The lever connects to a rope which entirely circumnavigates that room so that this man, at any place in the room, can pull the rope if he is in danger. There is the added precaution that when a man is working on the inside another man is observing him through a glass window from the outside. The exhaust gases are taken away through a gas line system. The doors which lead outward are so arranged that by simply falling against them or subjecting the weight of the body to the doors they will open. When this man presses the button or pulls the cord actuating this switch he blows a whistle on the outside of the cold room. Every man working on that floor has instructions that the minute the whistle is heard he is to rush to the door (which is shown in the next slide) and

open it, with the idea of saving the man inside who is in danger. This door handle, by one jerk, opens the door and on the opposite side of this handle is a ball (shown in the next slide) which is actuated by pushing against it. These inner doors actuate the locks from the inside and open the doors, allowing fresh air into the room.

This is an operation which I think is rather unusual, and was designed by a foreman in our motor plant. A rocker arm is placed under the punch and a steel ball is pressed through the bushing to size it. Before the rocker arm comes to this operation the facing operation on each side of it and the chamfering set up a slight burr and it is necessary to remove this burr to get a snugger fit. Formerly the steel ball was placed on the rocker arm and the punch allowed to descend, which presented a hazard to the fingers and thumbs of the men who were operating the press. The foreman on this particular job, seeing the danger involved, set to work and devised this mechanical feed.

The next slide shows you the operation of the cut away sections. There are fifteen balls in this opening. These balls are a little over three quarters of an inch in diameter. Here is the tube and at the opening of this tube a slight spring which allows this ball to descend almost to its extreme diameter. It is held in place by that slight pressure. Tipping the press causes the punch to send the ball through the rocker arm, pushing the entire assembly around, rolling another ball in place. It is a very simple operation and in addition to making it safe, the device has made the operation just a little faster.

I spoke of the element of fatigue entering into our work and these two slides are to show what can be done from a mechanical standpoint to eliminate fatigue.

Crank shafts which are handled in our factory weigh all the way from 90 to 120 pounds and a man handling those all day, in addition to becoming fatigued and not being able to turn out as much work, subjects himself to the possibility of accidents. This device was evolved from a previous home-made device; I will explain this device and then show you the one it evolved from in the next slide.

We have here an I-beam frame work containing a pulley and a balancer, a Pedwyn balancer. This balancer is attached to the shaft in this location and from that same shaft comes the cable which hooks to the crank shaft. The rope in the man's hand is attached to a sheave wheel which has a leverage of about three to one. By pulling down on the rope the balancer effort is overcome and the hook descends. There must be enough effort expended by the man to lift a slight amount of the crank shaft. The balancer does not lift the shaft entirely. That is, equilibrium is not maintained. The man actually handles about 10 per cent of the weight. It was deemed advisable that he handle 10 per cent of the weight in a lifting motion rather than in a downward pull because he would have better control of the crank shaft.

The next slide shows the crank shaft being placed in the machine; the rope, which is attached to the sheave wheel, is not now needed in the operation and the crank shaft is handled as he would ordinarily handle it, with approximately 90 per cent of the weight going through the countershaft to the balancer. The installation of this device has not only eliminated accidents but has also improved production. It has eliminated fatigue, and with elimination of fatigue men have been able to do more and better work. The device that this was evolved from is shown in the background. We have some of them still in operation, consisting of a counterweight arrangement. The counterweight is in this case and operates on the shaft the same as the Pedwyn balancer. The objection to this was that it was more expensive to maintain, because as this carriage was moved back and forth along the track, reciprocal motion occurred with every shaft that was handled. The length of this counterweight can have a deteriorating influence on the material which attached it to the I-beam, so that they were

constantly breaking off. A bracing effect was put on to offset that but, of course, the balancer type is so far superior to this that there is no argument for the old type at all.

CHAIRMAN GRAVES: The next speaker is a man whom I have not known very long, but I have heard something about him by reputation. It is not unusual to have the general superintendent of a plant interested in safety, but to have one come to address a safety congress is a little unusual. I take great pleasure in introducing Mr. Wm. B. Kirtland, general superintendent in one of the largest light stamping industries of the middle west.

Safeguarding the Shop Machinery

By W. B. KIRTLAND

General Superintendent, Ternstedt Manufacturing Company, Detroit, Mich.

Yesterday I heard two splendid talks, one by Mr. R. H. Sullivan, personnel director of the Fisher Body Corporation, Detroit, who spoke on "An Executive's Viewpoint on Accident Prevention" and another by Mr. Sam. Morgan, director of education, Buick Motor Company, Flint, Michigan, who spoke on "Safety Practices in the Plant." These talks brought home to us in striking fashion the progress made by the safety movement in this country, and the attitude taken by the management in all industries toward accident prevention. From what I hear, and more especially from what I see here today, the attendance at the convention is quite as large as it was last year and this in spite of economic conditions—this depression of which you might have heard some little rumor. This is indeed strong proof of the tremendous interest which industrial management is taking in the continuance of the safety movement.

It is my privilege to have been here at the convention since Tuesday night, and in this time I have had a little opportunity of observing the way these Chicagoans drive their automobiles. Indeed, last night, as I stood outside the hotel I could not help but observe that in Chicago the population seems to be divided into two classes—the quick and the dead—if you're not quick, you're soon dead. Now, gentlemen, this used to be the situation in all our industrial plants before the introduction of safety devices. Time and time again the machine operator who wasn't quick in getting out of the way of a possible accident was soon minus a hand or a couple of fingers. Today, thanks to the great safety programs which have been initiated throughout our industrial plants, this situation is fast being eliminated.

This morning's talks have all been devoted to the recent development of guards. Surely we all can take home with us some ideas from the three previous illustrated talks and I hope that I will have something to show you which will prove of interest.

In the development of guards and safety devices at our plant, it is our idea that the simple, easily attached—easily adjusted guard receives a good reception from the die setter or job setter. It has been our experience that when you make a guard hard to put on or adjust, the job setter will fight against using it. So we have attempted, successfully, I believe, to overcome this attitude by simplifying the design of the guard itself.

I am going to show you pictures of some of the guards now in use at our plant and I want you to notice especially the simplicity of these devices.

(The slides were described as follows:)

Two types of swing-arm press guards of our own development are used in our plant applicable to high-speed, small-stroke presses of both the large and small types. The first is a device adapted for use on heavy-duty stamping presses

from 3 inch stroke and up. In this example, the object of the design was to get a large swing of the double arms with a small movement of the press slide and to have this movement take place during the initial advance of the slide while there was still considerable opening between the punch and the lower die.

A feature of the guard is its simplicity. The two gate arms are pivoted about a common point, forming an X-member in which the upper part of the X is about one-tenth the size of the lower part. The upper end of each arm carries a roller that engages one side of a V-wedge block carried on the press slide. As originally laid out, the arms were only 18 inches in length, and the strap carrying the pivot point was originally set at the third gib bolt from the bottom. This arrangement, however, gave an extended opening of the arms of only 18 inches, and also swung in a small arc which was insufficient to insure the operator's hands being taken from the die area. Hence, the pivot point was moved up to the position shown, the arms increased in length, and the dangling pieces attached at the bottom to produce positive removal of the operator's hands from the danger zone as shown with the arms open and the slide in the descending position. These added pieces were simply picked out of the scrap pile, the ends drilled and bolted to the end of the arms. At the point of contact with the operator's arm, the gate arm is covered with soft rubber. This new arrangement increased our extended opening to 30 inches.

A somewhat similar arrangement applicable to smaller presses is shown in this next slide. Here the gate arms are actuated by separate bell cranks that cross each other when swung simultaneously, in opposite directions. Here, in order to get an appreciable movement of the arms before the slide has descended a fraction of an inch, advantage is taken of the fairly large horizontal movement of the crank bearing cap before the vertical movement of the slide takes place. This is accomplished by fastening the bracket actuating these bell cranks to a common member on the connecting rod head. The links used, between the bracket and the bell cranks, are the turnbuckle type which makes it possible to adjust the arms to any position required for the best feeding of the die. By means of five drilled holes in the bell cranks, we are able to vary the swing of the arms from 19 inches to 32 inches. The arms are made of wood $\frac{3}{4}$ inch by $\frac{3}{4}$ inch and are held in the bell crank by a set screw which makes them easy to put on or take off. This guard can be used as a single sweep guard swinging either right or left hand or as a double sweep guard, whichever is needed.

Where there are trimming operations that involve metal flying off and possible injury to the operator, or where white lead is being used in drawing operations at high speed with the danger of splash, the shield type of guard, as shown in this slide is applied. The same guard is used, you will note, as shown in our last picture except a different arm is used with a fiber fan shield added at the lower end of the arm. Before reaching the shielded position shown, the arm swings the operator's hands out of the die area.

If you have a die to run which requires an enclosure type guard instead of a sweep type guard, instead of removing the complete guard from the press you merely remove the arms from the bell cranks.

We use the small Johnson single sweep guard on all small high speed short stroke presses. We believe this guard is very effective for that type of job.

In order to prevent the operator working from the side of the press, thus circumventing the swinging arms of the guard, side barriers are placed on either side of the guard so that it is impossible for the operator to position a piece in the die except from the front of the press. These side barriers consist of a light gauge frame covered with one-half inch wire mesh. The barriers have two key-hole slots on the rear end which can be slipped onto two studs which are installed on the frame of the press for that purpose. They are very easy to remove for adjustment to the die.

On some jobs where we want to use an enclosure guard instead of a sweep guard, we use a front barrier in conjunction with the two side barriers. These are made of the same design as the side barriers but are equipped with two key-hole slots on either end which fit on studs placed on the front ends of the side barriers. An opening is made just large enough in the front barrier to allow the insertion of the stock being used. This makes a very effective fence completely around die, affording the operator no opportunity of getting hands under same.

Our pedal guard is a housing made of malleable iron. Inside dimensions are 9 inches by 9 inches and 6 inches deep, with a foot rest in the lower left corner. This guard will prevent any falling objects or passing trucks from striking the pedal, and the foot rest is a fatigue factor. The foot rest is part of the casting 4 inches high—4 inches wide and 6 inches deep. Pedal must be adjusted about one-half inch higher than the foot rest to prevent operator's foot slipping off on pedal.

On our V. and O. presses where pedals are controlled by a spring and which occasionally break causing the press to operate and repeat, for protection against accidents when this occurs we have placed a 24 pound counterweight on the back end of the pedal arm which counter balances the pedal if the spring breaks.

The simple and inexpensive guards we use on our Milling Machines are made of a strip of steel 6 inches wide, 18 inches long. This strip of steel is bent over the steady rest arm, extending down to a position below the cutters. The sides of this guard are formed over so as to make a flange which contacts with cutter arbor preventing cutter from touching guard. A slot is cut in the face of the guard to allow for insertion of work, and at no time can the operator's hands come in contact with the cutter.

On board drop hammers we guard the operator against accidents by placing a pair of wristlets on the operator's wrists. To each wrist strap is attached a $\frac{3}{4}$ inch sash cord which is drawn through conduit pipes which are clamped to each side of the frame of the drop hammer. The ropes are led through these conduit pipes up the side of the hammer and over a pulley near the top of the frame and are attached to the arm. When the operator releases the ram, the ram descends, pulling the ropes with it which automatically pull the left and right hand out of the danger zone.

For protection against sparks on our Spot Welding Machines we have placed a cone shaped shield around the contact points. This shield is 14 inches in circumference at the top, 20 inches at the bottom, 9 inches deep and is made in two halves. One half is one-half inch smaller in circumference than the other allowing this half to telescope with the first half. These guards are suspended on arms 7 inches long which pivot on a swivel, riveted under clamp and tightened to point holder. The big feature of this guard is that you can close in the points entirely or telescope the two halves to any size opening that the work may require. In addition to the telescope guards a glass shield 6 by 8 inches is placed for the operator's protection against sparks flying through the front opening.

Sparks from butt welders have the habit of shooting in all directions, so we have made a housing of galvanized iron to completely close the back and top. This housing or hood has a 6 inch hinged door on the front which may be opened for insertion of work and closed before making contact.

We have other types of guards in use at our plant which we have not shown today as our time is limited. I have with me a set of photographs of the slides shown which I will be glad to show to anyone who is interested. I shall be glad, also, to give out any information you might want concerning these devices.

CHAIRMAN GRAVES: What Mr. Kirtland said about getting photographs of the things that are described here today applies also to the other speakers; you can

apply directly to the National Safety Council, describing what it is that you are interested in and they will refer your request to the speaker.

The next speaker, Mr. P. G. Hunter, from the Motor Wheel Corporation, Lansing, has an interesting plant and has some interesting problems, I imagine. Mr. Hunter has not had \$100,000 a year to spend for guarding. He has been forced to make the best of the situation, and that has led to the developing of some interesting things. This is the time of motor invention and it is in times like this that the new ideas come forth. I take great pleasure in introducing Mr. Hunter.

Developments in Power Press and Machine Shop Guarding

By PERCY G. HUNTER

Safety Engineer, Motor Wheel Corporation, Lansing, Mich.

We guard our presses possibly the same as all these slides you have heard described. We got some of our ideas from the Ternstedt Manufacturing Company which we have found very good.

Personally, I am not a believer in a two-handed trip or any mechanical guards if it can possibly be avoided. When a job comes into the shop the last thing I think of is a mechanical guard to guard it.

As our chairman has told you, we have all been forced to work with very little means for these things. My idea has been that if you can possibly get the stock in and out of the press without putting the hand under the punch you are one hundred per cent better off. Any mechanical guard or two handed trip is subject to failure at some time.

Practically all the guards that have been described here have been on a small type of press which has been regarded as the most dangerous type. We have guarded them all this way.

Our large presses run mostly on brake drums, backing plates and large stampings, and we have found that by using a wooden paddle about five feet long we can remove practically all of these drums and stampings with very little effort on the part of the worker. The stamping usually follows the punch up and either a stripper or knockout pin takes it out. You will be surprised at the number of large stampings that can be handled in this way.

On any blank and draw job that stays on the die we use steel hooks or rings to pull them off; there is usually some inexpensive way of handling these stampings without the use of mechanical guards, and I advise you to give more time to trying out some of these methods. Your firm will appreciate the saving in cost.

We have the inclosure guards on our small dies; and I would like to stress one point, be sure that you have ample room between the punch holder and the guard to allow the fingers to enter so that if an operator should get his finger in there the guard would not be the cause of cutting the finger off. Make them so that plenty of light can enter, and run the bars up and down as this is not so hard on the eyes.

I would like to bring out one other thing: that is the speed of the press and production.

We are all trying to increase production and we think that this is only possible by speeding up the press. Suppose you had a large press running 720 revolutions per hour, and you had to hurry to get the stock in place and sometimes it would stick or go in crooked; you have to stop the press to right it and are only getting 520 pieces per hour. By cutting the press speed down to 600 revolutions per hour you get away from the hurried movements of the operator, which cause accidents, and the slower speed allows the stock to be placed

correctly every time. You do not have to stop the press and your production will remain the same or will be increased.

However, the slow speed is not always the safe speed; if your speed allows the operator time to stargaze or turn to speak to somebody standing by, this is a menace. Gauge the speed of the press so that the operator will be kept busy feeding with no time to look around, but not so fast he has to make hurried or uncertain movements. You can sometimes make the job safe by increasing the speed as well as slowing it down.

Safety can also be promoted and production held by increasing the stroke of the press, giving more space to get the part in and out; also by slowing the press down and using a double die instead of a single die.

On some of these large presses where the operator has to throw out the clutch every little while, due to not having the part in place, you can increase safety by installing air controlled clutches. This does away with fatigue and is quicker acting. Just use a standard air cylinder and hang it so the plunger will connect where the hand lever connects to the clutch. Your maintenance man will know how to install it properly.

I also advise you to guard the pressure springs on your small presses as they are a source of danger. The rods sometimes break, fly up and come down on your foot. This can be corrected by the use of collars. Remember in any guard you make be sure that it can be taken off easily or it will not be put back on again. This is the cause of many of our accidents.

CHAIRMAN GRAVES: Now comes the best part of the meeting, men. Who has any question to ask?

MR. HUNTER: What will happen on one of these guards, say a sweep guard, if one of the screws should fall out while it is being changed over on the top of the press?

WM. B. KIRTLAND (General Superintendent, Ternstedt Manufacturing Co., Detroit): It has never been our experience to have a ram screw break on any of our presses and I am thankful of that. The only ram screws that we have had break are screws on jobs where the guard does keep the hand away. The only time we have ram screws break at all on these presses is when we have overloading on our presses. When you are doing a job that is heavier than the press should carry, you naturally crystallize that screw, and then it breaks. On all our jobs we try not to have overloading.

CHAIRMAN GRAVES: Mr. Thalner spoke about eliminating the fatigue on some jobs, so it came to me the other day that, as an operator is generally seated, it is his arm that gets tired, and it might be a good plan to put arm rests on each side of the press. This might add to the success of your safety work.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Cement Section

Officers 1930-31

General Chairman—R. B. FORTUIN, Pennsylvania Dixie Cement Corp., Nazareth, Pa.
Vice-Chairman—W. L. WHITE, JR., Medusa Portland Cement Co., Cleveland, Ohio.
Secretary—A. J. R. CURTIS, Portland Cement Association, Chicago, Ill.
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Chairman Program Committee—FRANK H. SASS, Universal Atlas Cement Company, Buffington, Ind.
Chairman Engineering Committee—S. H. HARRISON, Vulcanite Portland Cement Co., Phillipsburg, N. J.
Chairman Poster Committee—DAVID ADAM, Lawrence Portland Cement Co., Northampton, Pa.
News-Letter Editor—JACK DEMESTER, Canada Cement Co., Ltd., Port Colborne, Ont. Can.

Tuesday Afternoon Session October 13, 1931

R. B. FORTUIN, Chairman
Pennsylvania-Dixie Cement Corporation, Nazareth, Pa.

The first session of the Cement Section convened with General Chairman R. B. Fortuin, Pennsylvania-Dixie Cement Corporation, Nazareth, Pennsylvania, presiding.

CHAIRMAN FORTUIN: The first order of business this afternoon is the annual report of your Chairman.

Annual Report of the General Chairman

By R. B. FORTUIN
Pennsylvania-Dixie Cement Corporation, Nazareth, Pa.

It is a privilege and an honor to welcome you to this 20th Annual Safety Congress which, if present indications are any criterion, will be the best of all time.

Each year the National Safety Council has grown better and broader and this has been accomplished only through the work and interest of all the members.

It is an equal privilege to welcome you to the sessions of the Cement Section. The greatest benefit and pleasure of the Cement Section sessions is the personal

participation of all those present. The Cement Section as a whole should feel highly honored and gratified to have as splendid a representation of high caliber safety men as are present here this afternoon.

The irrefutable fact that the National Safety Council is a cooperative, non-profit, non-partisan, non-political, and non-sectarian association rendering accident prevention service to members and through them to all mankind has been the inspiring ideal which has led the Cement Section to unselfish leadership in accident prevention.

Our Cement Section held its first meeting at the Sixth Annual Congress of the National Safety Council, October 20th, 1915, in Philadelphia. There were 65 cement safety enthusiasts present at that meeting.

The enthusiasm and interest shown by the members of this section is well emphasized when we call to your attention that the cement industry leads the National Safety Council, all industry in this country, and the world, in accident prevention and reduction of accidents.

The past year has been replete with activity for the Cement Section. Despite the reversal in business progress, the success of accident prevention in the Cement Section has continued. Never before in the history of our industry have we met with as much success as during the past year. Of the 167 plants reporting their accidents, 43 completed the year 1930 without a single lost-time accident. There were three additional mills in 1930 that operated without an accident but their period of operation was less than six months; of the remaining mills that suffered lost time and fatal accidents 438 accidents were reported for the year, which was a reduction of 40.8 per cent from the total of 723 in 1929. Fatalities for the year 1930 amounted to 18 as contrasted with 37 for 1929.

The record of the Portland Cement Association from September 1, 1930, to August 1, 1931, shows the following comparison: lost-time accidents, 1930, 544; 1931, 266. Fatalities, 1930, 18; 1931, 19. There was a decrease of 51 per cent in lost-time accidents, and an increase of 5 1/2 per cent in fatalities.

The cement industry, as represented by the Portland Cement Association, besides leading for the third consecutive year all industries in lowest frequency of accidents per man-hour, dropped from fourth highest position among all industries in severity rating to eighth.

At a very conservative estimate, each fatality can be estimated as costing \$5,000. At this rate, the number of fatalities for the year ending August 1, 1931, would have cost \$95,000. This compares with 1924 in which year there was a total of 76 fatalities, with an estimated cost of \$380,000. The net saving of \$285,000 is shown for the year ending August 1, 1931, as compared with the accidents experienced during the year 1924.

This figure is all the more remarkable when it is considered that there were but 110 plants in the 1924 study as compared with 130 plants in the 1930-1931 study.

During the past year the safety committees at all the mills were requested to reduce expenditures to as low a figure as possible. We may have considered many times that curtailment of expenditures would make it impossible to carry on efficient safety work. However, the above figures speak for themselves and the members of our Cement Section have capitalized on this expenditure reduction and have secured greater cooperation from the employees. Perhaps it was a fortunate circumstance that we were forced to reduce our expenditures as it caused the safety committees to change their tactics and methods of approach to the employees.

At the 19th Annual Congress a committee was appointed to call upon the Bureau of Mines with the idea of ascertaining whether an appropriate trophy could be provided for the three quarries which had completed five consecutive years of operation without a lost-time accident. The committee composed of Messrs. F. D. Hunt of the Nazareth, W. L. White, Jr., Medusa, and Frank Sass, Universal-Atlas, with the cooperation of the Portland Cement Association, and the Departments of Labor and Industry of the country led by the Pennsylvania Department of Labor and Industry called upon the Bureau of Mines. The committee learned the Bureau was

not provided with funds for awarding and presentation of trophies. Concerted action was brought with Congress to secure an appropriation for the Bureau of Mines. However, business conditions prevented Congress from serious consideration of the request of your committee. Activity of this committee has therefore been held up for the time being. I would recommend the life of this committee be continued for another year.

Your officers have been hard put this year to carry out the ideals of the Cement Section due to business conditions but I believe the reports of the various committee chairmen speak for themselves in indicating the amount of work each chairman has accomplished.

The Program Committee should be highly commended for the very fine program which has been developed for the sessions of this section. Very interesting topics have been outlined and speakers have been selected who are well qualified to deliver papers on the topics selected. The Engineering Committee has passed on a number of Safe Practices Pamphlets which have been distributed to the various members. The latest issue being Cement Mill Yards and Railroads, pamphlet number 6. The Poster Committee chairman of the Cement Section has worked very closely with the Poster Department of the National Safety Council and the committee should be highly commended for the very excellent posters which have been published during the past year. One of the outstanding features during the past year was the excellent news letter which was published each month. The interest which has been created and carried on during the past two years is unquestionably due to the individual support and activity of our news letter editor. All the committee chairmen deserve the support of all the members of the Cement Section and I believe the work which has been accomplished during the past year deserves the commendation of all the members.

The members of the Cement Section can be of immeasurable assistance to the Executive Committee if the committee could have the benefit of your ideas.

In closing, I wish to thank the members of the Executive Committee for the invaluable assistance and unselfish support given to your Chairman and the Cement Section during the past year.

The next order of business will be to hear the reports of the various Committee Chairmen.

In the absence of Mr. Adam, chairman of the Poster Committee, I shall ask Fred B. Hunt of Nazareth Cement Company, Nazareth, Pa., to read that report.

Poster Committee Report

By DAVID ADAM
Chairman

The National Safety Council has continued the practice of producing one poster per month pertaining to hazards or unsafe practices in the Cement and Quarry industries. For nine months (the latest figures available) the demand for these averaged 1,380 copies per poster. The highest circulation for a single poster was 1,700 copies and the lowest was 850 copies.

Your committee has cooperated with the National Safety Council Poster Division in arranging for the taking of photographs and encouraging the members to send in suitable ideas, photographs and drawings. Very little contributed material has been received during the year, but fortunately we have not needed a great deal, owing to the fact that the need of economy has led to the reissue of a number of the old posters which are just as applicable today as they were when first issued.

However, this practice cannot be continued indefinitely and it is hoped that more members will become interested in taking a more active part by contributing suitable ideas and material for these posters.

The conclusion we can draw from our experience in this work is—that it pays to design every poster so that it will have as wide as possible an application to the Cement and Quarry industry.

It is only by doing this that we will obtain the widest use of the posters and it naturally follows that the more they are used the more good they will do.

The committee wishes at this time to thank all who have helped in this work and particularly Stanley H. Korshaw, director, Poster Division, National Safety Council, for his guidance, suggestions and work done.

CHAIRMAN FORTUIN: We shall now hear from Jack Dempster about the News Letter.

JACK DEMPSTER (Canada Cement Company, Ltd., Port Colborne, Ontario, Canada): The preparation of the News Letter has been a source of much pleasure and benefit to me during my two years as editor. Many members of the Cement Section have cooperated with me in the work and I want to sincerely thank every one who helped with it in any way at all.

In the last five or six issues of the News Letter, mention was made of the Cement Safe Drivers' League. I may be able to elaborate a little bit on that subject later on, but it is something that is going to go through. We have received the assurances of both A. J. R. Curtis of the Portland Cement Association and R. H. Ferguson of the National Safety Council, that the Cement Section will be given every assistance in trying to prevent accidents on our highways which will indirectly affect the cement industry.

CHAIRMAN FORTUIN: I think our News Letter editor deserves the commendation of us all for the very splendid work on this News Letter during the past two years.

Mr. Harrison of the Engineering Committee is not here to make a report.

Colonel Reninger, do you have a report for the Membership Committee?

COLONEL H. A. RENINGER (Lehigh Portland Cement Co., Allentown, Pa.): I am sorry to say there is not much of a report as far as membership goes. There is only one cancellation.

I do not know of any Section of the National Safety Council where the members have done more work and continued their membership as has this section. I think that the cement industry, probably better than any other industry, realizes the service and the value of the material that the National Safety Council furnishes us to carry on our educational campaigns. Therefore, when we have been cutting down expenses wherever possible, the one thing that has not been cut down, and which is a great satisfaction to me and to the Executive Committee of the National Safety Council, is the fact that those in the cement industry have not cancelled their National Safety Council memberships, nor cut down their safety work.

Having maintained that position which the industry has as the leader of all industries, every executive of every company feels that they cannot afford to stop safety work after being the leaders for the past several years.

The value of this work has been so definitely proven to the cement industry, not only from the humanitarian side, but from the financial side, that its members realize the stopping of any safety work would mean big increases in financial loss, and in insurance premiums.

A. J. R. CURTIS (Portland Cement Association, Chicago, Ill.): You will all be happy to know that in the State of New York, where the matter of corporation and insurance rates was taken up recently, and industry as a whole given an increase of 15 per cent in base rate, the cement industry rate remains as it was. That is a direct reflection of what the State Insurance Commission of New York thinks of the safety work as done by this group.

In Texas last year, when the base rate on all industry was increased by 36 per cent, the rate on the cement mills was decreased 18 per cent. That leads us to believe that we may confidently expect that kind of treatment elsewhere just as rapidly as the situation can be known to the Insurance Commission and the Rating Bureau.

CHAIRMAN FORTUIN: We are going to open the last part of this meeting to a general discussion about the program of activity for the Executive Committee of this Section for the next year. I believe it would be best to defer the nominations until that time. We will hear the first paper which is by W. L. White, Jr., of the Medusa Portland Cement Company. Mr. White has done a tremendous amount of work in labor turnover throughout his organization, and I do not believe we have anyone in our industry who is better qualified to talk on this subject.

The Relation of Labor Turnover to the Accident Curve

By W. L. WHITE, JR.

Assistant General Manager, Medusa Portland Cement Company, Cleveland, O.

The experience of the Medusa Portland Cement Company has been that a very definite relationship exists between safety and labor turnover and resulting plant efficiency. The word safety is used in its psychological rather than its mechanical or educational sense.

There are four groups of people who must cooperate in order to insure good safety practice:

- (1) Company executives and officials
- (2) Plant managers and superintendents
- (3) Members of plant safety committee
- (4) Individual employees

Unless there is 100 per cent cooperation among these four groups, good safety records will not be attained. I do not mean that the labor turnover will be reduced to nothing even if a perfect safety record be attained, but the improvement will be marked by contrast.

In 1928 attention was called by the Portland Cement Association to the fact that one of our plants had an extremely poor accident record. It was one of the lowest of the low twenty-five reporting to the association and had a high loss in hours through lost-time accidents and fatalities.

About 250 men are employed there and because the accident record of this plant was far below that of other plants of the company, the officials were naturally very much concerned about it. Thinking that if the competitive spirit could be aroused conditions would improve, they constantly emphasized the poor showing that the plant was making when compared with other mills. This did little or no good. The safety committee continued to function in a more or less desultory manner, as it had for years, and very little honest-to-goodness safety work was being accomplished. During this period, as you will see from the figures given later, the plant had a very high percentage of labor turnover.

In 1929 it was decided to try entirely new tactics. A safety director was employed who had under his jurisdiction all the plants of the company. His was a personal contact, man to man, and the positive, encouraging attitude was taken rather than the negative, discouraging attitude. New life and pep were put into the safety committee and they were told to forget past failures and to look ahead to what could be accomplished. Employees were urged to offer suggestions for additional mechanical safeguards and these suggestions were carried out wherever possible. An extensive educational program through means of bulletins and posters was carried on, and, in short, every effort was made to give them a new outlook on the situation.

In August 1929 this plant made a complete right about face. The safety movement gained ground rapidly and the next year, 1930, the plant was awarded a safety trophy by the Portland Cement Association.

The labor turnover percentages for the Medusa organization for the years 1929 and 1930 are as follows:

	1930	1929
Bay Bridge	145	131
Dixon	37.0	103.0
Toledo	20.3	45.0
York Gray		4.5
Wampum	12.9	12.0
Manitowoc	2.67	—
Newaygo	—	—
York White	7.8	12.1

While the labor turnover at Dixon was reduced but 8 per cent in 1929, you will note that it was reduced 66 per cent in 1930, and this is attributed entirely to the effect of safety, inasmuch as there was no change in the plant management.

It is a poor rule that does not work both ways and that applies to labor turnover and safety.

A case can be cited where the labor turnover was extremely high and the safety movement carried on in a rather haphazard manner. A change in plant management was made and efforts were immediately directed to reorganization of personnel, which was of the utmost importance. This took a long time to bring about, but it was finally accomplished and it was found that the increase in labor efficiency brought about a decrease in labor turnover, a corresponding increase in plant efficiency and consequent reduction in cost.

Where there was anything but a smooth-running organization prior to the change in plant management, after this change was effected and a suitable force of employees built up, the organization was as smooth-running as a clock and the lost-time accidents and accident severity rating were reduced to a minimum. It is only reasonable to expect that accidents will occur with greater frequency where the worker's knowledge of the machinery and its operation is limited.

Then there is the "old" plant which might be termed a dangerous place to work. Two instances of this sort come to mind; one of a plant built in 1892, the other in 1901, both removed from industrial centers that might affect the labor turnover over a long period of time. Plant management has not been changed frequently and a stabilized force has been built up, the son often taking the place of the father. Labor turnover has been consistently low with correspondingly low accident frequency.

Results in safety work cannot be secured in a short time and the worse the record of the plant is, the longer it is going to take to clear it up. Missionary work, perseverance, patience, education are all part of the program and there are many discouragements, but the results to be secured more than repay all the effort put into the work.

As you know, every plant of this company won a trophy in 1929 or 1930 and you will see from the labor turnover table given herein that safety has a large bearing on labor turnover and vice versa.

CHAIRMAN FORTUIN: During the year 1931 up to date, we have had the lowest labor turnover at a particular plant, and yet the highest frequency and severity rating in accidents. Although your labor turnover does play a very important part, there will be other items which will have a very important bearing on your accidents. We find at the other plants that the accident curve moved in direct proportion to the ups and downs of the labor turnover. Labor turnover, according to my understanding, is the number of men hired, plus the number of men fired, divided by the average total number of employees for a given period.

There are men here who are well qualified to take part in the discussion. Mr. Zook, I am going to call on you first for some ideas.

J. B. ZOOK (Great Lakes Portland Cement Corp., Buffalo, N. Y.): Mr. White spoke of the importance of the location of the plant away from the large city in its relation to labor turnover. Our plant is located in Buffalo, a city with a population of

about six hundred thousand. Our labor turnover is very, very small, in fact the only turnover is in the packing house. The statement that low labor turnover has a direct bearing on the decrease in accidents is shown by the fact that this is our third year without any lost time accidents.

Mr. WARR: Speaking of contrasts, our Lake View plant is located five miles from the city. We have boys there whose fathers started to work there in 1892. In the past two years the plant has hired and fired one man. At our Toledo plant which is thirteen miles away from the city of Toledo we are going into our fourth year without a lost time accident; yet we have a bigger turnover there than we have at Lake View.

W. M. POWELL (Medusa Portland Cement Co., Cleveland, Ohio): I think one of the best ways to control your labor turnover is in the Employment Department through the proper selection and training of men. I think if our plants were fixed so that we could have an executive in charge of the employment of men, and particular attention paid to the proper selection and training of men, that we would get even better results.

Mr. ZOOK: Do I understand, Mr. Powell, that you take the responsibility of hiring and employing men from the foremen; that they have nothing to do with the employment of men in their own departments?

Mr. POWELL: No, we do not do that in our plant, but I think it is an ideal situation where you can do that, and in some cases even take away the power of discharge from the foreman. There is a whole lot in the fitting of a man to the job so he will not be a "square peg in a round hole." If a man is not suited to a job in one department, and there is no reason why he should be discharged, he can probably be shifted to another department where he can do good work. You make a better feeling with the fellow and lessen your chance of accident through the fact that he was better able to do the work assigned to him.

F. B. HUNT (Nazareth Cement Company, Nazareth, Pa.): In 1926 out of 168 plants reporting, 160 had practically no labor turnover. In 1927 there was a semi-reorganization of the company and a complete construction program was started. From then up to 1930, when we received our trophy, our accidents decreased from year to year although our labor turnover increased because of our large construction program. There are cases, I think, where the two do not go hand in hand, and it is necessary to bear down more on safety. That perhaps is the reason why labor turnover and safety do not always go hand in hand.

A. R. COUCHMAN (North American Cement Corporation, Hagerstown, Md.): I think that we all agree that low labor turnover has a whole lot to do with our accident records, at least that has been my experience. In our plants, our highest accident record followed the upward trend of the labor turnover. I believe that we can keep our labor turnover down, as Mr. Powell says, by shifting our men around; if they do not fit in one department, put them in another. That promotes a good morale, and at this stage of the game, we certainly need a good morale. I think one answer to the question of reducing accidents when we have a low labor turnover, is to be sure the men are properly instructed in the work they perform in the various departments.

JACK DICKERSON (Canada Cement Company, Ltd., Port Colborne, Ontario, Canada): Our plant, until the middle of the summer, operated with practically no labor turnover. Practically all in the organization were old timers who had been brought up in this safety game. Suddenly the company decided to build a new plant, a wet process plant. A new organization of laborers, carpenters, skilled and unskilled labor of every kind was employed. When I came away on Saturday, that whole new organization, sufficient to build a modern cement plant, had operated for one hundred and eighty days without an accident. There is the answer to the labor turnover.

Mr. WARR, JR.: When a plant has no labor turnover to speak of and yet has a high accident record there is something wrong with the management. It should

not be so. I think these three have to go hand in hand. I can not conceive of how one could be unbalanced with the other.

CHAIRMAN FORTUIN: I think you are perfectly right, Mr. White. That was our situation at one plant I mentioned. After an investigation there, we put in a comprehensive foremanship training, which changed conditions for the better.

R. A. BEVER (Central Tube Company, Ambridge, Pa.): I would like to know if the safety record affects the labor turnover or if it is the labor turnover that affects the safety record. Whichever it is why does it do so and in what way?

MR. POWELL: I believe it can be said in favor of low labor turnover in influencing the safety record that an old and stable group of men becomes more familiar with conditions under which they work; and the men can do their work with less chance of injury. On the other hand, if men are induced to come to work in a plant because they know it is a safe place to work, I believe it can be said that then safety work influences the turnover.

CHAIRMAN FORTUIN: There is a whole lot to be said on both sides. Mr. Sass, the Universal Atlas has some of the largest cement plants in the world. What is your experience?

F. H. SASS (Universal Atlas Cement Company, Buffington, Ind.): I wonder whether it would be possible to have a low accident rate if you have a large turnover. Prior to the last two years we did have a large labor turnover. Perhaps the experience of others is the same as ours. Men would quit but in two, three or four weeks would apply to be taken back to work. Taking such men back does affect the labor turnover but it should not result in an increase of accidents because those taken on are all experienced men. Recently we brought in on construction work a lot of men who had never before worked in the plant. Such action has not increased our accident rate because of good supervision by the foreman. When your foreman takes a proper interest in those working under his supervision, the men will carry along and help keep the accident rate down.

MR. WHITE, JR.: I claim that the man who quits and comes back is very liable to be an accident hazard. He is inefficient, or he would not quit. I think you will find that so from experience.

MR. SASS: That is not always so. Sometimes a man who has but two or three days a week work needs a little ready money, and his employer for good reasons does not advance it to him. The only way for the man to obtain the money is to quit his job. He may be a good workman and in many instances will apply for reemployment within a very short time.

W. H. BAKER (J. E. Baker Company, York, Pa.): When a man leaves the employment of a company and comes back in a couple of weeks he certainly is a factor in your labor turnover. However, such a man is often taught more about safety than the man who remains on the job because the man who quits is instructed in safety before he is reemployed as well as after to work. I want to mention, that foremen holding group safety meetings once a week and talking to their men has helped us a lot in our safety work.

CHAIRMAN FORTUIN: Thank you, Mr. Baker.

It is thought by some that we should not consider the accident experience of the past couple of years because of conditions due to a depression in business. I believe these conditions have taught us a lot and that our handling of foremen and other employees will be different from now on.

A. J. R. CURTIS (Portland Cement Association, Chicago, Illinois): I think it is rather generally conceded that if you will let a man go, your chances of getting a better man are not over fifty per cent. That is probably one of the best arguments for trying to educate a man in safety—a man who has been careless—rather than to turn him loose and try to get another.

You are letting men go nowadays rather than taking them on. This is perhaps the first time you have noticed that men are being selected according to their ability

to play safe. There has been a remarkable reduction in accidents during this period of depression, notwithstanding the fact that hundreds of men have been called upon to do things they never had to do before. Dozens of men have been called upon to supervise work that formerly did not fall within their scope, and still they have gone ahead in a safe way. Isn't it a fact that you men whose duty it has been to cull out fellows to leave, have been careful to select them on the basis of their relative ability to conduct the general activities around their plants in safety. Haven't we found a pretty good yard stick for measuring men in general? I will give you a concrete example of what I mean. You have relatively few foremen in comparison with the number of ordinary men. The ordinary man does a line of work considerably different from that of the foreman. You have quite a number of foremen, and just one superintendent. By what indications are you going to pick out the man whom you want to make a foreman? One of the best is his safety record. It is one of the best records you have of his general intelligence.

In picking out a man to serve as superintendent, you can't go far wrong if you will pick him on the basis of the safety record in his own department, because it is in a way a very true measure of his intelligence. I am pleased with the evidences we have had lately that when it has been necessary to let men go, you have applied the safety rule rather than some other.

F. B. HUNT (Nazareth Cement Company, Nazareth, Pa.): Isn't it true that if labor turnover remains constant, it is unnecessary to do much work in safety promotion?

JACK DEMPSTER (Canada Cement Company, Ltd., Port Colborne, Ontario, Canada): My experience has been that with a gang of men, however many there are, working for a long while without an accident, your work is intensified, doubled and trebled, because you are up against a stiff proposition to talk safety to a gang that has never had an accident. You cannot sit down and take it easy and say, "We are a safe gang." You have not only got to harp on safety, but also present it to them in new forms that will not only renew their interest, but stimulate and keep up their interest. Therefore I think the work is intensified.

MR. SASS: I agree with Mr. Dempster. In safety work you have to continually find new ways of advertising and bringing safety to the attention of the men. Often the better the safety record the harder it is to find new forms of advertising safety that will catch the man's eye in order to have him carry on, and add no-accident days to those already passed.

CHAIRMAN FORTUIN: I believe, and I think you fellows will agree with me, that we were getting to be more or less spendthrifts on our safety campaigns: putting up fancy bulletins, giving out gold pins, etc. This depression has forced us to change our tactics entirely, and I think we are getting the results. Last year speaks for itself with forty-three plants without an accident.

The next paper on our program is entitled: "Accident Investigations from the Employee Point of View." You will recall that at the Nineteenth Annual Congress, a paper was delivered entitled, "Accident Investigation from the Employer's Point of View." We shall, no doubt, get the opposite slant this afternoon when we hear from Mr. R. A. Finch. Mr. Finch has had a wide experience in accidents.

Accident Investigations From the Employee Viewpoint

By RAY A. FINCH

Safety Engineer, Bureau of Safety, Chicago, Ill.

The discussion of this subject is predicated on the premise that in the majority of industries, executives recognize the importance of accident prevention work and therefore realize the importance of accident investigation.

A few executives still object to accident investigation but we are inclined to believe

that these few objectors are prompted by the fact that they hesitate to accept their responsibility for the prevention of accidents; that they wish to avoid having the truth known concerning the cause of accidents and find it most convenient to hide behind the smoke screen which they have named "Employee Objections to Accident Investigation."

There are two primary reasons for a thorough and formal investigation of accidents. These are: first, to determine the company's legal liability, such investigations usually being made by or under the direction of the claims department; and, second, investigation held for the purpose of ascertaining the true cause of accidents so that an intelligent effort may be put forth to prevent recurrences.

Too often the management appears to believe that an investigation conducted by the claims department to establish legal liability is sufficient. Experience in accident prevention work has proved that this is not true. The two types of investigations just mentioned are entirely different. The purpose of each has an entirely different object in view. It is the accident investigation conducted primarily to determine the cause of accidents, that we are concerned with at the present moment.

It is generally agreed that the percentage of unavoidable accidents is very small. It follows then, that the majority of accidents are the result of mismanagement, misguided efforts, hazardous conditions or other inefficiencies that can and should be corrected or removed. Every accident has in it a lesson. The investigation should be so conducted that that lesson will be brought out and utilized for preventive purposes.

In many cases accidents are inadequately reported over the telephone to the safety director or to some person whose duty it is to receive such reports. The person receiving the call usually accepts the statements made at their face value, and attempts to reconstruct the circumstances and conditions in accordance with his own ideas based upon perhaps incomplete information. In other cases the foremen in charge, and sometimes other persons who may have been witnesses send in certain statements or accident reports. From this meager information the safety director or other person receiving the report many times is quite likely to arrive at erroneous conclusions as to the cause or causes of an accident. Imagination is a good thing in its place but a poor substitute for facts. It is much better, therefore, to arrange for a thorough investigation at which the supervisor or foreman in charge, employees or other witnesses may be given an opportunity to make a complete statement and be questioned until all pertinent details are brought out and made a part of the record.

Many companies now properly consider the investigation of accidents a matter of great importance. Such inquiries are not conducted as a matter of form nor to gain general information, but to secure the facts and to determine the primary cause of the accident. The accident report usually requires that the proximate cause of the accident be shown, but in many cases the apparent cause is not the primary or basic cause. This is especially true of the more serious accidents. By properly conducted investigations the facts involved are shown in the true relation they bear to the particular case in question and enables the management to take steps to prevent recurrences.

The investigation of accidents is, of course, only one of the several phases of safety work that must be given proper attention, if our accident prevention efforts are to be most successful. Such investigations are but one step we must take to gain our objective, the prevention of needless or avoidable accidents. And, if we are to receive full benefit from this feature of our safety work, we must, as in all other phases of accident prevention work, cause employees, the workmen, to understand the purpose for conducting these investigations in order that their cooperation will be obtained.

It is well known that when the management first inaugurates safety work within the company, workmen generally question the motive prompting the effort. That feeling continues to exist until employees are made to understand that the majority of accidents are in reality the results of human failures and could have been avoided

by someone involved in the accident and also if accidents are avoided, through greater individual care or precaution, the one who might have been involved gains first and most by the preventive effort expended.

Employees who have this correct viewpoint voluntarily cooperate in all accident prevention effort.

Most employers have a very definite system of selection, instruction and training of employees. No up-to-date employer would think of putting a man to work without giving him proper instructions and, if necessary, some training and following this up with proper supervision to see that instructions are understood and observed. There are some employers, however, who stop at this. They do not acquaint the new employee with the company's policy with respect to accident prevention, particularly the investigation of accidents. In justice to the employees they should be informed that any accidents which they may have will be thoroughly investigated and the responsibility definitely placed. This understanding at the time of employment would obviate any spirit of resentment or misunderstanding resulting from an investigation.

If we will consider the personnel of the properly organized Accident Investigating Committee and will consider as well the average workman's interpretation of the word "investigation," certainly we will understand that the first reaction of the employees probably will be unfavorable and will remain so until they are properly informed concerning the purpose, the methods and the desired results of accident investigations.

The only possible good which can result from an accident is the experience gained and the lesson learned. Unless accidents of a serious nature, or those that might have resulted seriously, are properly investigated to determine the primary cause, and unless the information gained is properly utilized, we have lost our one opportunity to profit from an otherwise unfortunate occurrence.

Employees are entitled to any information that will enable them to guard against being involved in a similar accident.

A complete investigation may, if followed by the proper action based upon the facts determined, not only prevent a recurrence but actually save the lives of persons who later might be subjected to like hazards. Whenever an accident of any consequence occurs, the investigation should be conducted with due consideration to the parties involved and should disclose all pertinent facts regardless of the consequences. A superficial inquiry might reveal gross carelessness on the part of the individual involved. Further investigation of the same accident might indicate that the person who apparently was responsible for the accident was suffering from some physical ailment at the time of the accident which made it impossible for him to take the proper precautions to do his work safely.

While the cause of an accident as shown in the accident report may be violation of rules, a proper investigation may prove that the underlying or primary cause was lack of proper instruction, poor physical condition of injured, lack of proper inspection and maintenance or because proper tools or protective equipment were not provided by the management. If no investigation is conducted to determine the primary cause of an accident, but instead the management proceeds on the theory that the accident was due to a violation of rules, no action will be taken which would give assurance that other employees needing instruction receive it. If the primary cause is poor physical condition of the injured proceeding on the theory that the accident was due to violation of rules would be an injustice to the employee involved and would not result in aiding other employees who might be in poor physical condition. If the apparent cause of the accident is accepted, no action would be taken to provide for inspection and maintenance of equipment if that item was in need of attention nor would provision be made to provide proper tools or protective equipment.

An accident which the accident report may charge to "poor judgment on the part of the injured," may in reality be due to the fact that the employee involved was a

"misfit" or that the particular operation was "not governed by company rules or bulletins" by which the employee might be guided, but only a proper investigation can disclose the true cause.

Although the cause of an accident as shown by the accident report might be "carelessness on the part of the injured" or "due to lack of proper supervision" a properly conducted investigation of the accident might determine that the accident was due to lack of knowledge, poor judgment, indifference to safety, lack of ordinary care or due to unsafe practices on the part of the injured, or the primary cause might be determined as unsafe condition of physical property, improper tools or equipment provided or due to lack of inspection and maintenance.

In fairness to employees, the employer and the general public, investigations should be made immediately following an accident by obtaining all statements available irrespective of the companies or individuals who might be hurt by such statements. A properly conducted investigation will show the general attitude of the employees and of the supervisory forces towards the established methods, practices and safety rules. Quite often accidents occur which are not governed by existing rules. When an investigation discloses this fact, such bulletins or orders as are necessary can be formulated to afford the necessary protection and guidance.

The problem is to definitely ascertain the cause of the accident so that prompt action may be taken to prevent a recurrence. Much can be learned by analyzing the results as well as the causes of any accidents whether an employee or the public is involved.

Adequate preparations should be made in advance for every investigation; the committee should be provided with operating bulletins or orders and with charts or blue prints pertaining to the locations or work involved. Any defective equipment or protective devices having any bearing upon the accident being investigated should be placed at the disposal of the committee.

When the necessity for an investigation arises, the first question that might be asked would be "Who shall conduct the investigation?" It is important that the investigating board or committee have the proper personnel. The chairman should be the man in charge of the property or location, dependent upon the size of the property. As a rule the general manager or the chief operating official should conduct the investigation but on properties where the company has a large number of divisions or districts the division or district manager or the executive in charge of the department involved should act as chairman. Other members of the committee should be appointed from among the heads of the departments and supervisory forces. The safety director and claims man, if the company has such men, should be on the committee. The personnel of this committee should always be selected by the chief operating executive and it should be understood that the committee has full power to act. No person involved in the accident to be investigated should serve as a member of the committee.

The committee should have the power to call before it any or all witnesses who may have knowledge of conditions which have had any bearing on the case. After the date for the investigation has been decided upon, members of the committee and those to be called before it should be immediately notified through their superiors. Witnesses called should be brought before the committee separately. There should be a competent secretary in order that a complete record of the investigation can be prepared for the reason that often questions concerning accidents arise months after. In such case the records of the investigating committee have proven invaluable. After the committee has questioned all persons involved in the accident they should, from the evidence before them, draw conclusions showing the cause or causes of the accident and should make recommendations to prevent a recurrence of such an accident. In cases where it is evident that there was gross violation of rules or instructions, it is in order for the committee to recommend to the management that disciplinary action be taken.

Accidents have been investigated where the apparent cause was the violation of rules by the injured. The investigation as it progressed brought out that the injured had never been instructed by his foreman which, of course, placed the responsibility upon the foreman, but before the investigation was completed the fact was established that the foreman's superintendent had failed to instruct or to properly impress the foreman. The importance of gaining such information is obvious. These facts can only be determined through a thorough investigation. When you have the facts concerning an accident in black and white as you do after a careful investigation you are in a position to know the truth and profit by it.

The paramount purpose of accident prevention is the saving of human life and the protection of our fellowmen from injuries, which means that those engaged in this work are fostering happiness, better homes and satisfied workers, thereby promoting the welfare of the communities in which they live.

A thorough investigation and analysis of each accident will assist us in accomplishing these purposes.

To summarize the investigation and analysis of accidents should, (1) determine the cause of the accident and enable the management to take corrective action; (2) when the causes of accidents have been recorded and correlated the proper effort can be put forth to eliminate the predominating type of accident occurring on the property; (3) the permanent record prepared by the investigating board may be referred to should questions concerning the cases arise; (4) give every employee the benefit of the lesson taught through accidents that occur without the necessity of being involved in a similar accident to gain that experience.

Discussion

CHAIRMAN FORTUIN: That was a very interesting paper, and gave us the opposite slant from the paper we had last year. There are two points which I would like to mention in regard to Mr. Finch's paper. I thoroughly agree that if the employees are properly informed, and have a clear knowledge of the facts surrounding every accident or near-accident that occurs, it will be very easy to sell safety to them. In our own company we investigate every accident. I do not refer to injuries. The injuries are secondary. We are taking the attitude at the present time, that if we thoroughly investigate the accidents in which there are no injuries, and the accidents in which there are minor injuries, the fatalities and the lost time accidents and the permanent, partial and total disabilities will eliminate themselves. Our records to date speak for themselves.

One point on which I disagree with Mr. Finch is that the investigating committee should be appointed. We tried that, and found it very unsuccessful. We made a complete right-about-face and had our investigating committee elected for a period of six months or a year, as the case might be. I must say that electing the committee has been successful, and we are getting much better results.

Who would like to start off the discussion?

COLONEL H. A. REXINGER (Lehigh Portland Cement Co., Allentown, Pa.): I think it is up to the superintendent to appoint the investigating committee from your safety committee. Our investigating committee holds over, and is composed of the master mechanic, the chief electrician, probably one of the general foremen, with one other man. We have confidence in these men, they know their job and we get a better report from men who are thoroughly familiar with the entire job in the cement plant, than we would from ordinary committeemen who might be elected. The results from such committees, in all our plants, have been very satisfactory.

The investigations do not always prove that we have done everything that we should. We have tried to make this committee feel that we want an impartial report, and not only a report on the cause of the accident and the results of the injury, but we

want them to go further than that and study how accidents in the future may be avoided; whether any guards are necessary; whether it is a case of more education, or a different type of machine, or whatever it is. We believe that the committee appointed by the superintendent should be composed of the best men in the plant, men who are familiar with the entire plant.

A Safety Police System

M. P. GREEK (Marquette Cement Manufacturing Co., Cape Girardeau, Mo.): We have a safety police system which, I believe, is the most efficient measure that we have tried to handle our accident prevention work. Our chiefs of police are elected for a term of six months by the men. That makes the chief a very popular fellow, and his word is pretty well the law. He has, as a part of his duty, to investigate as a committee of one, all near accidents. Up until this year, we had a record of three years and two months and fifteen days without an accident, and therefore did not have many cases to investigate. This year, however, we have been unfortunate in having two minor lost time cases and several "close calls." We have a chief in the cement mill and one in the quarry, and they each take an hour a day to make an inspection trip. It seems we have always been fortunate in getting men who are able to hear about these "close calls" and these near accidents; whether they result in injury or not, they get the facts and bring them to me. We then discuss whether or not some correction should be made, either in the mechanical guarding, or more education.

We did at one time have investigating committees of three men appointed by the superintendent, and they were in office about one month. We found that the men did not like the type of report that was made by these committees, because they very often rightfully stepped on someone's toes who felt that he should not have been criticized. Now, with a chief of safety police elected by the men making the investigation the men accept the decision made.

DR. WM. PARKER (American Tobacco Company, Richmond, Va.): What do you mean by an accident? In my plant, we regard even the cutting of a finger as an accident and investigate every case. Do you regard these accidents, and do you investigate?

CHAIRMAN FORTUIN: During the past few years our attitude has been to consider the minor injury as important. If you investigate the minor accidents, and eliminate them, you will eliminate the major injuries. A slogan which speaks for itself is, "Every minor injury is a potential fatality." That is the basis on which the cement industry has operated.

W. L. WHITE, JR. (Medusa Portland Cement Company, Cleveland, Ohio): We investigate every accident, even a minute scratch a person might get. We make out a card of report entitled, "Minor Injury Report." Now we are engaged in drawing up a chart to use when the accident happens, showing the time, place and the fullest details that we can make of it. What I would like to ask is where you are going to draw the line in this investigation? We found these reports were coming in in quantities, and it is one of the hardest jobs Bill Powell has, to get the reports in with details correctly written on them. I think you can elaborate on that a little more, Bill.

W. M. POWELL (Medusa Portland Cement Company, Cleveland, Ohio): On the report that we are getting out now will be noted the hour the accident occurred, the nature of the injury, the part of the body injured. As a matter of fact it is a summary of the form we use in making out the individual accidents, so we can separate the causes and other desired data.

The descriptions of the accidents that you get, no matter where you go, all seem to be a stereotyped form; for instance, a good many of the reports read something like this: "Stick flew up and hit the man." What caused the stick to fly up? Did

the stick suddenly become a live object and jump up and hit the fellow? Really some of the things put in these reports furnish more amusement for the Sunday comic section of the newspapers than they do service for our purpose.

It has been very difficult to get a sensible description as to how the accident occurred. The request has been made in some of the regional meetings that letters be sent out to first aid departments asking that the men who make the investigations of the accidents get as much of the detail of the events leading up to the accident as they possibly can, so we can draw some intelligent conclusions.

MR. WHITE, JR.: How much time, money and various expense is to be put into the investigation of an accident? Certainly you should spend more time investigating an accident of a serious nature than you would one where a fellow had a stick jump up and hit him in the head and give him a little bruise. Where should the line be drawn on a complete and full investigation?

All First Aid Cases Investigated

CHAIRMAN FORTUIN: At our plant, every minor injury reported to the first aid room—and all injuries are—is investigated either by the foreman of the department or by the investigating committee, as may be decided by the superintendent and the chairman of the safety committee. If, in their opinion, the accident is of such import that it should be investigated by the investigating committee en masse, it is so investigated.

Every employee in our organization has been educated to feel obligated to report every unsafe practice. We had occasion just a short time ago to investigate a near accident. The chap came out of one of the buildings and started to cross the railroad tracks. He stumbled, and as luck would have it, he stumbled away from an oncoming locomotive. One of the other employees saw that occurrence, reported it to the safety committee, and it was thoroughly investigated by the entire investigating committee.

D. B. COLEMAN (Missouri Portland Cement Company, St. Louis, Mo.): One feature that has not been brought up is the protection of the company involved in these investigations? With the situation as it is now over the country, some men are going to resort to all sorts of schemes to protect themselves. We feel that it behooves us to thoroughly investigate each accident for the company's protection as well as for the men. It is very true that the investigation will oftentimes reveal weak links in the organization. Those can be corrected for the protection of the employee. For the protection of the employer an investigation is essential. We have in the past few years had four cases where we proved accident reports were based on untrue statements.

F. H. SASS (Universal Atlas Cement Company, Buffington, Indiana): Any person who applies to our dispensary for treatment of any kind whatsoever is written up on a "Surgeon's Report" which, after the man's injuries (whatever they may be) have been treated, is taken by him over to the safety office. At the safety office, we question him as to how it happened. There are many cases where we have to go to the dispensary to see the man, and from the questions asked the man at that time, we determine whether it is necessary to investigate the cause of his injury at that time or not. In addition to the injury report, the man is also given a slip to take to his foreman. The foreman questions the man, and from the information received, makes out a report.

Whenever it is necessary to make an investigation regarding an accident, the superintendent in charge of the department calls together an investigating committee comprised of somebody from the safety office; possibly two men from his own department; the mill superintendent, and either the general superintendent or the assistant general superintendent. All involved in the injury or accident in any way

whatsoever are called in and questioned and the liability or discipline, or whatever action may be necessary, is decided by the committee.

DR. WAT. PARKER (American Tobacco Company, Richmond, Va.): May I explain our method? We have them go to the dispensary and have the nurse write a complete report of the accident covering all the various points, whether violation of rules, carelessness, etc., and then she takes down in the employee's own words his version of how the accident occurred. A copy of that is made in triplicate, and a copy sent to the foreman, and he investigates it from the Company's standpoint and makes his notations on the back as to his version of it. Then when I come down, I compare the two, and where there is a wide discrepancy, we go into it thoroughly.

W. H. BAKER (J. E. Baker Company, York, Pa.): I think it is a very necessary part of safety work to investigate accidents. One thing that is just as important as the investigation of accidents is what is brought out in the minutes of your safety committees in the way of suggestions to prevent accidents. These have done more to prevent accidents than the investigation afterwards. We are stressing this, and have gained more since we started to do so. For example, we have three men who go over the job every week, then they hold a meeting and prepare their suggestions.

CHAIRMAN FORTUIN: In practically all cases where cement companies are investigating accidents, the most important part of the report is the suggestion for the elimination of similar accidents in the future.

Prevent Accident Repetition

A. J. R. CURTIS (Portland Cement Association, Chicago, Ill.): The investigation of the accident is a good thing, and very necessary, but when you get that done, you have only gone a short way. The report should never be filed until you take all measures necessary to make sure that such an accident cannot happen again in that plant. An investigation is merely the first step to the thing you have to do to be successful, that you have made it absolutely impossible—so far as any men in your safety committee can see—for the same accident to happen again.

ED JONISH (Swift & Company, Chicago, Ill.): Some of you men say that you select supervisors to oversee safety. We have a different method. If a man is hurt, he is sent to the doctor's office. The doctor makes out a report and sends it in to the safety committee. Then one supervision man and one employees' man are sent out to investigate the cause of the accident. They write down what they believe caused it. On Tuesday morning at a regular meeting twelve men, six employee representatives and six company men discuss how the accident can be avoided in the future.

J. B. ZOOK (Great Lakes Portland Cement Corp., Buffalo, N. Y.): The monthly reports sent out by the Portland Cement Association on all significant accidents throughout the cement industry help us a lot, because we know how men in other plants have been injured. We can then go through our own plants and see that we have everything safeguarded against similar accidents.

We have an interplant report on which we send reports of all accidents to our safety director. He, in turn, sends them out to all the other plants, and we in turn receive all reports from the other plants. On the bottom is space for suggestions for the prevention of similar accidents which must be given in detail.

CHAIRMAN FORTUIN: Practically all the members of the Cement Section are also members of the Portland Cement Association. We have two methods for the exchange of ideas. One is through the significant accident report, a composite report of the accidents that occur in all the plants, is sent by the Portland Cement Association to all plants each month without the mention of the company name, but with a description of each accident. The other is with the National Safety Council News Letter edited by Mr. Dempster.

We will now call on Mr. Powell, chairman of the Nominating Committee, for his report.

Report of Nominating Committee

W. M. POWELL (Medusa Portland Cement Company, Cleveland, Ohio): Mr. Chairman, Gentlemen: The Nominating Committee this year consisted of Stanley Downs, David Adam and myself, and we submit for your approval the following slate of officers for the coming year:

General Chairman: W. L. White, Jr., Medusa Portland Cement Company, Cleveland, Ohio.

Vice-Chairman: David Adam, Lawrence Portland Cement Company, Northampton, Pa.

Secretary: A. J. R. Curtis, Portland Cement Association, Chicago, Ill.

Chairman Membership Committee: Lt. Colonel H. A. Reninger, Lehigh Portland Cement Company, Allentown, Pa.

Chairman Program Committee: J. B. Zook, Great Lakes Portland Cement Corporation, Buffalo, N. Y.

Chairman Engineering Committee: Fred B. Hunt, Nazareth Cement Company, Nazareth, Pa.

Chairman Poster Committee: A. R. Couchman of the North American Cement Corporation, Hagerstown, Md.

News Letter Editor: Jack Dempster, Canada Cement Company, Ltd., Port Colborne, Ontario, Canada.

CHAIRMAN FORTUIN: The Nominating Committee has selected a strong slate for the coming year. Are there any nominations from the floor? If not, will someone please make a motion for the Secretary to cast a ballot for the officers listed in the report of the Nominating Committee.

(The motion was made, seconded and carried.)

CHAIRMAN FORTUIN: The work of your officers can be made easy, and a load taken off their shoulders if you will give them your heartiest co-operation. Mr. White, and the other officers, will be pleased to receive any suggestions you have to make.

JACK DEMPSTER (Canada Cement Company, Ltd., Port Colborne, Ontario, Canada): Some six months ago, I started to write in the Cement Section News Letter, on the subject of highway slaughter. In every section of the whole of North America, the highway laws do not operate with any degree of success. The number of people killed, and what is far too tragic—the number of *children* killed every year—is mounting until it has become a national calamity and we pay no attention to it.

One of the most striking posters ever put out by the National Safety Council is that of a father holding in his arms the crushed and lifeless body of his little child who had just been killed by an automobile. Now picture yourself in the position of that father. God knows we hope it will never come to any of us here today, but it may.

It did not seem to excite much comment when the National Safety Council stated that in the eighteen months ending December 31, 1930, there were more people killed by automobiles than were killed in the American Expeditionary Forces overseas. I claim that the cement industry can accomplish what purely Federal Laws have failed to do. We can make such an extreme effort to handle our automobiles safely, that others watching us and seeing us will take notice thereof and be compelled to do the same thing.

There is no way that we can enlarge upon that word "safely." Drive safely for the protection of human life, more especially for the little children who are to take our places tomorrow, those little children, God knows what is in store for them. Today they are populating our cemeteries.

I have received letters from all over the country, from the State of Washington, from California, way down through Massachusetts and from different parts of Canada, saying that the writers realize something must be done, and that they are heartily in accord with the cement industry taking a decided stand. We have been assured

by the National Safety Council that they will help us out to the limit. We have been assured by Mr. Curtis that the Portland Cement Association will back us up.

Suggestions have been made that we either have a sticker or a badge, coupled with a pledge to drive safely. That requires some careful forethought, some planning, but the thing is—can we start it today? Will you, gentlemen, take a solemn pledge, without exception, here and now that as long as you are in possession of a car, as long as you have anything to do with an automobile, that you will at all times drive it to protect those who cannot drive as you do, those little children who cannot take care of themselves, and those who are a little bit more unfortunate and make the mistakes on the highways? It has been said that the child is careless, that the children do not look after themselves properly. God forbid that the day should come when the children will look after themselves properly. We are raising little creatures of flesh and blood, not machines, not automotons. We love them because of those very mistakes that they make. Must we kill them, also, because of those mistakes? Will everyone of you rise and solemnly and fervently pledge yourselves to so operate your cars on the highways as to protect our children and the flesh and blood who are our brothers, wherever they are in America?

(Everyone rose in accordance with his request.)

A. J. R. CURTIS (Portland Cement Association, Chicago, Illinois): We have been doing the job so well that the plant accidents have been disappearing rapidly. If you believe you have got to the place where you think you can lie down and not do any more work in the mills, you are mistaken. Not so very long ago a company president, who takes a personal interest in the accidents and sees the report of every accident, both in the mills and among the sales automobiles, realized that the mills were having practically no accidents and the sales department was having a lot of accidents with its cars. He immediately extended the influence of the safety director of his company over to the salesmen's cars as well as to the plant operation. You know that story has been relayed. Mr. White's company does it. Mr. Powell supervises the safety work among the salesmen of his company. Mr. Huth is doing the same with Universal Atlas. That will soon be a common practice. The first step is to get rid of accidents in the mills. The next step, logically, is to get all cement plant employees who drive their own cars, to drive them safely. After we can show other industries we have been able to do this thing we can ask them to do likewise. We have taken the first step, and we can see already by reports of some companies more accidents are watched by the safety managers of their companies, and that the step is not hard to take and produces results.

In the final analysis, most of the cars on the highways are driven by men driving either cars or trucks for business purposes, or employees of industries driving their own cars for pleasure, and if we all just follow the procedure outlined, it seems to me that the cement industry, and all of us, can contribute to the solution of this problem. You, I am sure, are willing to get behind this, and you are willing to say a good word for it and put it into personal practice as far as you can. If just that one thing could be accomplished during the coming year, if our own skirts could be cleared sufficiently to take this thing to other industries, that would be worthy of the entire Cement Section. Why not let's put it across?

D. B. COLEMAN (Missouri Portland Cement Company, St. Louis, Mo.): In line with that suggestion, I wonder if it would not make a big hit to place one of these stickers on the windshield?

MR. DEMPSTER: My idea is that cars having a sticker on them when they come from the makers would be noticed by the general public. As an organized safety body, we are proud of our record in industry. Now as such a body we can carry it further and therefore I believe it would be feasible for the Cement Section to take the first stand as a Section.

CHAIRMAN FORTUIN: Gentlemen, what is your pleasure in regard to this suggestion by Mr. Dempster and Mr. Curtis? Shall we put our resources, pep and enthusiasm

behind the Cement Section in this idea for next year? Shall we make it the outstanding motive for achievement for next year, or shall we carry on for industrial accidents as we have in the past?

W. M. POWELL (Medusa Portland Cement Company, Cleveland, Ohio): Why be stingy? I don't see why we should not extend our activity to the highways. As Mr. Curtis said, we have had a remarkable success and we have had some wonderful cooperation from our salesmen on the highways. I regret I did not know this sooner, so I might have brought some of the letters we received from the salesmen on the road. There is no question but what if we go after them right, we will give them all the help we can.

I think it would also be a good stunt if we adopt the suggestion made that makers of cars slap a sticker on the automobiles as they come from the factories.

A recent issue of the *National Safety News* strongly condemned the slogans that some of the automobile manufacturers were using in their sales talks for the cars. I do not recall just exactly what they were now, but they ran something like this: "Our car with ninety miles an hour insures absolute rulership of the road."

"Our car drives seventy or eighty miles per hour like forty or fifty."

I think we should try to get them to abandon those slogans. I think it would be a good thing if every member of the automobile industry would join the Automotive Section of the National Safety Council, and receive that little magazine which is sent to all members of the Automotive Section.

CHAIRMAN FORTUIN: The Street and Highway Traffic Section of the National Safety Council does a tremendous amount of work with the automobile manufacturers. We do not want to cross that section. I think that if we use all the resources within our power to cut down the highway accidents among our employees and our salesmen, we will be doing a tremendous service.

We will have plenty to do if we would do as much for the highway safety as we did for first aid, when we fostered the United States Bureau of Mines and the American Red Cross first aid training, where forty thousand or more men in the cement industry in this country have been trained in first aid. Those forty thousand men have gone out and sold the idea to another eighty thousand. They have taken it into their homes. When a child is hurt, they know how to take care of it, because they have taken a home safety course.

I recommend that a motion be made that the Cement Section go on record to do all things possible and use all resources within its power to cut down the number of accidents on the highways. I believe if this Cement Section goes on record that we follow some scheme in all cement companies for the reduction of accidents, we will have begun a very concerted action toward the accomplishment of one thing. Has anyone any thoughts he would like to bring out in regard to framing a motion?

MR. DEMPSTER: I make a motion that we adopt Mr. Fortuin's recommendation.

(The motion was seconded and carried.)

CHAIRMAN FORTUIN: I believe we will find that the activity in the reduction of highway accidents to our employees and salesmen will come through the News Letter to the membership.

J. B. ZOOK (Great Lakes Portland Cement Corporation, Buffalo, N. Y.): May I make this suggestion for every safety director who wants something to keep him busy. Many of our plants are peculiarly situated in that the plant controls, more or less, the activities of the community in which the plant is located. Most of the men work in the plant; their families are dependent on the operation of the plant, and are so interested in whatever the plant does, that it would be logical for the safety director of the cement plant to take an interest in the safety education of the children in the public schools, or grade schools. I suggest that anyone who is interested—and you all should be interested in the children and their education, for after all, as Mr. Dempster says, they are going to take our places tomorrow—write to

or get in touch with Lt. Colonel H. A. Reninger, Lehigh Portland Cement Company, Allentown, Pa. He was present at a regional safety meeting in Allentown where they put on a little play of the safety meeting conducted in the public schools. I am sure that Colonel Reninger could give you some good help in carrying this thing along.

CHAIRMAN FORTUIN: The school boys and school girls in the first and second grades of today are the future cement workers of tomorrow. The more time we spend in educating and training those children to be safe living individuals, the better cement workers we will have in the future.

This has been one of the liveliest and most interesting sessions that we have ever had in the Cement Section. I hope that everyone present this afternoon will be present again tomorrow morning. Thank you all for your very splendid attention and part in the discussion.

ADJOURNMENT

Wednesday Morning Session October 14, 1931

R. B. FORTUIN, Chairman
Pennsylvania Dixie Cement Corporation, Nazareth, Pa.

The second session of the Cement Section convened with General Chairman Fortuin presiding.

CHAIRMAN FORTUIN: Yesterday we had some very interesting papers, and a great deal of very interesting discussion followed those papers. This morning we are fortunate in starting off with a man who has had a very wide experience in first aid training, Dr. W. J. Fenton who was in charge of the first aid car of the American Red Cross for quite a number of years. He is also training many thousands of people in first aid.

Emergency First Aid

By W. J. FENTON, M. D.
American National Red Cross, Washington, D. C.

There appears to be quite a little misunderstanding among a great many people throughout the country about the difference between "First Aid" and "First Aid Instruction." These are two separate and entirely different things.

First Aid is the means employed in properly caring for a patient after he has received the injury, while First Aid Instruction has for its prime object the prevention of the accident, and if it cannot be prevented then the knowledge gained from first aid instruction will assist some individual in rendering the proper first aid treatment.

Far too many times I find, in my work throughout the country, that some management of an industry thinks that the Red Cross is conducting these training courses for the purpose of training different individuals in the plants to qualify them to run a first aid station. Nothing could be farther from the truth. The training of first aid personnel for an industry belongs to their plant surgeon, or if the plant does not have a doctor connected with it then this training is the responsibility of either the city or county medical society.

We of the Red Cross are interested in training first aid instructors for the different industries, provided they want them trained, and then these instructors in turn train their fellow workers in the standard first aid course which is a fifteen hour course and those successfully completing it are issued cards from our National Headquarters certifying to the fact that they have completed the course.

I have been very much impressed, as I have visited the different sections of this Safety Congress and listened to the different papers presented, to note that practically every speaker has cited the fact that their first aid instruction has been one of their very best assets in promoting their safety movement.

At this Congress I have met several who have been in some of my classes during the past few years and I have been greatly interested in their reports as to how they feel that their courses among their fellow employees have had a marked influence in their accident prevention work.

I just wonder if you people know the history of first aid. I am going to try to recall to your mind the first recorded incident of first aid being rendered. It was back in Biblical times. Were you at Sunday school last Sunday? Do you remember the lesson, the parable of the Good Samaritan? If not, let me recall it to you in my own words. A man was robbed and wounded and left by the wayside to die; a passerby with long flowing robes and a long beard soon came upon the scene, he saw the

man lying there but he passed him by on the other side; and very soon another similarly robed gentleman came up from an opposite direction, he too looked upon the unfortunate wounded man but he too passed by on the other side. But presently another man approached, this time not on foot but riding a donkey; he also saw the wounded man but did he pass him by as did the others? No, he did just as any good first aider of today would do; he parked his donkey at the side of the road, examined the wounded man, found he was in shock, a condition which is present in all injuries; it may not be manifest with all its symptoms immediately following the injury, but all first aiders are taught to be on the look out for shock and to forestall it if possible by position and heat in and around the patient.

This man first treated his patient for shock, then he bound up his wounds, and not having a Ford, automobile or Austin to transport his patient in, he carefully lifted him to the back of his poor old donkey and transported him to a hospital. You say, no, there were no hospitals in those days. But he did take him to an inn and paid for his keep, and further stated that he would be back that way in a few days. Now, friends, to the best of my knowledge that is the first recorded case of first aid.

It is a long jump from Biblical times down to the year 1899 when Dr. Matthew J. Shields, over in the hard coal regions near Jermyne, Pa., decided that in the mine accidents the patient too frequently was in much worse condition on the arrival of medical aid than had been the case immediately following the accident. In other words, the Doctor frequently found upon his arrival that the patient was suffering from a compound fracture, when originally there had been just a simple fracture; or in the case of where a patient had been injured so as to cause a loss of blood that this loss had been allowed to continue so long as to greatly weaken the patient and sometimes in itself cause death. So Dr. Shields decided that it should be possible to train the miner in some simple practical methods of properly handling an injured person and also to train him in proper methods of transportation of the injured, so that his injuries would not be made worse while placing him under medical care. To this end he gathered about him a few miners who had had some previous training in England and Scotland in the St. John's and St. Andrew's Ambulance Corps and formed "First Aid Teams" in the mines.

From that small beginning has now grown this vast army of trained first aiders scattered throughout the length and breadth of this old United States.

In 1915 the American National Red Cross incorporated first aid instruction in their program and during the year of 1930 they issued more First Aid Certificates than in any previous year of their work along that line. They issued during that year 74,437 First Aid Certificates.

Mr. Fortuin has just told you that for a number of years the National Red Cross operated by and with the cooperation of the Railroads of the United States, a Pullman car which the roads pulled free of charge over their entire system in the interest of safety. It was my privilege to have charge of that car from July 1926 until June 1929, when it was discontinued, and during those years we covered 14 of the large railroad systems from coast to coast and from Canada to the Gulf. We not only gave demonstrations to railroad groups in their shops but the local Red Cross Chapters would also arrange for hour demonstrations in the different industries. Fire and Police Departments, schools and colleges, civic clubs and other organizations in the cities and towns visited the car.

Your chairman has just been telling me of a case of a man who was injured by being thrown through a windshield of an automobile during an accident; this fellow himself had had a course in first aid and being the only one present who *did* know what to do, he rendered efficient first aid to himself. If I am not mistaken, I think Mr. Fortuin told me that this same man, while in bed recovering from his own accident was told of a neighbor who had just sustained a fractured arm and he asked that they bring the injured man to his bedside and he, although injured, applied emergency splinting to the fracture so the patient could be safely transported to

medical assistance. I hear of any number of similar cases where some one has not only given themselves emergency first aid, but frequently has saved some other life by knowing just what to do with any improvised material at hand and thus relieve the suffering of some fellow being.

Again let me call your attention to the fact that we are not interested in training some one to run a first aid station in a plant; there they have all types of equipment, drugs, dressings, etc., and frequently they go farther than first aid; they sometimes, under the advice of the plant surgeon, give treatment. We are interested in training the individual to use caution and to prevent the accident if possible, and if this is not possible then we want to train him to use his head and his hands and be able with any improvised material that may be secured to render efficient help to the injured in order that his injuries will not be made worse before the arrival of skilled medical service. I strongly impress upon all who are under my instruction the fact that they are *not* to play doctor, and they must always remember that their duty to the injured is "To get him to the medical man, or hospital, as soon as possible, *but* alive if possible and if alive, then to get him there in as good condition as possible." If first aiders will only remember this warning there will never be any clashing between them and the medical profession.

It is remarkable the reduction in accidents that is being made in industries but it is appalling to note the number of accidents occurring daily in our homes and on our streets and highways. A man or woman is safer working in industry today than at home or on our highways.

I like to teach first aid by demonstrations and I presume the stenographer will have a very hard time in recording all the motions of my hands or even catching every word I say since of necessity I must work very fast.

A first aid kit is very nice indeed to have, and it should be preferred, but how many times is this kit left out of the car to make room for some basket when going to a picnic, and just at the time that the kit is not at the scene of the accident is the time you are more likely to have the accident. Always use the surgically clean materials from a first aid kit in preference to emergency materials, provided of course that you do have access to a kit; but if you do not have a kit, remember you can do efficient first aid with improvised materials.

May I demonstrate to you my first aid kit? It is an ordinary penny box of matches; we all, as a rule, carry matches; well, in this match box I carry this small tube of one half strength iodine for minor wounds, and this tube only takes up the room of about four matches. If you ladies don't carry matches, you could carry this tube in your lipstick container. Now when one scratches himself or in some other way breaks the skin of the body there is always a danger of infection which may later terminate in blood poison. This can all be prevented by the immediate application of half strength tincture of iodine, applied first in the wound, then for about one-half inch surrounding the wound.

The germs which cause these infections are not so frequently on the thing that produces the wound; they are more frequently on the skin on your own body, for our bodies are covered with germs. I don't care how many baths you take, nor what soap you use in your bath, there is always danger of infection if the skin is broken.

Too many people place a wound in their mouth and suck it; this is also a very dangerous procedure for your mouth probably is the dirtiest part of your body as far as germs are concerned. I don't care what kind of a mouth wash you use.

Recently a man in one of my audiences told me that I went to too much trouble in treating these minor injuries. When I asked what he did for them, he stated that he took a quid of tobacco from his mouth and placed that on the wound.

Now let's get back to the dressing of this wound with my small first aid kit. You first apply the half-strength iodine; don't wash a wound, that is a doctor's job, put your iodine on, let it dry; then you need a small cloth to cover it. You say you have

none; well why not tear off some small piece of your clothing, some piece you wouldn't miss very much? Tear off a corner of your shirt tail, which will do very well. Now remember, anything that is placed directly next to a wound should be as nearly surgically clean as possible, that is where your dressings in the first aid kit come in so well. But you do not have the kit and you must render this corner of your shirt tail, or other rag, free from germs, and the best way I know for a first aider to do this to subject it to heat. That is where the match comes in; you can light the match and scorch the rag. Of course you could use a cigarette lighter; if the cloth catches fire do not blow your breath on it as that would probably place those germs from the mouth on it. In fact, when I blow out a match, I do not blow on the match, I blow up the opposite sleeve; that is just a trick in the trade, its all in the way you hold your mouth. Now, don't try and wipe this charred surface off the cloth, the deposit of carbon will not injure the wound.

For your wife or any woman in the home, they could render this rag reasonably free from germs by placing it on top of a kitchen range, but in a recent demonstration in a parent-teacher group one lady stopped me. She said, "Doctor, you didn't put any salve on that wound before applying the cloth." I told her that to my way of thinking there were only two places for salve, one was when you were introducing a speaker, and the other was when you were dressing burns, and I preferred using it on burns.

Well now we have the half-strength iodine on the wound and it has dried and we now have this germ-free dressing applied, but how are we going to hold it on. I'll tell you. Come up here, Mr. Hunt; you are a big man and I will need a large piece of cloth for a bandage and I want to wrap up this injured knee. I will just tear out the whole back square of your shirt and then rip it diagonally from one corner to the other making a triangular bandage (such as this one which I carry with me).

You say, probably this man's shirt is colored or soiled; well it's the best thing you can get at the scene of the accident; then, too, remember we have a clean dressing next to the wound, and this bandage is only used to hold the dressing in place.

Now let me get up on this table so you may all see how I apply this bandage to a skinned knee. I had a man come in to me one morning stating that he had lost 10 days' work due to a skinned elbow and it had been wrapped in a roller bandage and he could not bend his elbow hence had to lose his work. This same bandage is good to wrap knee, elbow, or heel. Fold it in a wide cravat, so, now flex the knee as I am doing and place the center of the bandage over this dressing on the knee; cross these long ends behind the knee; now bring them around the front of the leg, the lower one passing over and binding the lower edge of this bandage just below the knee, and the upper strand binds the upper edge above the knee; now again bring them to the back of the knee, (with knee bent all the time), and now tie the ends together in a square knot in the hollow just behind the knee. Now see, I can extend or I can flex this knee, no need of me having a lost-time accident if I have nothing worse than a skinned knee or elbow.

Always remember, though, that all injuries should be reported to the doctor; it makes no difference how trivial they may seem. The industries insist that they be reported to their medical staff, but his injury may occur while off the job and, due to the depression, you decide you are going to take care of it yourself instead of calling a doctor. Personally I think that is false economy.

Let me tell you of a fellow who once came up to me following my demonstration. This fellow informed me that he had had two courses of first aid instruction, one in the army and one after he got out, and he proudly made the following assertion. "You know, Doc, I haven't had a doctor in my house since I got out of the army." I said, "Well that is fortunate indeed, do you mean to tell me that you have had no sickness or accidents since you were discharged?" He said, "Oh, yes, I have had quite a few accidents but I have never had a doctor; I always cared for them myself."

I said, "Well, my friend, you certainly have been fortunate. But you are not a first aider." This man was and is trying to play doctor, a very, very dangerous thing for any layman to do. Remember, the doctors are trained with years and years of study and practice just how to care for injuries, and even then, with some of the best of us, a case does become infected and we sometimes have some very unfavorable results. If this can happen when the patient is under skilled medical attention, how much easier might it happen when some layman tries to do treatment? Remember, first aid is not treatment.

There are numerous things which I would like to show you this morning, remember it takes us a minimum of 15 hours to instruct you in the standard first aid course. Our time here is limited so that I will just have to touch on a few of the high spots.

I next want to call to your attention the dangers of the layman attempting the removal of a foreign body from the eye. The other day a man came up to me and said that he had just learned that a safety razor blade was the best thing to pick a cinder out of an eye. Can you imagine a more dangerous thing to pick around in an eye with than an old safety razor blade? Another time a man was using a lead pencil to pick out a cinder from a friend's eye and by mistake he had an indelible pencil and thus ruined the fellow's eye.

Protect your eyes, wear goggles when in danger of foreign bodies entering the eye, and if a foreign body does become imbedded on the eyeball, then no one except a medical man should attempt its removal. Eyes are too precious to let Tom, Dick or Harry meddle with them.

The next thing I want to demonstrate is how to control bleeding. You say, oh yes, you are going to show us the use of the tourniquet. Friends, unfortunately many people when they think of first aid, think of the tourniquet and prone pressure resuscitation. But that is not by any means all of first aid. Was there ever an accident prevented by using the tourniquet, or by prone pressure? No, but of course there have been numerous lives saved after the accident by the proper use of the two measures mentioned.

Now, personally, I want to speak of a tourniquet to condemn it. It is one of the most dangerous things, to my mind, in the hand of the layman if he doesn't know where, when and how to apply it, and the dangers of its use.

Too frequently somebody will use a rope, wire or shoe string for a tourniquet and then twist it up like they were cranking a Ford on a cold day. Remember, there are nerves always running alongside the large blood vessels and if some narrow material is used for a tourniquet and then it is tightened with force, a severe injury to the nerve and other soft parts may occur, and probably permanent damage and disability may be the result. We doctors learned a lot, during the World War, about the terrible dangers from the improper application of tourniquets and their being left, without loosening, for too long periods at a time.

Why use a tourniquet, anyway? There are only two places on either side of the body where we teach the use of the tourniquet. Those places are between the shoulder and elbow in the upper arm, and between the knee and groin, about one hand breadth below the groin, in the upper thigh. Now, in either of these locations I can much more quickly, safely and efficiently control this bleeding with pressure on the vessel with the fingers of my own hand, and in fact this should be done before the application of the tourniquet and the tourniquet only used if you need to control the bleeding while you are applying a dressing to the wound. *Always release a tourniquet for a short period every twenty minutes.*

Now suppose that this man here has a gash in this wrist and it is bleeding profusely. I can thus stand behind him and grasp his injured arm by his hand with my hand and quickly grasp (from behind) his upper arm in this manner, letting the palms of my fingers come across the inner side of his upper arm just about where the seam is in his coat sleeve, and by pressing my fingers toward the bone I completely control all this bleeding from his wrist; and if he should feel faint I can quickly slip my arm

under his arm pit and pull him toward me in such a manner as to push his elbow to his side causing his upper arm to press against my arm and close the blood vessel against the bone in the arm. See how easy it would be for your wife at home in the kitchen, should she accidentally gash her wrist, to quickly place some small pad up under the armpit and then draw the arm down to her side and thus stop the flow of blood, and still have her other hand free to go to the telephone and call her physician. By the way, everyone should know their family physician's telephone number so as not to have all the worry and inconvenience of having to thumb through a telephone directory to find it in a hurry.

Probably I should have first outlined on this man here just the course of these arteries from the heart. These particular ones I have just talked about come off from the heart up to the point of the neck just at the inner end of the collar bone, and then they make a detour, and one passes outward here just behind this collar bone and lies on top of the first rib. The one on the other side also goes the same way, and at the point of the shoulder starts down the inner side of the upper arm in a line about parallel and under the seam in a man's coat sleeve; and at the elbow each artery then branches into two and they go down the forearm just inside the two bones of the forearm, then on to the hand where they continue to branch into smaller vessels. Now, if you should attempt to compress it or them below the elbow you have two arteries to compress, and it takes much greater pressure here since they are forced in between the bones instead of directly onto the bone as the case is in the upper arm.

Should this arm be severed or torn off at the shoulder, then of course you would use your pressure to compress the artery against the first rib in the hollow formed by the collar bone in front and the shoulder blade from behind.

Next, let us suppose this leg is crushed off close up to the body in a railroad crossing accident, attempting to beat a train to the crossing. How could you control the bleeding when there is not enough stump left for the application of a tourniquet?

First let us trace the blood vessels. One large one comes off from the heart and starts down the body, lying just in front and at the side of the back bone. When it reaches a spot directly behind the navel it branches, each branch crossing the bone in the groin and about a hand breadth below the groin each starts to wind behind the thigh bone. When one reaches the knee it branches as the artery does in the elbow and we have two blood vessels and two bones from there on down to the feet.

Now, to control this bleeding at the groin, of course the patient, if he had a leg off, would be lying down; you would press with the palms of your fingers or the heels of your hands on this blood vessel just as it crosses the groin and you can easily control all bleeding.

Following one of my demonstrations at a Fire Department where a great many citizens were standing about the door, a business man stopped me on the street to thank me for that demonstration, telling me that he wished he had witnessed it two years previously. He told me that while out hunting with a friend the friend was accidentally shot in the groin. This man did not know what to do and just had to let his friend lie there and bleed to death.

That is one reason why I am so interested in this work; some one who has seen or heard me may sometime be the means of saving my own life or the life of some one who is near and dear to me.

Now, the last point I want to demonstrate is in the neck, a throat cut. Could you apply a tourniquet here? I should say not.

Well, first let's outline the course of these vessels in the neck. They come off from the heart and start up the neck; they do not make a detour, but run up next to the bones in the neck just beneath this big long muscle on either side of the neck.

Recently someone in my audience asked me, "Doc, what is the name of that blood vessel?" Whereupon I said it made no difference about a name since you could push on a name from now until dooms-day and never stop a drop of blood. Then he wanted to know if it was an artery or vein; to which I answered that it made no

difference to a first aider, since just as much blood would run out of one as out of the other, provided there was a hole in it.

You say, how can a fellow get a hole in his throat? Well, somebody might be wielding a wicked "razzer"; or in an automobile accident in a car not equipped with safety glass one might get the throat cut from broken glass. I told you accidents occur at home; suppose, as your wife comes to the door to greet you on your return home, a little puff of wind slams the door in such a manner as to cause a flying piece of glass to strike her in the throat. What would you do? Could you successfully control that bleeding?

Watch me, I will try and show you exactly how to do it on this man here. Standing behind him, I quickly grasp his neck just at the outer side of his Adams apple, on the injured side, and with my fingers beneath this large muscle I compress those blood vessels against the bones in the neck. If he fights or attempts to faint, you have your other hand and arm free here to grasp him across his chest and hold him and gradually lower him to your lap as you gradually sit down on the floor. Now the next thing to do is to send some one running for medical help. Unfortunately few people know the proper way to summon a physician. There are five essential points in calling a physician.

(1) Tell the Doctor who it is that is calling him. This saves lots of questioning on his part.

(2) Tell him where the patient is. Too many people in their excitement hang up the receiver before that information is given a doctor, and the same is true when they call a fire department.

(3) Tell the physician who the patient is, if you know; and if you don't know, then tell whether it is a man, woman, or child injured.

(4) Tell what you think is wrong with the patient. Remember, a physician does not carry a complete operating equipment with him and if he does not know the nature of the case into which he is called, in all probability he will only be able to do first aid, as you are doing, and the patient might lose his life before the physician could get back to his office for proper equipment.

(5) Be sure to tell the physician what is already being done for the patient; in this way he can instruct you what further to do until his arrival, or correct anything you are doing which might be wrong. All this advice is very essential for the most efficient assistance following an accident.

Someone says, well suppose this flow of blood in the neck cannot be stopped by pressure as I have showed you, then what? Well, in the emergency then, you should place your finger or the cleanest material at hand directly into the wound. Any physician would much prefer a live patient with an infected wound in his neck to a dead patient with a nice clean wound in the neck. A life may be at stake and you must act quickly.

Now, let me attempt to demonstrate an emergency treatment of a fracture. It would be fine if you had some real nice boards, proper size and length, and plenty of padding and bandages to tie the splints in place; but where can you always get these boards? You have got to improvise. If it is a broken wrist, why not just place the arm across the patient's chest, this way, using the chest for a splint and then binding the arm against the body with the patient's own clothing? Or let me demonstrate the making of a splint out of your or the patient's coat; first, fold the coat inside out then fold it over again so as to make a strip about six or eight inches wide. Now lay it down somewhere and roll it from each end, making two rolls which meet at the middle. Now a splint of this kind for a forearm needs no padding; just unroll it enough to wedge the injured arm in with the patient's thumb up, so the two bones in the forearm will lay parallel with each other, now secure this dressing to the arm with your necktie, supporters, women's stockings, or what have you, by tying one of these fasteners above the break and one below the break, and then use a belt if you have nothing else for an arm sling.

You may ask, how are you to determine if the injured person has a fracture? Well, first you consider the type of accident and you will have a pretty good idea if such an accident could cause a fracture; then in the absence of any other symptoms, if the patient himself thinks there may be a fracture, you take his word for it and treat it as a fracture.

I have been teaching that there is generally extreme tenderness over the site of a fracture, and I got a great comeback on this recently in a class over in Pennsylvania. On asking one of the members of my class what is the outstanding symptom present in most all fractures, his answer was, "You feel until the patient ouches." I think that explains it pretty well. If, in gently running your fingers down over the supposed site of a fracture, your patient "ouches", that's pretty good evidence he has a fracture at that place.

Now, let's see how you can use this same emergency treatment for a broken thigh. A patient is injured and you suspect a fracture in the upper thigh. If you have those nice long board splints which you have all seen applied in first aid contests, all well and good, but you don't have them, so what will you do? Let me show you. Have somebody help you to gently get this patient on his back, you supporting the injured leg so that he will not jerk and thereby cause the bone to pierce the skin and cause a compound fracture. You have already, before even moving him, looked around to see if there is any bleeding coming through the clothing around the leg. You see none, so you determine that you have only a simple fracture. You can rip his trouser leg up the seam if you care to examine further, but don't tear his clothing unnecessarily.

Then take a coat or sweater and fold it in such a manner as to fill the hollow space between the patient's legs from his knees to ankles. Now take belts, suspenders, ladies' stockings, or what have you, and tie the two legs together, slipping these ties first under the hollow spaces around the legs and adjusting them to the places you want them, always one above and one below the break, never over the break. If you don't know where the break is, he will mighty soon "ouch" if you get a bandage too near it. Now tie one around the legs below the knee, having previously tied both feet together.

Now you have a very effective splint, of course not nearly as good as those long board splints; but if every fractured thigh had received this much attention before moving the patient we would have less suffering and probably less permanent cripples. You note what I have done. I have tied his broken leg to his good one, and if he had been fortunate enough to have a wooden leg for his good one it would have made a much better splint since it would not bend.

A first aider must transport his patient; let us see how this can best be done. Bring me your stretcher. You say you have none, or that the canvas has torn. Well, I don't care whether you have a patent stretcher or not; give me an overcoat, or go up into the boss' office and get the carpet off the floor; a blanket or an auto robe makes a wonderful stretcher. Now you three men there in the front row please come up here and assist us in lifting this injured man to the stretcher. Line up on the uninjured side with the tall man at the head and short man at the feet, in this way if you do want the head a little elevated the tall man will not have to tiptoe. Now let us place our hands under this patient so as to lift him, the man at the head first lifts the head, placing it in the bend of his elbow, and his fingers resting in the patient's opposite armpit; now the free hand is slipped under the patient's body just above the belt line. As he does this, the other two men place their hands as follows: the one in the middle slips his hands gently under the patient's belt line and under the upper thigh; the next fellow is also placing his hands, one under the knees and the other under the ankles. Now I will work from the opposite side assisting here in the middle to help with the heavy part of the body, my hands being placed as near the other men's hands as possible. Now let us all watch the patient's face so as to keep him level and all lift gently at the same time. Lift him and place him on this

shelf formed by your knees. Now I place this blanket down and you lower him into the center of it, and we will then roll the edges in a tight roll up close to his body; these rolls are our poles. Now we grasp these rolls as follows: the men at the head have a knuckle opposite the ears and elbows, the next at the belt and the crotch, and the last at the knees and ankles. Now in lifting him let us avoid straining our own backs, and to do this we will lift him from our squatting position, the calves of our legs doing the work. Now keep him level, and I want all of you to notice how comfortable this patient appears in this stretcher; it fits snugly around his body.

In carrying an injured patient, you carry him feet first unless you are going up hill or up stairs. If a blanket is used for a stretcher you will note that you can either raise the patient's feet or his head without any danger of him slipping out of this stretcher. No matter how much you elevate either end of the stretcher, still the nap of the blanket clings to the patient holding him in.

If the patient does not have a fractured leg you could very easily lift him by grasping his clothing in this manner, thus using the clothing for a stretcher.

I have taken quite a bit of time to show these methods of emergency first aid; but, remember, I have been trying to show you that in practically each case of accident all that is necessary is for some one with a little first aid knowledge to use his head and hands and some improvised material, and in this way some very effective first aid can be rendered.

Remember, the American Red Cross is conducting four separate courses in first aid, the Junior course for folks from 12 to 17 years of age, the Standard course for folks from 17 years on, and the Advanced course, which is a ten hour additional course and review after you have taken the fifteen hour Standard course. After the satisfactory completion of any of these courses the student is then issued a card from National Red Cross certifying to the fact of his completion of the particular course.

Members of Fire and Police departments, rescue squads of gas and electric companies upon completion of this advanced course are then permitted to wear our little arm brassard on their uniforms which designate them as American Red Cross First Aiders.

We have also worked out another course in first aid called the special course which is taught by members of our national staff. To qualify for this course the applicant must be 20 years of age and have successfully completed at least our Standard course. Those who complete this fifteen hour Special course may then make application for appointment as instructors for their particular organization or industry, and in this way many industries have their own trained instructors and are thus carrying on the courses throughout the year, training all their employees and using it in the interest of their safety movement.

Should any of you desire to organize first aid classes in your community or industry, may I suggest that you contact your nearest local Red Cross Chapter, and they will assist you in any way possible?

If perchance you do not have an active Red Cross Chapter near you, then I suggest that you write directly to the American National Red Cross, Washington, D. C., stating your wants and Mr. Harold F. Enlows, director of First Aid and Life Saving, will advise you as to how best to organize for the courses. The services are free to the community, the expenses of this work being paid out of moneys received each year during Roll Call for memberships, which drive begins on Armistice day and ends Thanksgiving.

CHAIRMAN FORTUIN: All I can say, Doctor, is that if you leave the Red Cross, you will give Floyd Gibbons a run for his money.

W. H. BAKER (J. E. Baker Cement Company, York, Pa.): How may all those who attended this meeting obtain copies of Dr. Fenton's talk?

CHAIRMAN FORTUIN: That is a very good question, Mr. Baker. Here is a copy of the 1930 Cement transactions, and all the talks which are delivered in the Cement Section this year, together with the discussions, are printed in a similar booklet of

the transactions which will be published a few months after this Congress closes, by the National Safety Council.

Dr. W. J. FENTON (American Red Cross, Washington, D. C.): May I answer a question asked me privately here, which might be something of interest to you who wish to know how the courses are secured? They are secured through your local Red Cross Chapters. If you go to them and say that you would like to have one of these instructor's training courses, and ask for a representative from the National Red Cross, you may have one if a class of from twenty to forty people are gathered together. We prefer that you divide it up among the different industries. It may be that you will need three instructors in your industry, and the Fire Department may need two or three, but if a class the size of from twenty to forty people is recruited, the local Red Cross Chapter will, in turn, write the National Red Cross and ask if they may have one of these classes. Then the National headquarters will assign an instructor when he can get somebody who is not busy.

What is the expense? Absolutely none. This is one of the services of the National Red Cross, and is financed out of the annual Roll Call money. There is no expense to your community or to you. Of course each fellow needs a text book and a couple of bandages costing \$1.00, but as far as the instructor is concerned, there is no expense. I probably should have said that in the beginning.

CHAIRMAN FORTUIN: Each year we have attempted to have on our program at least one technical paper. This year the technical paper, which is of pertinent interest to every cement man, is entitled, "Minimizing Pulverized Coal Dust Hazards in Cement Mills." During the past several years we have had some very serious accidents to the coal mill departments of our cement mills, and there has been considerable agitation among cement people as to just how they could be eliminated. The Program Committee, in selecting someone to give this paper, called upon the Bureau of Mines. There is no other organization in this country better qualified to produce a paper of this type than that Bureau. I believe there is no one in the Bureau of Mines better qualified to give us a very fine paper than Mr. Daniel Harrington.

The Minimizing of Pulverized Coal Dust Hazards in Cement Mills

By D. HARRINGTON

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It is desirable that the "cobbler should stick to his last," and as the writer is not exceptionally familiar with the various conditions under which pulverized fuel is used in cement plants, it has appeared advisable to give a brief resumé of coal dust hazards in coal mines and the methods used to overcome them, and finally to make some suggestions as to the problem of minimizing pulverized coal dust hazards in cement mills. It is fully realized that the conditions in the cement plant are not at all similar to those in the mine; hence, some of the comments and suggestions on present or advisable cement mill practices may not be wholly pertinent. Recommendations will be chiefly in quoting from or in giving references to data by persons much more conversant with present-day cement mill practice than the writer.

The main reason for the establishment of the U. S. Bureau of Mines by congressional action in 1910 was the horror which had been caused throughout the country because of numerous explosion disasters in the coal mines of the United States in the years 1907, 1908 and 1909, the intent being to try to do what might be within the power of the Federal Government to ascertain definitely the causes of

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these disasters and to devise and broadcast methods of minimizing or preventing them. Prior to this time it was fairly well understood that while most coal-mine explosions were started by gas, coal dust was the dominant factor in the extension or propagation of explosions; in general, where gas alone was involved the explosion would be local in extent and the explosions which extended over much if not all of the mine were those in which coal dust aided in extending the flame and violence.

While nearly all persons familiar with coal-mine explosions believed even before 1910 that coal dust was instrumental in the extension of the flame and violence of many if not most coal-mine explosions, very few believed that an explosion could start from coal dust alone; in other words, most coal-mining people were of the belief that no explosion could start unless there was explosive gas present. This idea was held notwithstanding the fact that long prior to 1910 there had been explosions disastrous in loss of both property and life in bituminous coal mines where explosive gas had never been found before or after the disaster; one of these was the Winter Quarters, Utah, disaster of May 1, 1900, in which more than 200 deaths occurred as well as much property damage to the mine. This mine had operated for more than 20 years previous to the explosion without ever having found even a trace of explosive gas (and which operated until about 1927 also without explosive gas ever being found.)

Immediately upon coming into existence in 1910, the Bureau of Mines started (and to this day has continued) to study mine explosions in making investigations and reports on the conditions found in practically all major (and many minor) disasters which have occurred in mines in all parts of the United States; in addition, over 1,000 explosions have been staged at the Experimental Mine near Pittsburgh, Pa. As a result of a study of these as well as many other types of explosions, such as in steel galleries, the Bureau of Mines has demonstrated beyond any doubt that widespread coal-mine explosion disasters are preventable; in fact there is now no question that almost invariably where an explosion extending over any considerable area occurs in any coal mine, there has been negligence.

The bureau has initiated nearly 1,000 strictly coal dust explosions in the non-gassy experimental mine and can make these explosions of extreme violence entirely without use of explosive gas. Moreover, methods have been developed to control these coal dust explosions, making them fast or slow, mild or violent, essentially as desired, this including the stopping of the extension of explosions of great violence. In addition to being able to show by these experimental mine tests that coal dust alone can and does initiate as well as extend or propagate explosions, many coal dust explosion demonstrations have been made in flimsily constructed surface galleries using almost any finely divided bituminous or lignitic dust.

In the investigation of explosion disasters in mines there have been many instances of destructive coal-mine explosions initiated entirely from ignition of coal dust and propagated or extended also by coal dust; the Dolomite (Alabama) explosion in 1922 was started but a short distance from the surface in a rock tunnel in fresh air coming from the surface by ignition of coal dust when an electric power cable was ruptured by a runaway mine car; the resultant explosion killed 90 persons in the mine. In 1923, at Dawson, New Mexico, a derailed mine car pulled down the trolley wire at a point a few hundred feet from the surface in fresh air, the coal dust ignited by the resultant arc causing a violent explosion which very badly wrecked the mine and killed every one of the 121 persons underground. In March, 1929, a coal-carrying conveyor broke at the surface of the Kinloch mine in Pennsylvania and went down a 300-foot inclined rock tunnel, throwing much coal dust into the ingoing fresh air and wrecking some electric light wires at the foot of the tunnel; the arc made from the tangled light wires ignited the coal dust and the resultant explosion went out to the surface, wrecking the tippie, and also went into the interior of the mine and killed 46 persons. In all of these cases it will be noticed that coal dust was ignited by an electric arc at a point near the surface and in a

stream of ingoing fresh air from the surface, and that explosive gas had absolutely nothing to do with the starting of these disasters.

The Bureau of Mines' various investigations and studies appear to have established that coal dust is explosive in proportion to its fineness, dryness, freedom from incombustible matter, and the relative amount of volatile combustible matter to fixed carbon plus volatile combustible matter. The latter qualification indicates that high-grade anthracite dust or graphite would be practically non-explosive under conditions likely to be found in a mine, while fine dry bituminous and lignitic dusts are likely to be dangerous, and dusts of such hydro carbon solids as gilsonite are almost as explosive as gunpowder. It appears that under some circumstances lignitic or bituminous coal dust as large as 20 mesh may enter into the propagation of an explosion; dusts of lignitic or bituminous coal of which a considerable percentage is as fine as 100 mesh will not only propagate but will also ignite readily to initiate an explosion, and when fineness of an appreciable percentage of bituminous or lignitic dust is such as to pass through a 200-mesh screen, both ignitability and explosibility are great, especially if the dust is dry.

Tests under mining conditions show that while a very small quantity of finely divided lignitic or bituminous coal dust will extend or propagate an explosion, it requires a decidedly dense dust cloud distributed through the air before coal dusts will ignite to start an explosion in a mine. Bureau of Mines Report of Investigation 3,132 issued in August, 1931, states: "Tests in the experimental mine have shown that the lower limit of flammability through 200-mesh Pittsburgh coal-dust lies between 0.032 and 0.080 ounce per cubic foot under the conditions there obtaining. It appears the limit will be not far from 0.05 ounce per cubic foot. This very small amount is equivalent to three ounces per linear foot in an entry of 60 square feet in cross section. Such an amount distributed over all the surfaces could be detected only by careful examination." While it is seen from the above that a very small quantity of very fine lignitic or bituminous coal dust will extend or propagate an explosion which has had a start, on the other hand, it has been found that even very finely divided dry dust-air mixtures will not be ignited by an open light unless the dust cloud is so dense that ordinary types of lighting can not penetrate the dust-air mixture; however, an electric arc appears to have less difficulty in igniting a coal dust-air mixture than does the usual open light.

Research in foreign countries developed, and in this country very definitely confirmed, the fact that the quickness and violence with which coal dust ignites depends largely on its freedom from incombustibles such as moisture and ash; and it is from this fact that the present day methods of combatting widespread mine explosions have been devised. While nearly every coal has its own degree of explosibility, it has been found that even with the most explosive of the lignitic or bituminous coals (and in general this means those with the highest percentage of volatile combustible matter) if the finely-divided dust is mixed with finely divided incombustible (rock) dust (fineness such that at least 50 per cent goes through 100 mesh) to such an extent that 60 or more per cent of the whole is incombustible, not only will the mixture fail to ignite under conditions which obtain in a mine but also if thrown into the air it will stop the extension (or propagation as it is called) of the flame of an explosion which has been started, provided the flame is not being fed by explosive gas (methane usually in coal mines). In other words, the rock-dusting method (the covering of all surfaces in coal mines with rock dust) will prevent coal dust from aiding in the extension of an explosion, but it will not prevent the continuation of an explosion if there is around or over 5 per cent of explosive gas (methane) in the air; and if there is explosive gas in the air (but less than 5 per cent) there must be added approximately 10 per cent more incombustible to the coal dust-rock dust mixture for each per cent of explosive gas in the air if the mixture is to prevent extension of the flame (and violence) of an explosion. Therefore, if there is 2 per cent of methane in the air, the usually recommended 60 per cent incombustible in the coal dust-rock dust mixture on the mine

surfaces will not be sufficient to stop the extension of an explosion which has had a start; while the 2 per cent methane in air in itself will not ignite or explode, it will aid in the participation of coal dust in the combustion unless there is added to the dust mixture approximately 10 per cent more incombustible for every per cent of methane in the air. Hence for 2 per cent methane in the air 20 per cent additional incombustible must be added, thus bringing the incombustible in the coal dust-rock dust mixture to 80 per cent. While rock dusting in coal mines has its difficulties and also its limitations, and while it has been adopted only to a slight extent, there is no question that it is practicable and effective; there are few if any coal mines in the United States which can not be kept thoroughly and effectively rock dusted for approximately one cent per ton of coal produced; and during the present year there have been at least two cases in which large numbers of lives have been saved by the stopping of explosions by rock dust. In fact there is very good reason to give rock-dusting much of the credit for the excellent record of the bituminous and lignitic mines of the United States for having had not a single major explosion since January 28, 1931, or over eight months, by all odds the longest period in the past 30 years without the occurrence of a major explosion in our lignitic and bituminous coal mines.

The effect of moisture on the explosibility of coal dust is complex; there is no question that finely divided coal dust in the air in a cloud is explosive eventually in proportion to its dryness other conditions being equal; and on the other hand there is no question that finely divided lignitic coal dust with high percentage of inherent moisture (such as 20 per cent or over) is likely to fire spontaneously upon being stored for a relatively short time, and in handling such fire and explosion may occur. It has been found in testing the very explosive dust of coal from Utah at the Experimental Mine that fine dust which has absorbed water approximately to saturation will propagate an explosion violently if this dust is thrown into the air in the face of the oncoming flame of an explosion; however, under usual mine conditions the coal dust which has absorbed moisture to saturation (or in most cases much below saturation) in general sticks to surfaces and does not get into the air to nearly as great an extent as dry dust, and so does not feed the flame of an oncoming explosion; in this way moistening methods have a definite value in preventing the start as well as the extension of explosions in mines. As applied to mine conditions, moistening methods are not likely to be so dependable as rock dusting. In that application of both rock dusting and moistening methods is likely to be intermittent; evaporation quickly dissipates the good effects of moisture, sometimes within a very few hours, while rock-dusting may remain effective for considerable periods, in some isolated cases for months or years.

As a result of the studies made by the U. S. Bureau of Mines on coal dust explosibility in mines and to a more limited extent in industrial plants, the following conclusions and suggestions are made with a view to the minimizing of pulverized coal dust hazards in cement mills.

1. In mines coal dust (material all of which goes through a 20-mesh screen) is explosive about in proportion to fineness, to dryness, to lack of incombustible matter (such as ash and moisture), and to the relative amount of volatile combustible matter to total combustible (volatile combustible matter plus fixed carbon):

2. From the above in so far as concerns mine conditions, coal free of incombustible matter such as ash and moisture is explosive in proportion to fineness, dryness and volatile combustible, and this would class all of the present-day solid fuels except the high-grade anthracite and coke as explosive; however, with the higher long-sustained temperatures which obtain in the usual furnace these is every reason to believe that dusts of low volatile fuels such as anthracite coal or coke may also under some conditions be violently explosive. Hence it would appear advisable in pulverized fuel practice to treat the dusts of all of the present-day solid fuels from low-grade lignite to the highest-grade anthracite or coke as explosive.

3. While a very dense cloud of finely divided coal dust must be present in air in order to have explosive ignition by an open light such as a miner's oil or carbide lamp or from an electric arc, a comparatively violent ignition may be obtained from a very small quantity of finely divided pure coal dust if present in a dense cloud in the air; and in coal mines as small a quantity as 0.05 ounce of Pittsburgh seam coal through-200-mesh dust per cubic foot of air is sufficient to feed and extend an explosion violently. This amount is so minute as applied to coal-mine workings that no coal mine can be so free of coal dust as to be immune to the danger of propagation of an explosion by coal dust, in so far as the amount of dust present is concerned. The application of this fact to cement plant installations is not particularly direct as concerns some of the large-area, large-volume openings in those plants, but is of direct application in furnaces or bins where there is cross-sectional area and hence where the volume of air space is similar to mine areas; for instance, 3 ounces of coal dust per linear foot of entry in the experimental mine near Pittsburgh, Pa., with entry cross-sectional area of 60 square feet (5 by 12), is sufficient dust to propagate an explosion with violence, this cross-sectional area being not particularly different from that of some types of furnaces. Hence, in confined places, very small quantities of finely-divided coal dust are sufficient to cause an explosion to "carry on."

4. As dryness increases the explosibility of coal dusts, and as the dust used in cement plants is usually, if not invariably, dried, cement plant usage thus is faced with one of the dangerous features of coal dust.

5. Cement plants generally use the higher-grade fuels, though some lignitic coal is utilized. In drying, much of the moisture is driven off, leaving as the incombustible material only the ash, which is generally less than 10 per cent of the coal, or much too low in percentage to aid in the prevention of explosive ignitions of coal dust-air clouds. While in mines dust explosibility can be prevented when incombustible is around or over 60 per cent (unless explosive gas is also present), there is good reason to believe that under furnace conditions with confined space, high temperatures, and long sustained heat (rather than the practically momentary flash found in coal-mine explosions), dust with much more than 60 per cent incombustible would explode, though unquestionably there is some point at which preponderance of incombustible would prevent explosibility of a finely divided dust containing both combustible and incombustible matter. However, it would be well to consider all coal dusts used in cement mills as likely to explode where mixed in air in a dense cloud.

6. Spontaneous combustion, whether of coal or of many other substances, is by no means well understood, notwithstanding the mass of published data on it; some coals unquestionably are much more likely than others to fire spontaneously, but on the other hand some conditions appear to cause almost any type of coal to fire spontaneously. Lignitic coals with their high moisture content are particularly likely to spontaneous firing unless stored under water; fuels, especially in dust form, which have been subjected to drying methods seem very likely to fire in storage under some conditions; some fuels with high sulphur (sulphide) content seem to fire quickly, especially when subjected to moderately high air temperatures, while other high-sulphur coals seem relatively immune from this trouble; coals in storage subject to alternate wetting and drying seem to fire rather readily in some cases; coal dust in air forced at high velocity in tubes appears to acquire charges of static electricity which when discharged may cause fires (sometimes explosions). The net result of consideration of the matter of spontaneous firing of pulverized fuel is to think of all pulverized fuels as likely to fire spontaneously and to take the utmost precautions at all times against such occurrences.

7. From the foregoing it appears that under current plant conditions almost any coal in pulverized form may explode or it may fire spontaneously; hence every known precaution which it is feasible to take should be taken against both spontaneous firing and explosions. In general the cement plant has before it essentially the problems confronting coal mines in the prevention of dust explosions and ignitions, with

added difficulties in certain phases and with much less serious conditions in other directions. The added difficulties are the fact that all of the coal used in the furnaces must be very finely divided while in coal mines there is present only a small percentage of the small sizes of coal which are explosive or which are likely to fire; in cement mill practice flame must be brought in contact with the finely-divided dust, while in coal mines there is no real necessity for flame; in cement mill practice high velocity dust clouds must be handled in pipe, with the probability of causing static electricity, which is not to any considerable extent a hazard in coal mines; at least at times finely-divided dust at high temperature must be stored in bins or held in dryers, a hazard not found in mines; and in cement mills very high temperatures for long-continued periods are encountered by finely-divided dusts, thus again differing from the conditions in coal mines. The advantages of the cement mill are that the dust hazard exists in but a few places, the dangers are well known, conditions are subject to control of a few well-trained employees, and the plant is usually designed to care for the possible difficulties; the coal mine is at the opposite end of the dilemma in all of these very essential features, and notwithstanding this is slowly but surely overcoming the coal dust, fire, and explosion hazards.

8. Some excellent publications are available as to advisable precautions against occurrence of fires or explosions in pulverized-coal plants and as to procedure in case of starting of fires or explosions; the National Board of Fire Underwriters in 1927 issued Regulations for The Installation of Pulverized Fuel Systems, and has several other codes or treatises applicable to this problem; in 1927 the Bureau of Labor Statistics of the U. S. Department of Labor issued Bulletin 433, entitled "Safety Codes for the Prevention of Dust Explosions"; the National Safety Council has various safe practices pamphlets such as Safe Practices Pamphlet No. 31, "Fire Causes and Prevention" issued in 1927; Safe Practices Pamphlet No. 34, "Industrial Explosion Hazards," issued in 1930; and a new Safe Practices Pamphlet No. 97, entitled, "Safe Operation of Pulverized Coal Systems," issued in 1931. All these pages give data of value to those confronted with the hazards of fire or explosions in using pulverized coal; and Bureau of Mines Bulletin 242 issued in 1925 on "Explosion Hazards in Industrial Plants Through the Use of Pulverized Fuel" and Serial 2242, "Coal Dust Hazards in Industrial Plants," have pertinent facts not only on fire but on explosions due to pulverized coal.

In conformity with the idea that "the cobbler should stick to his last," instead of giving specific recommendations to the cement industry as to advisable procedure of a specific nature toward minimizing pulverized coal dust hazards in cement mills, the following recommendations are abstracted voluminously from an excellent paper by D. B. Coleman, safety director, Missouri Portland Cement Company, St. Louis, Mo., which was presented at the Regional Safety meeting of the Portland Cement Association, St. Louis, Mo., on February 24, 1931. The data and suggestions by Mr. Coleman are much more to the point than could be given by any person outside of the cement industry:

"Within the coal mill building, the best way to prevent the formation of dust in dangerous quantities is to keep the place scrupulously clean. One operator saw his department filled with flames when vibration from a quarry shot brought down clouds of dust from the rafters. Unfortunately the fire door to the drier furnace was open at the time. Another had a similar experience when a compressed-air line broke, blowing dust toward the furnace.

"The work of house-cleaning must be carefully planned and executed, for in such an arbitrary measure one certainly would not want to create the very condition we are trying to avoid, namely, dust formation. As was the weekly plan in one plant, a hose was turned into the drier furnace and all fires apparently extinguished. A crew of ten men were put to work sweeping down coal dust, starting from the top of the building. Within a few seconds the entire place was filled with dust. From some unexpected source it was ignited. Nine of the ten men were burned to death.

"The road to another accident was paved with good intentions when compressed air was used to blow the dust from the tops of the boilers in a power plant. Naturally, it was immediately put in suspension and exploded when it reached the fire door of the boiler.

"As an aid to safe cleanliness it is recommended:

"That buildings be designed to secure minimum lodgement of dust. With this in mind one coal building was actually built with the siding on the inside of the purlins. In existing buildings it may mean putting sloping shields over purlins and roof members, on which dust can not accumulate;

"That wherever possible the building be designed so that the interior parts on which dust might lodge will be accessible for cleaning;

"That the inside surface of walls be as smooth as possible;

"That there be liberal use of white or light colored paint. It will not only give more light but will have a marked psychological effect;

"That screw conveyors and belts be carried on solid flooring to prevent excessive dust formation in case of spill;

"That dust in the building be avoided by the use of dust collectors. If a cloth type is used it should be enclosed in a metal case and the fabric electrically grounded;

"That if compressed air must be used, it be only in connection with a water spray after careful experiment. Air may be used for blowing out motors and such inaccessible places, but it is advised that this be done just after the room is cleaned;

"That if large quantities of dust must be swept, it be carefully wet down prior to sweeping;

"That a vacuum cleaner is most desirable. In event it is installed: (1) It should be of the permanent type because of the hazard attending the use of the flexible cable on the portable type. (2) The nozzle and handle should be of non-ferrous metal, fibre or other non-sparking material. (3) Hose, nozzles, handles, and other metal parts should be electrically grounded to the piping system and that system in turn grounded to the earth. (4) Dust separation should take place before the dust reaches the exhaust. The discharge of the separators shall be carried outside the buildings. (5) The motor and separator should preferably be located outside the pulverizer room.

"Dust within equipment presents an extreme hazard because of its confinement. When ignited there is usually a wreck with personal injury or loss of life.

"Two repairmen entered an elevator casing, one carrying a lighted torch. The other man hit the chain with his hammer, intending as a joke to shower his partner with dust. Both men were blown out the top of the casing, one killed, and the elevator wrecked.

"Six men entered an almost empty coal bin to shovel out the remaining coal. Of course a cloud of dust was created which by some means was ignited. The bin was wrecked and six men burned to death.

"A night-shift oiler was forbidden to bring his lantern, which he carried coming to work, inside the coal room. One night he got by with it and used it inside the mill while oiling the rolls. He apparently forgot his lantern, closed and started the mill. He and the mill were blown to pieces, another man burned to death, and the building wrecked.

"At two different plants coal tank men lifted the covers to inspect tanks which were being filled. In each case a cloud of dust drifted out, became ignited, burned the men to death and wrecked the bins.

"To prevent explosions of the type just mentioned, it is recommended:

"That of course all equipment be kept as dust tight as possible.

"That safety relief vents be provided on all necessary equipment.

"Tank vents should be large enough to prevent building up abnormal pressure

therein. Safety relief vents from pipes or flues should have at least the same area as the pipes or flues vented, and should lead by the shortest possible vertical direction to the outside air;

"That all tanks have smooth inside surfaces and be so shaped that the minimum of material hangs up in the corners;

"That all joints be riveted, and rivets spaced to insure a dust tight joint, and joints caulked or welded;

"That the bin be so designed that the coal is introduced tangentially against one of the sides in order to reduce the size of the dust cloud;

"That all bins be equipped with high bin signals;

"That no manhole or inspection door be opened while the tank is being filled;

"That hammering on hoppers be prohibited, for it eventually causes leaks;

"That no mill or elevator be entered within 20 minutes of shut down, in order that dust may settle;

"That when working in equipment there be the least possible creation of dust."

"Obviously if we are successful in our efforts to prevent formation of dust, there is no ignition problem. However, we will have to reach the idealistic stage before we can disregard this hazard.

"Explosions are caused by open fires, electric sparks, metallic sparks, spontaneous combustion, driers and smoldering fires in equipment.

"Torches in a coal room are flagrant violation of good sense. Four men were burned in an elevator casing from the resulting explosion when one of them entered with a lighted torch.

"At another plant an operator opened an elevator casing to tighten a loose chain. He set a torch, borrowed from the kiln room, in one of the buckets and shook the chain to see how loose it was. A cloud of dust came down, ignited and burned him so fearfully he died shortly thereafter.

"On any number of occasions flashes have resulted from coal dust being blown to open furnace and kiln hood doors.

"All open lights, torches, salamanders and smoking should be prohibited in the coal room.

"Coal tanks should be located as far from kiln hoods and drier furnaces as is consistent with operating requirements.

"That part of the building around the firing end of driers and kilns should be kept particularly clean of coal that might be carried, by wind or vibration, as dust to the fire doors.

"Even locomotive sparks are a source of ignition, as shown by the fact that of 78 grain dust (very similar to coal dust) explosions and fires in 1929, 15 were traceable to this source."

"Electrical equipment is an occasional source of ignition. In one plant a short circuit of one of the armature coils of a 25-H.P. 500-volt D.C. motor ignited the coal dust accumulated inside the motor casing and initiated the explosion of dust throughout the building.

"Another explosion was caused by an electric spark from a blown fuse on the switchboard at the very moment a cloud of dust was formed by the breaking of a 6-inch drive belt.

"A \$650,000 explosion in a Kansas City grain elevator in 1919 killed 14 men and seriously injured 10 others. Evidence indicates that a short circuit was caused by a defective extension cord or by breaking an unprotected light bulb in a dusty atmosphere.

"There are any number of cases where light globes have been broken or exploded in coal tanks, the glowing filament then igniting the suspended dust in the tank.

"Several explosions in a plant, one of which seriously injured six men, resulted

in the discovery that a 20,000-volt charge of static electricity was being built up and discharged in a cloth type dust collector.

"Other causes of static charges are contact of rapidly moving parts of machinery, such as belts, rollers, balls in pulverizing mills, fan blades and particles of fine material being rapidly conveyed through chutes and spouts.

"To reduce the fire and explosion hazards of electrical equipment, as just illustrated, it is recommended:

"That as far as possible all wires and cables in the coal pulverizing department be carried in conduits;

"That unless the coal room is kept free from dust, switches be placed outside the building. If this is not feasible, they should be of the oil-immersed type;

"That provisions be made to cut off the light and power at some remote point in event of explosion or fire. This avoids the need of entering the building.

"That motors not properly enclosed or protected against ignition by sparks at the commutator have no place in the coal room. Motors of the non-sparking type, preferably squirrel cage motor, are the most nearly explosion proof now available.

"That the bulbs on extension cords be protected by a heavy wire guard and that connections and insulation be inspected frequently. It is even more desirable that lights of the flashlight type be used instead of extension cords.

"That where there is any possibility of the formation of a static charge, the equipment be grounded. This will dissipate the charge as it is generated.

"That coal tanks, conveying lines or pipe lines should not be used as supports for light or power lines, except where such lines are carried in conduits."

"Lack of evidence of explosions due to metallic sparking does not mean the hazard is unimportant.

"Magnetic separators should be provided ahead of all pulverizers of other than ball and tube mill type. Coal that has passed the separator should then be protected to prevent re-entry of foreign material. Separators should be protected by interlock or alarm systems to prevent passage of coal when not magnetized. In connection with sparking, it is interesting to note that the National Board of Fire Underwriters state that "Non-ferrous metals need not be used in the construction of fan blades or lining of fan casings."

"Unsuspected fires in equipment have caused immense damage.

"In one case the boilers were shut down and fire apparently killed for the regular weekly inspection of the coal mill. The fan was started up to clear the mill of coal, the dust blown into the boiler. A few minutes later there was a terrific explosion, the dust ignited by some embers in the fire box. The shift engineer was blown into the air and killed, the superintendent and mill operator sent to the hospital for four and eight months respectively and the boiler room wrecked."

"In another coal grinding department the building was wrecked and 12 men killed when the department was again started up after a fire in an elevator boot was thought to have been extinguished.

"In another plant an explosion occurred, burning 8 repairmen to death. While the mill was being repaired one of the men rammed a stick with some waste on it into the part he was cleaning. Smoldering fire apparently ignited the waste, which in turn ignited the dust created by the repair work. There was a flash in the mill and then flames traveled back and forth several times across the room with a strange hissing noise, apparently the result of dust shaken from overhead by the first flash in the mill.

"It is recommended:

"That when the fan is to clear the mill of coal, the induced draft fan be placed

in operation or the stack draft be wide open before the mill and exhaust fan are started;

"That a lighted torch always be placed in front of the burner, even though boiler or kiln are down;

"That the system be so interlocked that the mill and fan cannot be put in operation ahead of the induced draft fan;

"That all equipment be regularly inspected for smoldering fires, particularly before being opened for repairs; a fire may smolder in the system in operation without damage, due to lack of air. Opening the system and starting repair work may create the proper dust suspension for an explosion.

"That when a fire is found in equipment, except tanks, it be carefully flooded with water and then shovelled out of the system."

"Spontaneous ignition, though a serious problem, never causes an explosion unless the dust is stirred up, allowing suspension in air. To prevent spontaneous ignition, it is recommended:

"That a study be made of the coal used at each plant to determine its susceptibility to spontaneous ignition;

"That storage tanks be located as far as practicable from boilers, kilns, steam pipes, or other sources of heat;

"That they be regularly inspected inside and out when coal is stored for any length of time, to determine whether there is any increase in temperature or whether there are fumes from smoldering fires;

"That whenever a plant is idle for more than two days, all tanks be thoroughly inspected before resuming operations;

"Whenever possible, all pulverized coal should be burned before the plant goes down;

"That no coal, crushed or pulverized, be stored when its temperature exceeds 150° F."

"Now for the drier. There is almost no doubt that the keystone to safe operation of a coal department is in the proper operation of this piece of equipment. The majority of explosions and fires can be traced directly or indirectly to overheated coal, which is generally caused by either too hot a fire in the drier furnace, or the continuance of the fire after the drier has been shut down with coal in it.

"One typical case from the many will suffice. The pulverizing mill in a cement plant had been shut down for full kiln tanks. Just as it was being started a few hours later it exploded. The attendant shock brought down accumulated coal dust from overhead which in turn exploded, wrecking the building. Two men were killed. The investigation proved the explosion due to one of two sources. Either some hot coal remained in the mill when shut down and grew hotter until it needed only the additional air supplied by the simultaneous starting of mill and fan, or, due to drier operator's neglect, the coal was practically red hot when fed to the mill.

"To help in the safe operation of driers, it is recommended:

"That equipment be so interlocked that when the drier is shut down there is no continued heating of the coal;

"That operation be controlled by temperatures taken of the coal at the discharge of the drier. Such control compensates for variations in coal moisture and feed. Usually 90° to 125° F. on drier discharge will dry most coals satisfactorily;

"That there be a temperature indicator and alarm system in the range of vision and hearing of the drier operator;

"That if the coal is at all variable, automatic temperature control systems may be a good investment;

"That when necessary to reduce drier temperatures this be done by lowering air temperatures rather than air quantities;

"That in direct driers, the gases of combustion should not come in direct contact with the coal before at least one-half way back in the drier, in no event within 12 feet of the fuel bed;

"That the drier be run empty before shutting down;

"That shavings or other light inflammables should not be used in starting drier furnace fires;

"That operating schedules be so arranged that no dried coal is stored for more than 24 hours;

"That the drier operator be a reliable man who thoroughly understand his business."

"Overheating of bearings is another source of ignition. This hazard may be eliminated:

By frequent inspection and oiling.

By keeping bearings, in fans particularly, on the outside of equipment.

In case of unusual hazard, by a bearing alarm system."

"A coal dust explosion can not be handled. It must run its course. If it is not prevented, the next best measure is to see that there is sufficient fire fighting equipment to fight the subsequent fire, to be used only after all dust has settled and after the circuit breaker is knocked out.

"In case of bin fires:

"A:—Cut off the coal supply to the storage bin.

"B:—Shut off the carrier air supply to the bin.

"C:—Close the bin vent damper. If the damper is automatic, make sure that it has properly closed.

"D:—Make sure that all other openings into the bin, other than the feeders, are tight.

"E:—The foreman, fireman, or person in charge should be notified at once. It is this man's responsibility to exercise his judgment and determine whether the fire can be extinguished by its own fumes. If the fire has not gained headway and the bin has been tightly sealed, the fire will die because of lack of oxygen.

"F:—In some cases where the fire has gained considerable headway, the vent damper may be damaged or the seams may have opened. It is important that every effort be made to close these openings with water soaked non-combustible material.

"G:—When all of the bin openings have been tightly closed and the vents sealed, this will prevent the circulation of air and will create an atmosphere high in carbon dioxide. When all of the available oxygen in the bunker has been exhausted, the fire in most cases will smother out.

"H:—Live steam or inert gases may be used to smother a fire if it gains headway. Steam and water should be used carefully as it may create a dust cloud within the bin, and thus set up an additional hazard of explosion. Water should not be used unless absolutely necessary. It has little value in putting out a fire in large quantities of pulverized coal and makes it practically impossible to use the feeders.

"I:—The bin should be emptied as quickly as possible, even while the fire is in progress, by feeding coal to the kiln. This emptying process should be carried on regardless of the difficulties experienced in the feeders due to lumps of coke.

"J:—If it is impossible to feed the coal to the furnace through the feeders, the bin should be sealed and the fire completely extinguished before the bin is opened.

"K:—Care must be exercised in opening a bin which has been sealed to extinguish

a fire, so that any flammable gases which may have been generated during the time the bin was sealed will not be ignited when it is opened.

"L:—If all attempts fail to clear the feeders, men must enter the bin. In all cases, it should be thoroughly ventilated to eliminate any fumes and to make sure that the fire is really out. This work should be in charge of responsible parties. Men entering the bin should be equipped with positive pressure helmets or oxygen breathing apparatus, and also with life belts and life lines. Life lines should be in charge of a second worker outside the bin, and the man inside should be watched at all times.

"M:—In some cases it will not be necessary to empty the bin after a fire, but when doing so, coal should never be discharged on the floor through the opening in the bottom. It should be removed either by disconnecting the feed pipe and discharging into buckets, or by bucketing the coal cut through the top manhole. Fire of bulk coal in other equipment may be fought by the same measures.

"Even though the coal pulverizing system is efficiently designed and the most effective safety devices are provided, much of the value of these safeguards is lost if plant operatives are not educated to note and avoid potential dangers. Several of the incidents mentioned illustrate this fact, for example, the accident caused by the lighting of a torch in the elevator of a crushing plant and that caused by a fireman neglecting a drier furnace until hot coal was carried from the drier to the pulverizer.

"It is of utmost importance that the men in the plant, and also those who are in and around kilns which are using pulverized coal, should be impressed with the idea that coal dust is explosive and inflammable when in a cloud and mixed with the proper amount of air, and that it should be treated just as carefully as natural gas."

After having quoted so voluminously from Mr. Coleman, it seems pertinent to quote also from a tersely worded letter by Mr. W. P. Rice which appeared in the August, 1931, Monthly News Letter of the Cement Section of the National Safety Council. Mr. Rice gives some excellent suggestions:

"Almost every one using powdered coal knows its hazards, and that the explosions are caused by a proper mixture of powdered coal and air becoming ignited by some means. The methods of preventing these explosions fall in two general classes. The one, to eliminate the source of ignition, the other, to prevent the mixture of coal dust and air in explosive proportions.

"The most obvious, easiest and most discussed is the first—the prevention of ignition. The rule against the use of open flames near coal dust is generally understood and enforced—so needs little discussion. Electrical sources of ignition are more apt to be overlooked. Faulty lamp cords that may cause a spark; the breaking of lamp globes; arcing brushes on motors and electrical tools, are all means of ignition that need careful watching.

"The coal dryer is often the means of starting an explosion, and requires careful control. The use of temperature-recording instruments that will indicate the temperature of coal discharged from the dryer are highly recommended. The temperature should be kept well below the ignition point of the coal.

"When a fire does occur in the dryer the first thought should be to exclude the air, by closing the stack dampers or by other means. The obvious method to put out the fire is to use water, but it is much better and more convenient to spray the water on the fire in the furnace, not the dryer, and allow the resultant steam to smother the fire in the dryer.

"The second general method of eliminating explosions is by preventing the proper mixture of coal dust and air, by keeping the dryers, grinders, elevators, conveyors and tanks as nearly dust tight as possible, and this is necessary for general appearance as well as safety.

"A study of coal dust accidents proves that the secondary explosion is the most disastrous. These are caused by the concussion of the first small explosion dis-

lodging the accumulated dust on the building and machinery structure. This dust in falling becomes ignited and spreads the explosion over the whole room, often wrecking the building and burning men who would otherwise have been out of range. When explosions result in the roof being blown off, windows, doors and walls being blown out, it is almost always the result of the secondary explosion. The only remedy for this is cleanliness, not only of the easily accessible places but every nook and cranny of the building. As a means to this end, the painting of the entire inside of the building white is strongly recommended. Then an accumulation of coal dust can hardly be overlooked.

"If a coal-dust explosion were to occur in an open field, the danger would be greatly lessened. Therefore, to make the coal plant approach that condition is to make it safer. The tendency of an explosion is to go up. The roof should be high and equipped with a large monitor open on the sides. In addition, the side walls should leave a wide opening between them and the roof. Doors and windows should be large and kept open winter and summer. The best windows consist of wide metal louvers or shutters, rather than glass. The louvers as well as the doors should be closed only when it is necessary to keep out the rain and snow.

"Then the draft through the building will tend to lessen the accumulations of coal dust. If an explosion should then occur, it will have room to expand and often save the building and the men in it."

Conclusion

In this paper an attempt has been made to analyze some of the fundamentals in the hazards connected with the use of pulverized fuel; some of the experiences and research information of the U. S. Bureau of Mines are given. When applying the data to specific recommendations as to the best methods of avoiding or of overcoming these hazards, it has been deemed advisable to borrow from recent data issued to persons within the cement industry who are familiar with operating conditions and practices and hence are competent to make definite suggestions. For the material so presented, due acknowledgment is given to Messrs. Coleman and Rice.

Discussion

CHAIRMAN FORTUNE: That certainly was a very fine paper, and I think we all should consider it of inestimable value to the cement industry.

Are there any questions anyone would like to ask Mr. Harrington or Mr. Coleman? Mr. Coleman is here, and as you recall, Mr. Harrington quoted from Mr. Coleman's paper.

J. E. CARLSON (Universal Atlas Cement Company, Chicago, Ill.): It is rather hard to discuss a paper of this length upon one reading. Will this paper be distributed later?

CHAIRMAN FORTUNE: The paper will be in the cement transactions which will be published about the first of the year. All of the discussion and the papers verbatim will be published in the transactions. They can be secured from the National Safety Council at that time.

Mr. CARLSON: I congratulate Mr. Harrington for a very good paper on coal dust explosions which he seems to have covered very thoroughly.

In the cement industry, I understand that there have been explosions in the coal grinding departments mostly in the dust collecting systems. We have had some minor explosions, but none have been of any serious nature, and I hope we will not have any.

Dust explosions can be materially reduced by proper design of the equipment. What I have in mind is to eliminate as much as possible all shelves for dust to lodge on. All piping in connection with dust collecting systems should be of such a size that the speed of the dust-laden air should have a velocity of about 4000 feet per minute.

This will eliminate the dust settling in the pipe system which may at some time catch fire and be the cause of a serious explosion and damage, or wreck the buildings and equipment, and even result in fatalities or serious injuries.

In the early days of the cement industry, not much thought and study were given to the design of buildings covering the coal grinding equipment to prevent explosions due to coal dust settled on the truss members being shaken down by small explosions resulting in a heavy secondary explosion. For that reason, buildings over coal pulverizing equipment should be so designed to prevent all ledging and shelving as much as possible.

Explosion danger in coal mines is minimized by rock dusting. Such a practice in coal grinding buildings might be employed with similar results.

It is also in order to keep the grinding and conveying system in good repair and eliminate all possible leakage. It is also a good idea to use the vacuum cleaner at least once a day.

A Method of Cleaning Coal Switches

JACK DEMPSTER (Canada Cement Company, Ltd., Port Colborne, Ontario, Canada): I would like to ask Mr. Harrington a question which at first will seem obviously unfair as he is not with the cement industry, but it will bring out a point. We will assume just a hypothetical condition as applied to a hypothetical plant. We have four or five switches in the coal mill operating four or five mills. These switches become coated with a very fine coal dust. We have a compressed air system to clean our coal switches. Now these switches certainly must be cleaned, else the coal dust will get around them. I suppose right away you will condemn the method of using the compressed air to clean the coal switches, because you will say that raises a cloud of coal dust which may, just at that time, be in the proportion to cause an explosion or ignition to take place, and there will be a chance of a spark some way or other. What method would you advise to clean these coal mill switches?

Mr. HARRINGTON: I am afraid I am not going to be able to give you very much on that. Of course the obvious thing would be to cut off the current. If that cannot be done, you have to take the chance of the explosion. We have in mines a condition which many of us have marvelled at as not having caused an accident thousands of times. In the mining of coal, it is generally underground by machinery, and many, if not most, of the machines are run as we call "dry"—without the use of water. That throws into the air enormous clouds of dust. The dust is so dense that you could not see me, or I you, at a short distance, and yet men work in those places with open lights and apparently without having caused explosions, at least we have never been able to tie an explosion to that particular thing, but many of us have marvelled that it has not occurred.

On the other hand, we can take a carbide lamp, put it into a small box such as we use for testing purposes, do essentially the same thing as we are talking about, throw a jet of air into some coal dust, force that dust onto that carbide lamp, and we will get an explosion ninety-nine times out of a hundred, and that is with a flame which is less intensely hot than the electric arc.

As to your problem, of course if you can't do anything else. I would say your compressed air is about as good as you can do, but always with the possibility that you may get that explosion. You may do it one thousand times without it, and then you might get it.

J. J. FORBES (United States Bureau of Mines, Pittsburgh, Pa.): I want to have them used in closed switches.

CHAIRMAN FORTUNE: I think, though, the suggestion that Mr. Dempster brought out about cleaning the coal or cleaning up the coal house, and the various methods used in doing that, might be a good thought if we asked for the practice that various organizations are using. I see Mr. Coleman is here from Missouri, Mr. Powell

from Medusa, and Mr. Hunt from Nazareth. They are all engineers. Let's hear what your practices are.

F. B. HUNT (Nazareth Cement Company, Nazareth, Pa.): I think the answer to Mr. Dempster's question is to relocate your switches where there is no coal dirt. It is the safest plan to install an oil immersed push button and take your switches out of the coal-laden dust.

J. E. CARLSON (Universal Atlas Cement Co., Chicago, Ill.): How about the vacuum cleaner?

D. B. COLEMAN (Missouri Portland Cement Company, St. Louis, Mo.): I think, by all odds, the vacuum cleaning method is the most satisfactory, although probably the most expensive. In our plant, we have not been able to find the money to put in a vacuum cleaning system, so we are going back to the water can. We are moistening down the coal and the dust accumulated on the floor, before we sweep it up, but I want to stress this point. Someone might object to the method, claiming that if water is mixed with too much coal dust, it leaves a thin scum or film on the floor. Our coal room is not allowed to become that dirty. It is swept up regularly enough so there is a very thin film of dust on the floor at any one time.

CHAIRMAN FORTUIN: Mr. Powell, won't you say a word?

Other Cleaning Methods

W. M. POWELL (Medusa Portland Cement Co., Cleveland, Ohio): We keep our plants as clean as we can from day to day by the broom method, and on occasions by wetting the coal down. I believe the vacuum cleaning system would be good, but if you have to blow it, why wouldn't it be possible to use a blower so that you could distribute evenly cement dust or rock dust with the air, and get the proper mixture so it would be impossible to ignite?

CHAIRMAN FORTUIN: In many of our plants we have enclosed the units of operation to such an extent that there is practically no waste dust; in other words, the mills have been sealed. Is there any reason why you could not extend that, with limitations, to the coal house? Isn't there perhaps a reluctance to go into the coal mill and seal the mills because some one has said that the more air or drafts you have running through your coal mill, the less chance there is of an explosion?

Mr. COLEMAN: We had the old ball and tube mill set up until about a year ago, and then we switched over to a new kiln mill. To those of us not familiar with the new mill it looked like an ideal method of taking the roof off the building, but a study of it showed that the quantity of warm air drawn in off the furnace for drying and separating the coal, is not of sufficient quantity to propagate or sustain an explosion.

A. J. R. CURTIS (Portland Cement Association, Chicago, Illinois): Isn't there a great deal less dust going around than by the old method?

Mr. COLEMAN: Yes.

CHAIRMAN FORTUIN: May we hear from Mr. Stanley Owens.

STANLEY OWENS (Portland Cement Association, Chicago, Ill.): The records over a period of years show very gratifying decreases in the number of coal dust accidents, and in its lost time, and the amount of disability because of such accidents. We have only had three or four cases this year, in one of which a man was killed. I understand that in all four cases the superintendent making the report reported the equipment was not at fault but that the employee was to blame because he did not follow operation rules. Because of the ever present possibility of an explosion spreading disaster throughout the plant, it is necessary that we give the subject serious consideration all the time.

Mr. HUNT: I believe in time the coal house will not be used. In the experiments we have made we have installed on one of our kilns a unit pulverizing system comprised of a tube mill five feet in diameter and seven feet long. We store no pulverized coal but take the coal in from the coal mill, put it through this small tube mill,

where the coal is dried by means of pre-heated air from under the kiln hoods. The temperature of the air is about five hundred and fifty degrees, and it is absolutely impossible to create an explosion in that tube mill or in any part of the pipe going from the tube mill up to the kiln. There is not sufficient oxygen in there to create an explosion. We have tried in a number of cases to cause an explosion in such a mill but have not been able to do so. There is no deposit of coal dust anywhere about. The unit is placed directly in front of the kiln. We are using twelve men now to feed eight kilns in the coal house. On the new installation with the unit pulverizer mills, we will use two men to operate the eight kilns instead of twelve men in the coal house; in other words, it is a saving from an economical standpoint as well as doing away with the hazard of the coal house, and that of the drying and grinding equipment.

CHAIRMAN FORTUIN: May I ask how you use the oxygen, Mr. Harrington?

Method of Using Oxygen

D. HARRINGTON (United States Bureau of Mines, Washington, D. C.): The air is drawn in by means of a fan on the opposite end of the tube mill from the feed end. The load in there is about two hundred and sixty pounds of inch and a quarter balls. It is absolutely impossible, due to the seal on the feed end, to get enough oxygen for an explosion.

H. H. LAUER (Universal Atlas Cement Company, Chicago, Illinois): One solution to the problem is the type of mill that uses fifteen to twenty per cent carbon dioxide gas heated up so there is no possibility of an explosion in the grinding of the mill. When you start or stop a mill, you will have excess air going through the mill, and a spark will start an explosion, whereas if you have carbon dioxide gas, you can't get an explosion.

Mr. COLEMAN: That seems to be logical because in starting up a grinding mill, naturally with all the things in operation, there is such an excess of dust that an explosion is impossible. On the other hand, when you start up and shut down, you taper off, and at same point you get just the conditions for an explosive mixture. At the time it was started up and shut down, if the carbon dioxide were put in, it would prevent an explosion.

CHAIRMAN FORTUIN: One of the hazards in a cement mill is the lighting of a kiln which has been off the line. Valuable information in regard to burning of pulverized coal will be found in Safe Practices Pamphlet No. 97, "Safe Operation of Pulverized Coal Systems," recently published by the National Safety Council.

Mr. LAUER: Some time ago in the coal mines, they started putting up shelves of powdered rock which would, in case of an explosion, fall down and tend to stop the explosion. Do they still do that, Mr. Harrington, and would that do any good in the coal mill if an explosion started?

Mr. HARRINGTON: I am inclined to doubt the feasibility of the barrier system as applied to a cement mill, although it might work. They do use it still in coal mines. There are certain inherent difficulties in doing it, however. In the first place, the air must be fairly dry, or most of the rock dust will absorb moisture, and become a paste or almost mud. There are methods of preventing that, but after several years of quite a lot of controversy, research and experimentation, we believe that while the rock dust barrier is something which might be of added value it is something which you cannot depend upon.

There are some people who take a different point of view. If I were in a coal mine and responsible for the safety of the people in it, I might use some rock dust barriers. The probabilities are, however, that instead of spending the money necessary to put in rock dust barriers—some would cost \$500.00 apiece—I would spend the money in other ways, which would give better protection. There are places you cannot get into on account of cave conditions, or unsafe conditions, to do the ordi-

nary type of rock dusting. In such places it is advisable to surround them by these barriers with the idea that you are placing the barrier simply because you haven't the possibility of doing the rock dusting as it should be done.

ADJOURNMENT

Wednesday Luncheon Session
October 14, 1931

Joint Meeting of Cement and Quarry Sections

R. B. FORTUIN, Chairman

Pennsylvania Dixie Cement Corporation, Nazareth, Pa.

The joint meeting of the Cement and Quarry Sections was called to order by General Chairman R. B. Fortuin of the Cement Section, who presided.

CHAIRMAN FORTUIN: We have a very interesting speaker on our luncheon program to-day. Mr. D. D. Fennell is a consulting engineer and resides in Chicago. Mr. Fennell has been giving safety talks for the past twenty years in cities all the way from Canada to the Gulf of Mexico and from the Eastern seaboard to the home of the beautiful girls—Hollywood. I take pleasure in introducing Mr. Fennell.

Safety and the Interdependence of Men

By D. D. FENNEL

Vice-President, Turner and Turner, Inc., Chicago

There is no subject more apropos to our present economic situation than the one I propose to discuss at this meeting. The safety of the world, of the community, of the individual industrial or commercial enterprise and of the individual himself, depends to a large extent upon the measure of our recognition of the necessity for true interdependence in the affairs of men.

There is to be considered, (1) international economic interdependence, (2) industrial interdependence within an industry, (3) employment interdependence, (4) social welfare or the interdependence of the units constituting a community or state.

1. International interdependence. Never in the history of mankind has the world been in such a state of flux and change as since the commencement of the Great War. To be sure the Napoleonic ascendancy brought numerous political and geographical changes in the countries of both the new and the old world but hardly to an extent comparable with those which have taken place in the past seventeen years. A study of the geographical maps and political data of Europe, Asia and Africa and the islands about them, as of 1913 and 1931, will reveal such changes in forms of government, kinds and personnel of rulers and national border lines as have never occurred in a like period in the world's history.

There is going on constantly such a contracting of distance in both the fields of transportation and communication that it takes to-day, one-quarter the time to go around the world that it once took to cross the Atlantic Ocean.

The change of price in an important security on a stock exchange in America is published in the newspapers of England, Germany and France in the next edition, issued the same day as the change takes place.

Many of us could not follow nor support the late president Wilson when he proposed a covenant of nations to consider and act upon matters of common import in a crisis, yet when England abolished the gold standard the stock markets of America were immediately depressed and prices of securities fell abysmally.

We did not want political interdependence but we find we certainly are internationally, economically-interdependent whether we will or no.

Without question, the safety of mankind, as men "move in upon each other," is demanding that they sit down and counsel together before they resort to the brutal, destructive instrument of war to settle a disagreement.

2. Industrial interdependence within an industry. When the throttle-hold of politics is taken from the throat of industry and companies making like articles may confer as to the quantity of products the market can consume and are permitted to regulate scientifically that amount and the character of it, a sounder economic structure will have been brought into being. Overproduction is the result of the extremely individualistic character of the manufacturer executive and has had much to do with the bringing on of the industrial depression of to-day. No industries have suffered more severely from this unwise character of competition than those you gentlemen represent. It is my unbiased opinion that the day is not far distant when manufacturers will be urged by government to better regulate their inter-company competitive relations rather than be forbidden by law to do so as at present. Safety for every industry—its perpetuity—will be secured by such means—when men shall have become economically wise rather than politically astute.

3. Employment interdependence. The ideal in industrial relations is the recognition by employer and employee of the essential place of each in the success of the company's program. It is only through team work that a company objective may be achieved. All the safety codes that may be written, in which effort is made to secure obedience to their provisions through force will fail of their purpose. The building into the organization of a spirit of mutual dependence, the men looking to the management for leadership and trusting it and the management looking to productive labor for production and believing it will be secured, spells success and profit to each.

In the trying times we are experiencing, with depleted forces, and light demand for product, more than at any other time, is needed great candor, a fine quality of leadership and a constant checking up on all the accident preventives. It is an unusual time and opportunity for the putting on of a competent educational program in plant methods in general and in safety work in particular, that a well-oriented nucleus may be equipped to guide the augmented force that will soon be necessary to meet the production demands on the plants.

4. Social welfare, or the interdependence of the units constituting a community or state.

Industry and its leaders are coming to recognize that part of their job is not only to train men and women to produce things but to make possible for them enlightenment, liberty, social happiness and the impulse to achieve worthwhile goals. The safety and certainty of a continuing understanding in an industrial group is predicated upon a recognition of real mutuality of interest between management and workers.

After all, what character of purpose or career brings such satisfactory returns in happiness of heart and contentment of conscience as the spending of oneself in the culture of a fellow man so that he may measure up to his possibilities and fulfill his destiny?

The first safety engineer of whom I have heard is one John Woolman, a Quaker, who was born in New Jersey in 1720. When he came to manhood he at once commenced the instruction of the Quakers in New Jersey in reading and writing and later in farming, hygiene, in the care of their homes and the care of their bodies. He later continued his efforts with the Friends of Virginia. No Quaker excepting William Penn has exerted the influence for good among his people as did this humble teacher-artisan who earned his living as a tailor while carrying on his beneficent enterprises.

In the midst of his work he one day stopped to take stock of himself and here the interdependence of the man and his associates stands forth. Said he in describing this experience: "Being then desirous to know who I was, I saw a mass of matter of a dull gloomy color between the south and the east, and was informed that this mass was human beings in as great misery as they could be and live, and

that I was mixed with them and that henceforth I might not consider myself as a distinct or separate being."

It seems as though the words I quote from a dialogue of Plato, so appropriate to my thesis, might have been written yesterday instead of centuries ago. He stresses our interdependence as citizens of a state when he says:

"And can there be any greater evil than discord and distraction and plurality where unity ought to reign? or any greater good than the bond of unity?"

"There cannot."

"And there is unity where there is community of pleasures and pains—where all the citizens are glad or sorry on the same occasions?"

"No doubt."

"Then when any one of the citizens experiences any good or evil, the whole state will make his case their own, and either rejoice or sorrow with him?"

"Yes," he said, "that will be true in a well ordered state."

This picture of men contributing of their interest and their energies that the lives of their fellows may be rich and full is the new vision of social responsibility and opportunity that our industrial and commercial leaders as well as the workers who follow them are gradually coming to acknowledge—this interdependence of men.

If we carry this doctrine far enough will it not of itself insure the success of the entire safety movement? Supposing both the automobile driver and the pedestrian might be taught to *know* the other was *depending* on him to play fair and take no chances; that the workman be made to realize that the guard was put on the machine to protect him and that the foreman *depended* upon him not to remove it; that the clean-up man was taught always to remove oily rags to a place free from the possibility of ignition because his supervisor *depended* upon him to do it? What efficiency would enter the field of safety if such interdependence could be made concrete?

When that time comes in the economy of human affairs that the interests of our fellows shall mean, relatively, as much to us as do our own because "we are all one body and members one of another," then shall the safety movement realize its fondest hopes and highest expectations in a creditable, intriguing record of achievement.

ADJOURNMENT

Wednesday Afternoon Session

October 14, 1931

Joint Meeting of Cement and Quarry Sections

R. B. FORTUIN, Chairman

Pennsylvania Dixie Cement Corporation, Nazareth, Pa.

A. L. WORTHEN, Chairman

The Connecticut Quarries Company, Inc., New Haven, Conn.

The second session of the Cement and Quarry Sections convened with R. B. Fortuin, general chairman of the Cement Section, and A. L. Worthen, general chairman of the Quarry Section, presiding as joint chairmen.

CHAIRMAN FORTUIN: Our program this afternoon calls for what promises to be a very interesting discussion on "The Value of the Plant Magazine." The thought of the Program Committee in listing this item on our program was that everyone would take part in the discussion. This topic is strictly not a Cement Section nor a Quarry Section topic. It is an employee's publication topic, but since a number of the quarry organizations and cement organizations have gone into the matter of plant publications the Program Committee thought it would be well to get the pros and cons from the various people present.

We have some pioneers in this phase, and I would like to call on Mr. Couchman of the North American Cement Company to lead the discussion.

The Value of The Plant Magazine

By ALBERT R. COUCHMAN

Safety Director, North American Cement Corporation, Hagerstown, Md.

The plant magazine or house organ, as it is commonly called, has an unlimited organization value. It provides the safety engineer with a kit of diversified tools which if properly applied will greatly facilitate the difficult problem of maintaining interest in safety, as well as organization interest. I repeat organization interest because no undertaking, within the boundaries of industry, whether it be safety or otherwise, can be successfully carried on without the wholehearted support and confidence of the mass of workmen within the organization. Therefore, the composition of the plant magazine may be paralleled with the work of the safety engineer.

Everyone who is working in the safety field has recognized the task of reducing accidents an educational one. While there are various methods of applying this education through direct contact with plant activities, on the other hand, however, the dissemination of literature designed to interest both employer and employee is an important factor.

The plant magazine should be designed for such a purpose. It should be a medium through which the safety engineer can permeate the ideals of safety into the minds of the workmen. If this is to be accomplished it is necessary for the safety engineer to have a profound knowledge of the fundamentals of applying psychology to effect, through his magazine, the safety habit. There are many ways in which this knowledge may be applied to interest men to think and act safely. It should be borne in mind that organizations are composed of various types of individuals, material that interests one group may not interest another. In our organization, I make periodical checks of the reaction of my material. If I find that I have hit the wrong key, I immediately take steps to correct the situation.

It has been my experience that much good can be accomplished by becoming personally acquainted with the entire organization. Aside from gaining a knowledge of the characteristics and habits of an individual, it gives one a clearer conception of the kind of material that appeals to a certain group or groups of men.

Illustrated sketches, poems and personal items blended with wit and humor appeal to a cross section of the mass of readers, but real interest is shown if some form of competitive material is published that refers to the inter-departmental or inter-plant activities.

The safety engineer's pathway is not always strewn with roses; invariably new ideas, new procedures and methods, relating to safety, are bitter pills for some plant men to swallow. I have found, however, that the plant magazine has been the key to unlocking the minds of workmen and plant executives to some of these ideas which otherwise might have been a total failure. When I hit upon a new idea, or have the good fortune to borrow one, I always depend upon the plant magazine to put it across. If one department or plant accepts it, then I try to create an agreeable public sentiment by giving them magazine publicity which creates a desire for other department and plants to fall in line for their share of recognition.

If the scope of the plant magazine is broadened to include the safety news of the entire organization, its value is materially increased for it can be used to stimulate a spirit of friendly rivalry. The workman in the quarry, the repairman in the mill, the salesman on the road and the executive all meet on a level as contributors to its pages.

This same spirit of rivalry if properly encouraged and directed may provide the spark to ignite the fire of enthusiasm which is such an essential constituent of every successful safety movement. Through its medium of advertising it may be employed to rekindle this enthusiasm at the first indication of lagging interest.

I recall, near the close of 1930, a personal letter was sent out to all foremen and department heads, asking for their comments on, "What They Were Going To Do To Make The 1931 Safety Campaign A Success." The first replies received were published and within a short period replies came rolling in from all directions. The plant magazine not only offered a challenge but the spirit of rivalry was aroused. Bill Jones decided that Tom Brown was not going to get ahead of him; in this and similar instances the plant magazine has been a valuable asset in maintaining organization interest.

Since the conception of the magazine of which I am editor, I have discovered some real talent; down in the quarry we find a Shakespeare, in the mill we find a Mark Twain and throughout the plant many Byrons have stepped from the side lines to promote accident prevention through their contributions to the plant magazine.

The plant magazine with its messages of safety is a subsequent factor in the promotion of public safety as well as safety in the homes. While the National Safety News and other similar magazines have attributed to these important phases of accident prevention, on the other hand, however, their distribution has been limited, thereby leaving a gap between the plant and the home. The plant magazine can be utilized to fill in this gap and with a proper distribution, it should produce a far-reaching effect. The entire family is given an opportunity to acquaint themselves with the plant activities, that same safety habit which is gradually being engrained into the characters of the workmen will eventually have a psychological effect upon both family and community as a whole.

This, however, is only one side of the picture that enables us to visualize the value of the plant magazine. On the other side we find it a medium through which men and management are brought together in a closer relationship. It promotes goodwill and helps to obliterate indifference. It leads men to appreciate and view the problems of management with a cooperative attitude; it helps to increase their personal efficiency and strengthens their confidence in the organization with which they

are connected; all of which assists in building a better morale, which after all is the one essential cog in the wheels of industry.

Again may I repeat that the plant magazine has unlimited value.

CHAIRMAN FORTUIN: Who is going to be the first one to start discussion?

D. B. COLEMAN (Missouri Portland Cement Co., St. Louis, Mo.): There is no doubt that names appearing in a plant publication create interest. The more names of men in plants you can use, the more interest they will take. The only way I can see that you can do that is by publishing personal news of their trips, vacations, their new automobiles, or things of that sort. In a monthly publication when such news comes out it is stale. What other measures can be taken to get names in our papers relating to news that is fresh? Perhaps somebody here has had and settled that problem.

CHAIRMAN FORTUIN: My answer to that is the March, 1931, issue of our plant publication. On the front cover of this and other issues is the following: "He brushed his teeth twice a day. The doctor examined him twice a year. He wore his rubbers when it rained. He slept with the windows open at least eight hours every night. He stuck to a diet with plenty of fresh vegetables. He relinquished his tonsils with several worn out glands. He did his daily dozen daily. He was all set to live to be a hundred. He had forgotten about trains at grade crossings."

That page carries a lesson. The first inside page carries the editorial comments which may cover anything from accidents in the plant to general orders from the management, or a change of policy in our executive offices in New York. On the next page is an article reprinted from "Trained Men," by Irwin Brout. The page following that has a message from our president to the employees.

This issue happens to be one of those in which we have unusual things. We were going to send two representatives from each of our two plants to the meeting in New York, and the ballot was included in this issue. The men tore off the bottom third, or the lower third of one sheet, as their ballot.

The next page carries news items. The seventh page is the most important part of our magazine. It is a summary of Accident Investigation Committee reports for the month of February. There is a detailed description of every accident, together with the extent of disability, who was responsible for the accident, the name of the injured person, and a suggestion for the elimination of similar accidents in the future. The men don't want their names on that page, and they will be very careful they don't get on it. That is sufficient punishment, we find, in a great many cases.

The next page covers departmental records, and the last page the plant records of all our eight plants.

The last two issues published were dedication numbers of the two plants for which we presented trophies and they carried the speeches delivered at those dedications. In the page of snapshots is one of men from one of our plants. We call them "Big shots from another plant."

W. M. POWELL (Medusa Portland Cement Co., Cleveland, Ohio): We started a plant magazine in July, 1930. Our magazine is about five by seven and can be conveniently slipped in the side pocket of a coat.

In answer to Mr. Coleman's question as to whether a man's name appearing in an issue after a month's lapse of time from the time the particular thing happened would be considered old news, I don't think the fellows look at it in that way. The majority like to see their names in print regardless of how old the news is. We have found the boys like to see their name in print except in connection with an accident which they don't like so well.

We feel the plant magazine is an excellent way to reach the men in the plant. The men are anxious to get it. If it isn't there on the day it is supposed to be, there is an awful yelp about it. I have heard some say they would almost as soon miss their pay check as not to have their magazine.

We have eight plants and we give each plant a section of the magazine. A local

editor is appointed to cover the news from each plant. We have captioned the sections from these various plants with appropriate names, such as: "Wampum Warblings," "News from Newaygo," "Tales from Toledo," "Broadcasts from Bay Bridge," "Dixon Doings," "Yodels from York," and "Manitowoc Music." Once we omitted these headings. Immediately we got a letter from the chief clerk in the North Carolina office calling our attention to the omission.

Our magazine is printed on a fine grade of paper so that half-tone cuts can be used. We get about 1,200 copies, which cost us about \$90 a month.

CHAIRMAN FORTUIN: On October 1, 1930, we started compulsory physical examination for all employees, from the general manager to the lowest laborer. That issue of our magazine with a full description of the physical examination by our general manager went to every employee together with a copy of the physical examination report, so if there were any comments the men had ample time in which to make them, and we could adjust our plans accordingly. We believe the success of our physical examination program is in a great measure due to this preliminary work.

JACK DEMPSTER (Canada Cement Co., Ltd., Port Colborne, Ontario, Canada): I don't edit a plant magazine but I have edited for nine years an employees' publication. There is a wide difference. I have always contended that an employees' publication will do itself incalculable harm by trying to put out a publication that will compete with the *Saturday Evening Post*.

I claim the employees' publication should be the means of bridging the unseen gap between master and men. It should be a means of conveying orders or suggestions from the office. It should be the means of conveying the thoughts and expressions of the men to their fellow men, but it should be printed on such stock and so inexpensive that when they have read it they can throw it away. Then there is no monetary waste and they are not compelled to take it home, put it away on the book shelf and never look at it again.

Our paper has been put out every Monday for about nine and one-half years. It is mimeographed. I type the stencils, mimeograph the paper, fasten them together, put on the cover, hand them out to the men, and get all the blame.

I contend that as an inexpensive method of giving publicity to the policies of the office, you cannot supersede the employees' publication, provided you keep it in that field.

Mr. Powell said his magazine costs in the neighborhood of \$90 a month. Probably ours costs \$9 a month, but of course we are only one plant. Our paper is for our plant alone. We print 200 or 250 copies, including those we mail out and, personally, we don't give a hang whether the recipients like them or not. Sometimes they don't like them because they criticize them, but our paper is intended for our gang and nobody else, and our gang appreciates that paper because there is always a cry raised by the man we miss at the time office Monday morning.

Our plant paper is a six-page 8½x11 magazine with a picture of the plant on the cover. That is the only half-tone we have. The rest of it is begged, borrowed or stolen outright from posters issued by the National Safety Council, and since our paper isn't sold and is given to the employees and there are no pretensions made for it, we steal wherever we can. If we can steal lots of copy, so much the better, but the main thing is that it goes over and reaches the men and they react very favorably to it. When there is anything special up, like balloting for employees to go to receive the Cement Association trophies, all the instructions are put in the paper. They all know beforehand what they are to do and how to cast their ballots, and so on.

I don't agree with the policy of putting in personals. Sometimes they are stale by the time the paper comes out.

I firmly believe that the little bit of money a paper costs is one of the finest investments our plant has ever made. It is one of the finest ways of talking to our men without calling a meeting. It bridges the gap between the employer and employee and fosters the spirit of camaraderie. We don't say this with any degree of vainglory

or boastfulness (we are just part of the cement industry that has such wonderful safety records), but our plant is now on its nine hundred and fiftieth day without accidents, and our paper is practically 75 per cent safety. Sometimes it is 100 per cent safety. We are criticized because they say we put too much safety in it. You can't put in too much safety in any activity that you take up in our industry. Whether the paper has anything to do with safety records or not, I don't know and never will know; nobody will ever know to what extent the spirit of fraternity and camaraderie displayed in old Plant 8 of the Canada Cement Company is intensely fostered, I believe, by a paper that costs about two cents a copy.

CHAIRMAN FORTUIN: I think I can say without any hesitancy that those organizations that do have plant magazines, or employees' publications, are sold on the value of the publication. Perhaps the reason we all don't have such a publication is because the individual to whom it would be put up to in the organization hasn't sufficient push to take the responsibility for getting it out. If you once get to thinking about a magazine from the employee's point of view, you will appreciate the value of it.

W. H. BAKER (J. E. Baker Company, York, Pa.): I know nothing about magazines. I am anxious to get some information. I would like to ask Mr. Dempster what he puts in his magazine besides the safety literature?

MR. DEMPSTER: I generally write on the front page an editorial, in which I discuss anything from the birth of a nation—with the exception that I leave out politics—to what I think will help our safety cause. The rest of the paper is taken up with a discussion of accidents or near accidents, some personals and generally a humorous story or two, a moral and one or more jokes, and a cartoon or two. It is composite. No two issues are alike. No real definite policy has been adopted. If you take a year's publications and look at them, you may see a definite policy running through the fifty-two issues. The only things we stress are safety, harmonious relations between employer and employee and love for our country.

CHAIRMAN FORTUIN: Both the Quarry Section and the Cement Section have monthly news letters. Would you be willing to give up those monthly news letters? (Cries of "No.") They are of value to you in your safety work. The same thing can be said of your plant publication if you tie in each department and bring them all into a nucleus which forms the basis of safety work and the actual operation of your plant.

J. A. GIBERSON (Bluff City Lime & Stone Co., Alton, Ill.): Two years ago when I came to your meeting my main effort was to find out something about news letters. I started them and have kept up continuously since, a publication of the exact minutes of the safety meetings each month. We have built up our record and reduced accidents. The publication so far has been purely a safety magazine coming from the safety department. We have not attempted to include any messages from the management except those relating to safety. We send the publication with the National Safety Council "Safe Worker" into the homes of the workmen, and I find we have created an interest that I don't believe we could create in any other way.

CHAIRMAN FORTUIN: We have about 35 to 40 per cent foreign born employees and a great many of them cannot read or write or understand English. At various times we have asked several of these foreign born employees to tell us what was in the last issue of our plant publication and, believe it or not, they gave verbatim everything in the publication the previous month. Why? Because they took the magazine home and their children, who are in the schools, read the magazine to them at the dinner table, and they were able to get the material in that way. I venture to say they get more out of the magazine than the so-called American citizen who sometimes uses it as something on which to figure an estimate, or a job.

We have stated that if at any time we found any of our plant publication issues laying about the plant, the publication would stop immediately. To date we have not found one laying about the plant.

A. J. R. CURTIS (Portland Cement Association, Chicago, Ill.): Mr. Dempster didn't say so, but it has been his custom for one issue of the month to give in his plant publication a résumé of the statement of the Portland Cement Company on significant accidents. It isn't customary for us to supply copies enough of the statement so that each employee can have one, however we will be glad to increase your allotment. If you want to get enough for the whole crowd, that would be hard on us. A better way would be to put a résumé in your publication, as Mr. Dempster has done.

CHAIRMAN FORTUIN: For those of you who have never tried a publication and are thinking of doing so, it is well to start with the publication of the minutes of your safety meetings as Mr. Giberson did. You can feel your employees out that way and see whether they really want something of that kind.

M. P. GREEK (Marquette Cement Mfg. Co., Cape Girardeau, Mo.): I would like to know more about how plant publications are passed out to the men, what time of day, what days, or what method is best for doing that.

CHAIRMAN FORTUIN: Our publication comes out on the fifteenth of each month. However, the last two issues we have skipped a month in order to make a combined dedication number, but on the fifteenth of the month it is published and given to the men as they punch out at the close of the day's work.

W. M. POWELL (Medusa Portland Cement Co., Cleveland, Ohio): We try to arrange to get ours to the plant as near pay day as possible, and they are passed out to the men with their pay checks.

MR. GIBERSON: Our news letter is mailed to the home of each employee. We do that in five plants, and the number varies from 50 in one plant to 125 in the largest plant.

A. R. COUCHMAN (North American Cement Corporation, Hagerstown, Md.): Our publication is mailed to individuals in our sales departments and salesmen on the road, but those for the mills are sent to the associate editor who distributes them.

MR. DEMPSTER: Every Monday morning I stand at the time office window, and pass the publication out to the men when they get their time checks. At three o'clock I catch the other shifts. Every man who comes in to get his time check gets a copy.

CHAIRMAN FORTUIN: It has been a pleasure, to have charge of the meeting up to this point, and I want to congratulate the officers for next year and wish them the best of success.

With a great deal of pleasure I now turn the meeting over to Mr. A. L. Worthen, general chairman of the Quarry Section.

CHAIRMAN WORTHEN: I am sure I voice the sentiment of the Quarry Section when I say we enjoy this opportunity of meeting jointly with the Cement Section at these annual gatherings. We realize we have some distance to travel before we can reach the record made by the cement industry, but we feel we are rapidly coming within hailing distance and that we are traveling fast.

Most of us know very little about the relation between the human mind and accidents. Those of you who attended the joint session last year will recall the very interesting talk which Dr. Hulbert gave us, in which he told us that it might be important that a man should be thinking of safety when doing hazardous work, but it was still more important that no outside diversions should distract him from the work at hand.

Our speaker this afternoon is another prominent psychologist of the country. He is Professor of Applied Psychology at Northwestern University, Evanston, Illinois, and a member of the Psychological Corporation with consulting offices here in Chicago. His principal interest is in the field of management training and the selection of men. He is the author of a book on the "Psychology of Sales Management," and is continuously working on research and study in industrial psychology. I think we are fortunate in securing Professor S. N. Stevens, whom I wish to introduce at this time.

Basic Principles in Planning A Safety Education And Publicity Program

By PROFESSOR S. N. STEVENS

Department of Psychology, Northwestern University, Evanston, Ill.

Broadly speaking there are about two fundamental questions which may be asked regarding human behavior. Why do individuals act as they do—that is, what are the mechanisms and processes in behavior—and why do people act as they do? It is with the latter question that we are primarily concerned in the present discussion. Attempts to answer this question have been made since man first speculated regarding the origin and causes of his own acts. A completely satisfactory answer would imply the ability to predict individual action on the one hand, and the ability to control or modify it on the other. We must confess that such an answer is forthcoming in the present state of our coming knowledge. The claims of the pseudo-psychologist, the phrenologist and quackist fraternity are generally to the contrary notwithstanding.

While the advance which the modern psychology has made in this field does not enable us to manipulate individual action with certainty, it offers data which are suggestive to those who are concerned with direction and control of public opinion and modification of individual action.

What is the nature of those inner and outer factors which determine and control our behavior in given situations? Why do I turn my head to the source of a loud noise, stop my automobile when the traffic light flashes red, stand up when the national anthem is sung, vote for a particular candidate or read a paper before a scientific association? The blanket term "motives" may be applied to all the mechanisms in the organism which determine our response in these and other situations. The motivated response then is one which is determined primarily by conditions or factors in the organism. Knowledge of these factors is of the greatest significance to those interested in modes of effective appeal with a view of human action.

Man's Nicely Tied-up Packages of Ideas

There have been those in whom these inner factors or motives are primarily rational or logical in nature. It is assumed that man is possessed of nicely tied up packages called ideas, as a result of experience in the world; and after a preliminary period during which these ideas are compared and arranged rationally, determined actions result. Furthermore, it is assumed that some of these ideas carry with them a kind of inherent rightness or soundness, as if they were certified checks which will be instantly recognized by reasonable and right thinking persons. For example we are presented a poster which carries the statement that carelessness is one of the chief causes of accidents, with a suggestion that the elimination of carelessness will reduce the number of accidents. This statement is undoubtedly true, the information is undoubtedly authoritative, but it carries no guarantee that the recognition of this fact will, of itself, make people careful. The idea that human action is motivated basically by rational processes is essentially artificial and unreal. A great many people tend to rationalize their ideal after the act has taken place but it is one of the most certain conclusions of modern psychology that in the vast majority of our actions there is a little in the way of preparation that may be included in such terms as reason, judging or thinking. A safety program based on the assumption of rational motivation or human action cannot be expected in the long run to yield results that will be satisfactory.

A second common error regarding the control of the factors in human behavior is that the organism reacts in a more or less mechanical way to external stimuli. From the point of view of this conception the "right" stimuli will inevitably release the

right responses, that is to say, correct information concerning the proper safety procedure or positive instruction concerning it is expected to lead to positive and desirable reactions. This will not occur unless the information or instruction is arranged to appeal to motivating factors within the individuals to whom the appeal is directed.

It is with the nature of these motivating factors that we are concerned in organizing and presenting publicity material designed to promote safety and individual well-being. My reaction to the names of Gandhi, Lenin or Herbert Hoover is not explained by the fact that these words are auditory stimuli, but rather in so far as these actions present drive and intensity and determination, and the appeal which those names as symbols make to certain fundamental non-rational reaction patterns or tendencies to action. These reactionary factors, many of which were acquired in boyhood, furnish a background and are the source of the drive for most of the activities of the individual. Some of these may be inherited but most of them are acquired by a social conditioning. They are called attitudes and may be defined as the more or less persistent tendencies by reason of which the individual is rendered particularly susceptible to certain kinds of situations. Attitudes of a more general type are illustrated by one's reaction to prohibition, bolshevism, old-age insurance, socialism or the like. Our attitude toward bolshevism may determine our behavior toward Russian art, the Russian ballet, Lenin, whiskers, Tolstoi. A striking characteristic of attitudes of the latter type is the facility with which they became attached to symbols. These symbols or stereotypes as they are called, are illustrated by our conception of the whiskered Russian throwing a bomb; long haired poets, excitable Frenchmen, the mysterious oriental, and so on. These stereotypes often symbolize the attitudes of certain individual groups or races, or they may represent our attitude toward the idea or principle.

The Story of a Prohibitionist

My father was a prohibitionist. He was a prohibitionist, according to his method of rationalization, because of the fact that his father was a great drunkard and he felt that prohibition was a desirable state of affairs for the nation. In my humble opinion he was a prohibitionist because of the fact that he had been hungry since his father didn't have enough money left after he had been at the saloon to take care of the family, because he had been beaten when he was a boy by a father who was drunk and wild; because he had seen himself and the rest of the members of the family go without shoes and clothes because of the inroads of an unrestrained liquor habit on the domestic pocketbook. All of these emotional experiences rather than a rational evaluation of prohibition versus non-prohibition were the background for his attitude toward it.

So we might go on. But we tend to stereotype and symbolize our attitudes, and to have a symbol or stereotype stand for the thing in general and in particular.

The value of this idea, for instance, in terms of a safety program is this: When safety can become a stereotyped idea and symbolized in such a way that an individual's attitude toward it is the product of an emotional reaction to it, then that campaign can become a motivating stimulus pattern because it works on inner rather than outer factors in the life of the individual.

They are of great significance to those who are concerned with the control or modification of individual action for the reason that by means of pictures or in other ways it is possible to appeal to the attitudes of the individual through his stereotypes.

This appeal is possibly caused, to a large extent, the stereotype which the individual holds determining the nature of the impressions which he gets from the world about him. My stereotype of the Irishmen expresses my antagonism or hatred or my affection or respect. At any rate it acts as a factor so far as my impressions of an

Irishman. These stereotypes may be formed as a slow accretion of impressions over a long period of time or they may be a result of a long program of systematic propaganda. With that impression a collective attitude of a group may compel the object of the stereotype to conform to the picture. The creation of these stereotypes is one of the great games of the publicity agent.

We may briefly summarize the characteristic attitudes and point out their significance to those who are trying to modify the conduct of men, women and children. Attitudes as factors in human action may be characterized as follows:

1. They tend always to express themselves in action.

Attitude leads to action of a very definite kind. For instance, here is an individual who believes in the sanctity and the inviolability, so to speak, of Republican policies. There are still a great many who still believe that. They wouldn't vote for any other individual. They would vote only for the party irrespective of the individual. Their attitude determines conduct. You can predict it. Know their attitude with regard to a certain thing, and you can tell the kind of behavior they are going to indulge in. It is a characteristic of attitudes that they tend toward fixed action patterns whenever the stimulus is presented which produces, if you please, the arousal of the emotional stereotype or symbol which is the inner machinery for the outer reaction.

2. They tend to have a strong emotional coloring.

No one has ever set the world on fire by just a cold idea. Someone said that every great movement is the lengthened shadow of a man. It was an idea plus fire, plus an emotional drive that had become wrapped up and had engulfed the idea itself.

Slavery, for instance, was looked upon in a more or less abstract, cold, logical way by thousands and thousands of people, but when somebody got the idea hot enough, because of the emotional contacts, to get active then slavery became not a political issue but a moral and a social and almost a religious issue. In other words, the attitude has the emotional coloring. The idea with the coloring produces the attitude.

The Dynamic Motive Toward Safety

Therefore, with regard to building up a safety campaign, an attitude towards safety that is casual, abstract, and theoretical has little value. The attitude towards safety that possesses not merely a rational appreciation of the good that safety involves, but either an emotion of fear or insecurity on the negative side, or the emotion that comes perhaps in the sense of love for one's family and desire to keep well and strong, motivated by that larger social emotional background, then the safety idea becomes dynamic in action.

Someone said that the individual didn't like to find his name in the paper associated with an accident. In other words, the attitude toward safety there is motivated negatively by a distinct feeling of unpleasantness, when his personal achievement is related, to something that is undesirable socially, industrially and economically. The attitude toward safety which that individual has developed is colored by a strong desire to get away from a feeling of unpleasantness which a failure to maintain the safety rules would necessarily entail.

3. They do not involve rational processes as an antecedent to action.
4. They may be conscious or unconscious.

Nowadays we are coming to appreciate the role the unconscious plays in determining much of our behavior. I am not one to make any fetish of the unconscious or to think in terms of something esoteric or mystical, or something of that kind. To me it is a perfectly natural part of our total mental and emotional make-up. We are not always adjusting to our world on the highest level of consciousness.

As we sit in this room we are stimulated by a whole range of stimuli, many of

which are being attended to acutely, a vast range of which, however, are just being absorbed and adjusted to us on an unconscious level. You are not always aware of how comfortable or uncomfortable the seat is, but you are aware of my voice. You are aware of a lot of other things and perhaps are attending to them. The lights are what they are, but if one of these bulbs were to suddenly go out you would be aware of the difference, but for the most part it isn't specific stimulus to which you are attending. The lower level of sensory awareness, the lower level of adjustment is continuously going on and is being maintained as a very important basis, in my opinion, for much of the rich and full types of behavior and experience which we enjoy.

Attitudes Associated With Symbols

5. Attitudes are associated with and are easily released by symbols, signs, slogans, phrases, catch-words and pictures in individual cases to build up a stereotype or mental picture in which the attitude is personalized and characterized in graphic form.

Here is where the value of cartoons, posters, slogans and the like, which are freely distributed throughout plants and in journals and in the trade papers and in the plant papers and employees' magazines play a role, because one never can tell when a picture will become a stereotype for a safety attitude, or when a slogan will become emotionally tied up in such a way that it becomes a dynamic source of power for regulating safety behavior. The signs and symbols and stereotypes which can most frequently be built up over a long period of time are, of course, the chief instruments or mechanisms which the safety educator can indulge in.

My little boy came home from school the other day and he had a poster which he had designed for the safety campaign they were carrying on in the school. It was so interesting I went around to the classroom to see the designs of all the other children. Here is a child naively building up his conception of the safety attitude in a symbolic form, and my little boy had a picture of a street, an automobile and a little dog that had been run over, and at the bottom he had written across it, "All boys must keep their dogs off the street if they want to have a lot of dog babies." The point was that he had had a little female dog that was about ready to have a litter, and he had been looking forward to it with much anticipation. She ran out in the street and got run over, and it was a very emotional shock to him.

In a very real sense the symbolization of a safety attitude operates in various industries perhaps in a different way with different symbols, but nevertheless with a compelling motivating effect once it has been established and the emotional accretion is developed.

Newspapers make large use of this mechanism in appeal to group attitudes. Slogans almost always appeal to attitudes. Whoever stopped to analyze a slogan? It is what the slogan implies or suggests that makes it effective.

6. Where fundamental attitudes are involved the response is used in proportion to the intensity of the stimulus.

7. Attitudes may be developed as a result of a single experience or they may be established by a systematic and persistent propaganda. An example of the first is the establishment of an intensely negative attitude toward an individual or race as a result of a single experience. In the second case our attitude toward safety may be established as a result of a continuous presentation of materials arranged in dramatic and dynamic settings suggesting health, well-being, efficiency and the like.

By that I mean our fundamental attitudes center around the maintenance, the development of a feeling of personal well being. Secondly, they center around a need for and an attitude of social adequacy with regard to other men. Third, they center around our concept of ourselves as an effective instrument in the economic,

social, and political life in which we live. The fear of insecurity, the need for a loving experience that centers both in the family and in society as a whole, and the need for complete self expression that gives one a sense of power and a sense of personal well being; these drives tend to crystallize easily in attitude and as such are most effectively worked on by the safety operator.

For instance, when an individual makes a mistake and has an accident and is reported for it, and his name does appear in the paper, he has a very definite lowering of self esteem. To a certain extent he is not merely endangering the lives of others, but he is reducing that particular quantum of "I-ness," that sense of complete adequacy as an individual which is a very unpleasant experience and one which he strives to get away from as quickly as possible.

The significance of attitudes to those interested in a program of safety is obvious. The objective of such a program is the modification of conduct of men and women which may be termed as "safety behavior." Such a change in conduct cannot be effected except through a change in attitudes.

We may apply the term propaganda to the technique involved in bringing about such a change. Propaganda has been defined as the manipulation of attitudes by means of significant symbols and has for its objectives an arousal of action in specific situations. The most effective modes of propaganda appeal are those which refer to established stereotypes. These take graphic form in pictures and symbols or the written form in slogans. One must always be certain that there is some assumed causal connection between the picture symbol or slogan and the attitude or stereotype at which the appeal is made. Safety behavior which you purpose to establish must be demonstrated in dramatic form and present in settings which connect it with the stereotypes and symbols of well-being, efficiency and so on. From a psychological point of view the function of propaganda and publicity organizations may be generalized as follows:

Publicity Functions Generalized

They are concerned with the development of tendencies to action, namely, attitudes, by the manipulation of significant stereotypes and the arrangement of satisfactory situations which permit the completion of actions thus initiated.

Propaganda campaigns may be divided into three classes: first the campaign may be directed to already existing attitudes; second, the objective may be the establishment of new attitudes; and third, opposing attitudes must be overcome. All propaganda agencies make some assumption concerning the psychological makeup of the constituency toward whom their appeals are made. A fundamental problem has to do with a nature and kind of fundamental attitudes which may be assumed to be present in the beginning.

What are fundamental attitudes? The answer to this question is exceedingly hard to discover. It is exceedingly likely that no answer can be satisfactorily determined without a great amount of careful research. This is particularly true in the case of fundamental attitudes to a safety program.

In other words, we assume we are going to deal with a group of people who either have an attitude we want to change; an attitude which is opposed to the attitude which we hoped they would have, or certain emotional reasons for the presence or absence of the attitude. These assumptions you have to make. When you are starting a campaign in your quarry or in your factory or industry, you are assuming the presence or absence of a desirable or undesirable attitude on which you are going to build your safety program.

Generalized attitudes are dangerous to talk about and are very uncertain in character. However, there are about three attitudes of a sufficiently general character to be present in almost any group of men and women. One is the attitude which

grows out of our desire for an adequate experience of selfhood. This often may be experienced in terms of power self preservation. It is the attitude toward which most of the successful safety programs have been directed.

A second attitude is our desire for social approval. Scan the advertising in all of our magazines and one discovers that the fear motive is the power of the appeals toward social approval, social well-being and social experience. In the safety field at the present time too little has been done in establishing stereotypes or symbols on the basis of which this generalized appeal could be made.

The third type of generalized appeal based on a fundamental attitude apparently common to great groups of people is that based on insecurity. Whether that insecurity be a mental, physical or social attitude, much use has been made of this generalized attitude in most of the safety campaigns that have been carried on. Its success has been in direct proportion to the manner in which such insecurity has been symbolized through slogan or stereotype or symbol, which permitted a large range of emotional reactions to become aroused by the principle which the stereotype represents.

In conclusion, it will be well to point out that no safety campaign can be expected to produce permanent results unless the modification in the behavior of individuals, which it produces, can become sufficiently stabilized to furnish the basis for the development of definite habit patterns which will function even in the absence of the stimulation which the symbol and stereotype tend to afford.

Discussion

CHAIRMAN WORTHEN: It is quite possible that there are some here who might like to ask a question regarding this paper.

R. B. FORTUIN (Pennsylvania Dixie Cement Corp., Nazareth, Pa.): What do you mean by psychological inference as to personal responsibility for accidents?

PROFESSOR STEVENS: The strongest basis of appeal in a safety campaign is going to rest equally between two of the basic needs, and therefore the sources of drive in individuals. The first is: The individual's own sense and need for a feeling of security; secondly, his need for the social approval of the men with whom he works. These two things seem to me to be very important considerations, and appeals should be made from both attitudes and with equal forcefulness.

The statement made here about a plant magazine, in which a man who was responsible for an accident had his name mentioned and didn't like it, was eloquent evidence of the thing I am suggesting when I say that every man wants to have and needs to have a sense of personal well being. To use a technical term, he must have an egothic experience. He must feel for himself that he is an adequate, satisfactory person. Any time you reduce this, you are going to get a negative self feeling. In other words, the man is going to get away from the thing that is unpleasant, and when his responsibility for an accident has brought this negative self feeling to his doorstep, he will try to be more careful in order to get away from the condition which has produced that lowering of his own self esteem.

Similarly, the individual who cannot function effectually in regard to his fellows, who doesn't have their confidence, trust and good will, is going to have a very definite drive toward the establishment of an attitude that is positive on the part of these workers.

When safety as an attitude is symbolized in some such social terms it becomes a very definitely positive motivating factor toward the elimination of accidents.

J. R. BOYD (National Crushed Stone Association, Washington, D. C.): I have heard it stated that it is a very dangerous thing to disturb a man's self respect, that he becomes less confident and somewhat resentful. When a man has an accident that is given publicity in the paper and he is held up in a way to ridicule and his

self respect in relation to his own fellow men is disturbed, I wonder if he perhaps doesn't harbor in his mind some little resentful attitude as to the rightfulness of the company in going so far as to center attention upon him?

PROFESSOR STEVENS: I would say that very likely the individual does have a certain amount of resentment. He feels less effective as a person because of the social publicity that his failure has presented. But it seems to me, in spite of the fact that that condition is present, it is a stronger motivating stimulus toward more careful acting on his part than if he were patted on the back for having done something that was positively careful. In other words, the whole argument as to which is more effective, reward or punishment, has never been settled, but in the long run in dealing with men in industry I have observed that both are effective; but where the reaction is to be one that in a sense endangers (I don't mean to put it in terms of safety exclusively) and where the reaction is one which involves other people as well, it seems to me in general that the negative conditioning is stronger than the positive one.

J. A. GIBERSON (Bluff City Lime & Stone Co., Alton, Ill.): Two years ago I brought up the question as to whether it was a good idea to carry the whole plant question of safety, the troubles and the bad situations, into the families of the men, and I didn't get much satisfaction on the floor, but two or three men afterward talked to me about it. I went away from here with the idea that every man who talked to me said, "For God's sake, don't carry the plant into the homes; it is bad psychology. You don't want to get the women worked up."

In spite of that advice, I have for two years through our plant publication carried plant safety news into the home, and through the wife and through the children to the man, and have gotten results from that action.

Is it bad psychology to get safety into the family and into the man in that way?

PROFESSOR STEVENS: My reaction is this: After all is said and done, the man as he goes to his job, whether we would like him to do it or not, takes his family with him. There is no question about it. Sometimes that has positive and sometimes negative results, depending upon the kind of family the man has.

The Western Electric Company here in Chicago has introduced a method of what we might call psychological interviews with different employees. I have been very much interested to learn that the positive stimulation which the family has given, has worked in very desirable ways to reduce accidents and prompt strict attention to work. The company believes the talking of a worker with his wife and family about his work, the problems involved, and why he must go to work in the morning with a positive attitude toward his work and safety, has all produced very positive results.

Of course, the important thing to remember is, that to most socially minded men—and I imagine that classification includes both men who work with their hands and heads, and all the rest of us from the lowest laborer to the highest paid executive—the anxiety with regard to the social and economic welfare of their families is one of the most potent factors in what they do, say, and think during the course of their working day. To have built up in the home a positive safety attitude based more on a feeling of confidence that everything possible is being done to promote safety within the factory, rather than the negative one of fear or anxiety lest something should happen, would have a very positive and beneficial effect on the worker when he left home to go to work.

As I understand this news letter of yours, it tends to reinforce the attitude that the company is exercising every possible energy toward the reduction of accidents and the promotion of safety.

MR. GIBERSON: That is one thing back of the safety campaign. The company has done everything in its power. In two years' time, we have cut down the

number of accidents but we still have 50-odd accidents a year. There have only been two mechanical accidents a year. Failure of mechanical equipment has happened only once in each of the two last years. What bothers us is the personal equation in the accident campaign. With that thought in mind we have been getting results.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



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Tuesday Morning Session October 13, 1931

Joint Meeting of the Chemical and Refrigeration Sections

JOHN ROACH, Chairman

Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.

The joint meeting of the Chemical and Refrigeration Sections was called to order by Mr. John Roach, vice-chairman of the Chemical Section.

VICE-CHAIRMAN ROACH: On behalf of the general chairman, Mr. John Shaw, who is unavoidably absent on account of illness in the family, I want to welcome you to the Chemical Section. We will commence with a paper by Mr. George H. Miller, of the E. I. duPont de Nemours and Company, Wilmington, Delaware. Mr. Harold Miner will read this paper.

Safe Practices in Entering Tanks

By G. H. MILLER

Safety and Fire Protection Division, Service Department, E. I. duPont de Nemours & Co., Wilmington, Del.

Work inside of tanks or other confined places is always more arduous and difficult than work in the open. This may be due to limited working area, insecure footing, poor light, excessive heat, or any one or more of numerous causes. But when the tank or enclosure contains substances which, by virtue of any of their characteristics—toxicity, flammability, corrosiveness—may be harmful to human beings, or which contain machinery such as agitators or insufficient oxygen to support life, then the work in these enclosures is not only arduous and difficult but may be actually dangerous to life and limb unless suitable and sufficient precautions are taken.

While this discussion will concern itself principally with tanks or enclosures which are now in service and must be entered from time to time, the purpose of this paper would not be approximated if attention were not called to the necessity for more careful consideration, in future installations, of designs which will permit at least routine cleaning and repairs to be carried on from the outside wherever practicable. If possible, manholes should be installed in both the top and bottom of tanks to facilitate cleaning and draining and to provide ventilation for cleaning or repairs. The size of manholes should also receive more consideration. There are in service today many tanks with fourteen inch manholes, whereas eighteen inch manholes should be the minimum and preference should be given to twenty inch.

The subject will appear to confine itself to tanks, but it will be recognized that the scope of this discussion actually has a much broader application and should include all enclosures such as tubs, vats, barrels, pits, and even rooms under certain conditions from which safe exit may be seriously retarded. However, to permit brevity in future references to the subject, the word "tank" will be used.

Instruction and Supervision

No person should ever be permitted to enter a confined place where his life may be endangered until all hazard has been removed or protected as far as it is practicable to do so, and then only with suitable protective devices and with adequate means of exit for any emergency which may arise. This is the principle from which safe practices in entering tanks are drawn.

It is necessary, wherever it is required for men to enter tanks, that a man selected for his competency be placed in charge of this work. He should be thoroughly familiar with the hazards of the process and not below the rank of supervisor. One operating official on a small plant, or one operating official in each area of a large plant, provides a satisfactory arrangement. He should be specifically designated to supervise all tank work in his area by whomsoever performed and he should be given full responsibility.

At least once each month, the supervising official should personally satisfy himself as to the completeness and condition of all equipment necessary for this work.

He should supervise the designation and training of a sufficient crew of workmen for tank work, and the men should be selected with due consideration to their stability, good judgment, and physical fitness. They should be able to speak and

understand English and be without recognized susceptibility to any of the hazards likely to be encountered. Before being assigned to tank work, they should be given a regular physical examination and should be re-examined with reasonable frequency thereafter. When unwell they should not be permitted to enter tanks, and after sickness should be re-examined.

Tank men should be trained through regular drills:

- (a) In resuscitation by the prone pressure method.
- (b) In the fireman's carry.
- (c) In the adjusting and using of gas masks, hose masks, life belts and the other necessary protective devices.
- (d) In removing the body of a man from the bottom of a tank and through a manhole.
- (e) In the characteristics and dangers of fumes, gases, poisons, etc., likely to be encountered.

On large plants, one or more tank squads should be organized and drilled in this work. On smaller plants, or those where there is little of this work to be done, process men may be used if properly trained. The use of unskilled labor in this work should never be permitted.

Preparation before Entering Tanks

Conditions vary so that it is not possible to prescribe a procedure which may be definitely followed in all cases, but the following will apply to conditions in general.

(a) Place a sign on the tank containing the following warning: "Danger—Do not Enter."

(b) Next, the tank should be cut off. This may be accomplished by locking the valves shut or by disconnecting the lines and placing blank flanges over the tank inlets. The latter method is preferred. If the former method is used, it is better to provide an arrangement of double valves with bleeders between, in which case both valves should be locked closed and bleeders locked open. If the tank contains agitators, or other such machinery, the belt or other drive should be disconnected. The practice of merely pulling fuses and particularly the practice of hanging signs on starting equipment of electrically driven machinery are not sufficient precautions. However, fuses may be pulled if the switch box is locked. This is often necessary on equipment directly driven.

It is not only important to see that the connections to the tank are blanked off, but also important to see that there is no possibility of harmful substances entering the tank from any source.

An example will serve to explain the necessity of this precaution. Two men were inside of an open vertical tank which stood partly beneath another one. Due to improper operation of the pumps supplying acid to the overhead tank, the overhead tank overflowed, spilling into the tank in which the men were working, with the result that they were severely burned.

(c) The tank should be cleaned as far as it is practicable to do so. This may mean washing with water, steam or some neutralizing agent, depending upon the previous contents. Residue may be washed out with long handled implements. Tanks should be vented at both top and bottom if possible.

(d) After the tank has been washed and if necessary filled with water to drive out any vapors and drained, it should then be determined what the conditions inside the tank actually are and what they are likely to be while the tank work is in progress, because certain substances may cling to the side of the tank and give off harmful vapors after the first tests have shown the tank to be free of them.

There are instruments on the market today for measuring the toxicity and flammability of atmospheres. The conditions within the tank will determine what protective devices are necessary; but, wherever there is any doubt about the contents

of the tank, the maximum of protection should be provided, and in all cases an oxygen deficiency must be guarded against.

Entering the Tank

Before granting authority to enter the tank, the supervising official should himself inspect the tank and determine what procedure is to be followed and what equipment is to be worn. In respect to the latter, while having sole authority, he should take no chances with the safety of the men.

The supervising official should first see that all proper equipment and the requisite number of men are provided and then remove the "Danger—Do Not Enter" signs. He should remain until the tank has been entered and long enough afterward to assure himself of the safety of the operation. On leaving, he should see that a competent foreman is left in charge. He should leave directions as to where he, himself, may be reached in case of an emergency. Under these circumstances, the person left in charge should not leave so long as there are men in the tank. When the men are withdrawn, he should replace the danger signs or close the manholes.

No one who has not been trained should enter a tank. Furthermore, no one should enter a tank without permission and direction from the supervising official or without knowledge of the foreman in charge. No one should enter a tank which does or may contain harmful substances without the following equipment:

- (a) Standard life-belt and line (except only in case of shallow open tanks or pits less than four feet deep and readily accessible.)
- (b) Standard gas mask or air mask when and as prescribed.
- (c) Rubber boots, goggles, gloves, or other protective clothing as prescribed.

A duplicate set of equipment should be brought up and made ready for emergency use.

Under these circumstances, there should be in the vicinity within call at least two men in addition to those at work on the tank.

Men should be assigned to tend life-lines, and no man should be assigned to tend more than two lines. These tenders should remain at the manhole and should perform no other duties while men are in the tank. Tenders should watch their men closely, and, if necessary, be protected from fumes at the manhole by masks.

Masks should be tested and put on outside the tank. If men enter without this protection, but require it later, they should leave the tank in order to put it on.

No mask should be taken off inside tanks. If this is done, the foreman should at once order the man to leave the tank, and, if he fails to do so, should immediately have him drawn up on the line. If a life-line or belt is removed, the man should be ordered out, and, if necessary, brought out. Any hilarious or otherwise irrational conduct should be cause for instant, and, if necessary, forcible removal from the tank.

Men inside the tank should occasionally assure themselves of the presence and watchfulness of their tenders. In case of doubt, they should leave the tank.

If masks are supplied from hand-blowers, a separate man should be assigned to operate each blower. Care should be taken to see that the air supplied to air masks is not contaminated.

Tanks should be entered by means of ladders, and such ladders should not be removed while there are men in the tank, except only while drawing a body through the manhole. If there is a tendency for a ladder to slip, it should be secured so as to remain stable without being held in place. Special ladders with hooks may be used.

The use of a compressed air hose discharging fresh air against the face as a substitute for masks should be prohibited.

No tools or other articles should be thrown or dropped into tanks in which men are working.

These same precautions apply to conditions brought about by substances which may be introduced into a tank for any purpose, such as for painting, rubberizing, etc. It is sometimes possible to ventilate the tank by discharging fresh air into it or by exhausting vapors and gases to keep them below the explosive range.

Equipment and Its Condition

Life-lines should be $\frac{3}{4}$ -inch manila hemp rope in good condition. Rope should be kept coiled in dry, well ventilated boxes. If wet, it must be thoroughly dried before being replaced, and if subjected to acid, etc., must be washed, dried and tested. When new, this rope should carry 4,000 pounds. If it falls below 1,200 pounds, it should be discarded. Substitution of light chain for rope is acceptable for use in acid tanks, but not where flammable vapors may be present.

The free end of a life-line should be made fast to a fixed object and the slack should never be allowed to drag on the bottom of a tank.

Life-belts should be kept in good condition. To retain its life, the leather should occasionally be treated with harness soap or dressing. Under no circumstances should a life-line be attached to any other place but to the ring on the cross straps between shoulders. The use of an ordinary belt or a rope knotted around the waist should be prohibited. Rope should be attached to ring of belt by thimble and splice.

Gas masks and air masks should be of approved type. Under no circumstances should the use of government ex-service masks be permitted. Equipment should be kept clean and in first-class condition. Face pieces and hose should be discarded as soon as rubber or elastics have lost their life or fabric is broken or rotted. Face pieces should be adjusted to fit wearer and withstand deflation test.

Canisters for gas masks should be of approved type, and great care should be taken to see that special canisters are used for only those gases for which they are intended.

No canister gas mask should be used where gas concentrations exceed 2 per cent or where an oxygen deficiency may exist. For this purpose, an air mask should be used.

Masks should be kept hung up in clean, dry, dark, ventilated cabinets, properly labeled. (If subject to fumes, they may be placed in paraffined paper bags.) After use, the interior should be washed with soap and hot water, and aired for at least one hour.

Extension lights used in tanks should conform to requirements of the National Electrical Code for Hazardous Locations, Class I. These requirements include outside vapor-proof globe, guard, insulated keyless handle and approved three wire cord, which should always be protected from the sharp edge of manholes, etc. Before the light is lowered into a tank, the strength of connection at the receptacle and at the socket should be tested. Portable electric tools should receive the same rigid inspection.

The frames of electric drills or other electric tools should be electrically grounded before they are taken into the tank. The use of a cable carrying a ground wire—three wire cord—is recommended for this purpose in order to obviate the necessity of another separate wire within the tank.

No lanterns, or flashlights should be used in tanks or brought near their manholes except those approved by the Underwriters' Laboratories, Inc., or the Bureau of Mines for use in flammable atmospheres.

General

Where flammable vapors are likely to be present, no hammers, drills, or other tools likely to strike a spark should be taken inside tanks.

Riveting, electric or gas welding or cutting and ordinary soldering should not

be performed on the interior or exterior or near the manholes of tanks which contain flammable substances or vapors.

The possible hazards from gas leaks from torches or flames, the evolution of carbon monoxide from charcoal furnaces and depletion of oxygen by torches, flames, or furnaces in closed or partially closed places should be understood and guarded against.

Men who have been exposed to gases or fumes, or appear weak, nauseated, coughing, intoxicated or with nose-bleeds, or cramps, or who exhibit other unusual symptoms, should be placed at once under competent medical supervision.

We realize that the details of this discussion cannot be applied as they are to the individual requirements of the varied industrial conditions to be found today. Yet, it is hoped that they will be useful as a basis upon which practices may be founded for each plant or perhaps smaller unit.

The National Safety Council now publishes a safe practices pamphlet, "Petroleum No. 6—Safe Practices in Cleaning Petroleum Still," but it is felt that a pamphlet on the more general subject of safe practices in entering tanks and other enclosures might well receive the consideration of the Council at this time.

Our recommendation is established practices for each local condition with definite rules to follow.

VICE-CHAIRMAN ROACH: We have a few minutes for discussion. In our state where large quantities of chemicals are produced and large numbers of tanks are used, we know by our statistical records of fatal accidents that improper tank practices are common and very dangerous.

As Mr. Miner was reading the paper, my mind went over a period of the last five years and I thought of at least six fatal accident cases that might have been avoided if practices similar to those recommended by this paper had been followed.

Only two weeks ago the foreman in a plant in northern Jersey went into what he called a war tank. He was an experienced man. He had been employed in the plant for many years and he understood perfectly the nature of toxic gases. For some reason, when he went in he had no life line on, no mask, and no air line, and when they dragged the man out he was dead.

This instance can be multiplied many, many times, so much so that I feel we ought to give the very widest possible publicity to a paper of this kind that outlines safe tank practice. The floor is open for discussion.

C. L. JONES (Hercules Powder Co., Wilmington, Del.): In connection with Mr. Miller's recommendation for the drafting of a safe practices pamphlet on this work, I think it would be advisable if we could add to that pamphlet some sort of case history of the accidents that have occurred. We read a general treatise, which is of a great deal of value to us, but for the man who is just beginning to consider a problem of this sort, if we can prepare a brief history of a number of the more serious accidents that have occurred it will mean a great deal more and enable him to visualize what it means in his own plant. Take the experience for a period of five or ten years, or any period you may like. I think it would add a great deal to the value of the pamphlet.

P. W. GUMMER (Consulting Engineer, New York City): A similar problem that wasn't emphasized so very much was the painting of interiors of tanks, particularly where entry has to be made from the top. Very often they are painted with a bituminous paint where gasoline or benzene, or some other hydrocarbon is used as a solvent. Those vapors are heavier than air and remain in the bottom of the tank. Many, many cases of acute poisoning have occurred from that source.

W. D. PATTON (North Continent Utilities, Chicago, Ill.): I recall an accident which I witnessed some years ago. A Mexican was painting a closed redwood tank about five feet high and about twenty feet in diameter. He was given a bituminous paint dissolved in naphtha and told not to carry any matches or anything inflammable into the tank with him. He was given soft shoes to wear.

Contrary to orders, he had taken some matches and some cigarettes, and after he had painted for a while he sat down and lit a cigarette. Naturally, there was an explosion, and a jet of gas came from the top of the tank followed by the Mexican scrambling hurriedly out. The accident was not fatal, although it might have been, but every exposed portion of his body was severely burned. Even where he had a hole in his shorts or pants, that spot especially exposed was very severely burned and his hands and face swelled probably twice their normal size. It took months to cure him.

Such an accident could have been prevented by the supervisor searching the man and seeing that those who are liable to disobey the rules do not carry materials which may cause accidents with them.

VICE-CHAIRMAN ROACH: It is too bad we haven't unlimited time to discuss this paper because I think it is one of extreme importance, but we have a limited amount of time to give to each subject.

The next paper is by Mr. D. H. Killeffer, of the Dry Ice Corporation of America. It will be read by Mr. George C. Cusack, of the same company.

The Safety of "Dry-Ice"

By D. H. KILLEFFER

Dry-Ice Corporation of America, New York City

Experience covering a period of five years and the use in refrigeration of tons of thousands of tons of solid carbon dioxide, best known under the trade mark, "Dry-ice", has definitely proved its safety. The introduction on a large commercial scale of a material having such unusual properties, its use in the hands of thousands of unskilled workers in the ice cream and meat industries, and the development of a program of manufacture from nothing to hundreds of tons daily in the short period of six years has provided a basis for sane conclusions as to the safety of the material itself and the adequacy of methods of handling developed to meet its peculiarities.

In the experimental development of equipment we have had two accidents, but records of our own company show only five lost-time accidents, due to the peculiar nature of the material handled, in the six year period ending June 30, 1931. The only real source of accidents in this new industry has been the practical joker whose whims and overpoweringly perverted sense of humor are beyond human control. Of even these there have been only a half-dozen serious enough to be reported. This highly satisfactory record proves that fears entertained by some when "Dry-ice" first appeared on the market were hazards only and unwarranted in fact. For example, general distribution of a material having a normal temperature of -109.6°F. was looked upon as a probable cause of wholesale frost bite; the generation of huge quantities of carbon dioxide gas at high concentrations as a result of use of the new refrigerant was expected to be a source of danger on account of smothering or drowning of persons by the gas; and the pressure generated by the evaporation of a solid directly to a gas when accidentally or intentionally confined within refrigerators was believed by some to be a possible fruitful source of dangerous explosions. None of these possibilities has materialized, thanks to simple, safe, obviously logical methods of handling.

To understand the circumstances, it will be necessary to review briefly the basis of this new industry and its recent rapid growth. Although many previous attempts to commercialize solid carbon dioxide for refrigeration purposes had failed, a new effort launched in 1924 on the basis of material advances in the method of using it has finally reached a position of considerable commercial importance. The material itself is the same healthful gas used to give vitality and piquancy to carbonated beverages, converted to the solid state by intense cold. Not only is it the same gas prepared and purified in the same way as that used for food purposes but at the

present time much of that used for refrigerating purposes is manufactured, purified and solidified in the same equipment and at the same plants as the food product. The temperature of the solid is the lowest of any commercial material and is below those met by Commander Byrd and others in the long polar nights at the top and bottom of the world. Solid carbon dioxide is manufactured in cubical blocks ten inches on the edge weighing fifty pounds. Each block as made is packaged in an individual kraft paper bag bearing the trade-mark and a warning notice calling the user's attention to the immensely low temperature of the material and warning him to handle it with gloves to prevent frost bite.

From the point of view of frost bite, the manufacturing operation takes place in two stages in our older plants and in one in our more modern installations. In the two stage process, cold liquid carbon dioxide is fed into a chamber where it expands to further cool itself to form snow and this snow is shovelled out by hand into molds to be pressed in hydraulic presses to solid blocks. In the latter process the entire operation of solidification and pressing is done in the same vessel, thus preventing the loss from handling. In either case the pressed blocks are immediately put into paper bags and afterward are handled into storage and to the point of use with this protection. At the time of use, the bag is removed and frequently it is necessary to cut the blocks into smaller sizes to adapt them for particular purposes. This cutting operation is carried out with either hand or power saws, and the small pieces may be bagged again if circumstances require it.

The minimum handling through which a block of "Dry-ice" must go is once from the press to the customer's storage box in which it is delivered to him and a second time from this box into the refrigerator where it is used. In practice the blocks must frequently be handled as many as half a dozen times, exposing someone to the possibility of frost bite at each handling. During 1929, some 15,000 tons of "Dry-ice", equivalent to nearly three quarters of a million blocks, were made and handled a probable average of four to five times each. Nearly double this amount was put to use in 1930 and it is probable that this year's total will be even larger. It is obvious from this that there has been plenty of exposure to develop any real hazard to an extent satisfactory for observation.

It is also pertinent to note that our manufacturing and distributing program had developed from three plants and a single distributing warehouse in 1928 to eighteen plants and twenty-seven distributing points in 1930. In addition to these, storages capable of holding 13 million pounds of "Dry-ice" are in operation and a fleet of forty specially designed refrigerator cars has been actively transporting "Dry-ice" itself from point to point throughout the country to equalize production and demand from Coast to Coast.

Such rapid development has required assimilation of untrained labor in large groups as new plants and warehouses have been opened and this with the haste always accompanying new operations has supplied the most favorable conditions for increasing industrial accidents from any specialized conditions inherent in the operations of this new industry. No question can exist as to the value from a safety study standpoint of the data to be gathered from our own safety records extending back over a period of five and a half years into the earliest commercial exploitation of "Dry-ice".

In five and a half years only four cases of frost bite have been serious enough to require an employee to be sent to a physician, and only two of these required that the employee lose any time from his regular work! That record is submitted with a sense of real pride, but it also must be admitted that it could not have been achieved had the actual hazard been really great. Of course, there have been many smaller casualties, unpleasant and annoying but not serious enough to require more than first aid. Three injuries have been caused by rapid escape of carbon dioxide gas from snow making machines caused by stoppage, and none of them caused a loss of more than three day's time by the worker.

To get a clear picture of the situation, it is desirable to study carefully the actual hazard and the conditions surrounding it. The temperature of "Dry-ice" is farther from the temperature of the human body than that of steam and the effect from a purely physiological point of view of exposure to one is very nearly the same as to the other. Danger from serious scalding by steam or hot water is primarily due to the inability of the exposed person to remove himself from contact quickly enough to avoid damage. A person drenched with hot water or steam is in immediate, intimate contact with a temperature sure to injure him even though he makes an immediate effort to escape. In the case of water escape is sure to be unsuccessful if one is already wetted with it.

Solid carbon dioxide, being a solid, permits easy escape because it cannot flow as a hot gas, steam, or a hot liquid, water, can. Also its essential peculiarity, that of evaporating directly from a solid to a gas, prevents intimate contact of a warm object with it on account of a cushion of evolved gas which is continuously maintained around it by evaporation. The low specific heat of the evolved gas makes it practically harmless as a possible source of frost bite and it is only when contact with the solid itself is established by breaking down the gas cushion with pressure that injury can result.

With this in mind the protection required is simple to devise. All that is necessary is to insure the continuity of this gas film between the person's flesh and the "Dry-ice". This can be most easily done by wearing gloves of any ordinary variety. While even the customary paper wrapping is helpful, thin canvas or cotton gloves offer sufficient protection to a person intermittently handling "Dry-ice" for short periods and workmen whose occupation brings them in contact with it continually are amply protected by ordinary leather gauntlets.

The real hazard from the low temperature, if indeed there is a real one, comes from the handling of metal which has been in contact with "Dry-ice". For this reason particular care is taken to provide wooden handled tools to be used where accidental contact might cool them to a dangerous extent.

When accidents do occur from contact with "Dry-ice," the most effective treatments are those ordinarily prescribed for burns. The similarity to burns is so great that it is quite customary to refer to such accidents as "burns" rather than as frost bites, since the result is localized as a burn ordinarily is rather general as most frost bites are. Unguentine, picric acid gauze, bicarbonate of soda, caron oil, and all the other burn remedies are effective as first aid.

The hazard from carbon dioxide smothering is almost non-existent so far as our experience has gone. Unlike carbon monoxide, carbon dioxide is in no sense a poison. Actually, according to authorities on respiration, it is the change in carbon dioxide concentration in our lungs which keeps us breathing when we are asleep. The lungs are sensitive to even the slightest change, especially an increase, in the concentration of this gas produced either internally or introduced from the outside, and it has even been suggested that the exhilaration from drinking carbonated beverages is the result of the stimulating effect on breathing of the gas inhaled from above the bubbling drink. The only effect upon a human being which high carbon dioxide concentrations can have is stimulation of breathing in an effort of the lungs to void the gas and if so much of it is present as to limit or cut off the customary oxygen supply a person may be smothered by it. No after effects are produced and the residue of carbon dioxide in the lungs after being brought into the air is its own best cure. The use of carbon dioxide to stimulate the breathing of persons overcome by breathing foul air has become general to replace the more harmful and unnatural pulmotor.

Under ordinary conditions the quantity of carbon dioxide introduced into the atmosphere from a "Dry-ice" refrigerator is negligible and can be easily handled by even the most inefficient ventilating arrangements. To be specific, an ordinarily active person will exhale an average of about two cubic feet of carbon dioxide per

hour, while a five gallon package of ice cream refrigerated with "Dry-ice" will under ordinary conditions exhale less than three and often as little as two cubic feet of the gas per hour. It is thus obvious that the ventilation required by a person will readily take care of such a refrigerated package without allowing an increase in the carbon dioxide content of the air to take place. At the present time paper packages of this type and refrigerated automobile trucks consume practically all of the "Dry-ice" manufactured.

In some cases it is desirable to fill the refrigerated body of a truck or other refrigerator with carbon dioxide gas of high concentration. The anticipated danger to persons entering such spaces has also failed to materialize. The effect of the gas on breathing is immediate and is so evident to the person that he will not enter a high concentration of it. The gas being much heavier than air immediately rushes out and is dissipated. Our own experience in the storage handling of immense quantities of "Dry-ice" in storages which must be frequently entered has resulted in no single instance of trouble from this source. Where storage spaces have been built with the entrance through the top, workmen are provided with gas masks connected to fresh outside air and are able to supply their own air without the use of pumps or other means to bring it to them.

When a person is for one reason or another exposed to too high concentrations of the gas, the remedy is simple and extraordinarily effective. A minute in the fresh air and all trace of the exposure is gone.

The danger from explosion of refrigerators in which carbon dioxide is being continuously given off is also quite non-existent. In spite of the best efforts of refrigerator builders no practicable structure has yet been built whose natural leakage of gas is not amply sufficient to allow the escape of gas at a rate ample to prevent the creation of measurable pressure. An automobile truck for the transportation of 500 gallons or so of ice cream consumes about 60 pounds of "Dry-ice" in twenty four hours. The gas generated from this amount of solid is about 510 cubic feet, a little over twenty cubic feet per hour. This can easily be vented through a hole a quarter of an inch in diameter without the generation of any measurable pressure. In ordinary construction practice the difficult problem is to prevent the escape of this gas before its full usefulness has been realized, and not to get rid of it without creating dangerous pressure conditions.

VICE-CHAIRMAN ROACH: I think before we discuss this subject, we will hear from Professor Ward V. Evans, Professor of Chemistry, Northwestern University, Evanston, Illinois, who will present a paper on "Other Refrigerants". Then we will have discussion on both papers.

Other Chemical Refrigerants

By PROF. WARD V. EVANS

Chemistry Department, Northwestern University, Evanston, Ill.

Great strides have been made in the art of refrigeration in the past thirty years. Many of us can remember when the milk can was hung in the well and the day's supply of drinking water was cooled by evaporation in an unglazed jug. The general principle of refrigeration, however, has not changed, only its mechanical application. The chief principle in refrigeration is the utilization of the latent heat of change of state for cooling purposes. Absorption is simply a modification of the same principle. Refrigeration is secured by allowing a substance to change its state and mechanically arranging the mechanism so that the latent heat is supplied by the substance we wish to have cooled. The substance changing its state is the refrigerant, and this change of state may be accomplished by motor driven machinery, thus necessitating moving parts, or as in absorption machines by the use of heat supplied usually by a gas flame.

Artificial refrigeration, both in transportation, in storage and in the home, is an achievement deserving the highest commendation. The greatest advances in this art have occurred in the past ten years. It has been only recently that any substances other than carbon dioxide and ammonia were used as refrigerants. Recently however, with the advent of the household machine, a demand for other refrigerants that would have suitable characteristics to render them applicable to small machines, has arisen. The research sources of our industries have been taxed to find substances with suitable boiling points so that they could be liquified and evaporated without the use of great pressure or vacuum. Reviewing the history of refrigeration, we find that more than fifty different substances or mixtures have been at times used in compression and absorption machines. Table I gives a list of some of these substances, and other substances that might be used.

TABLE I

Substances that May Be Used as Refrigerating Mediums

Glycerin	Dichloromethyl ether
Pentachlorobenzene	Heptane
Trichlorobenzene	Ethylene trichloride
Ethylene-glycol	Hydrogen sulphide
Methyl aniline	Trimethylene
Aniline	Methyl ether
Phenol	Methylamine
Dichlorobenzene	Trimethylamine
Decane	Dimethylamine
Chloropyridine	Methyl ethyl ether
Chlorotoluene	Ethyl ether
Pentachloroethane	Dichloromethane
Nonane	Carbon disulphide
Acetylene tetrachloride	Diethylamine
Xylene	Acetone
Amyl alcohol	Methyl alcohol
Chlorobenzene	Hexane
Octane	Carbon tetrachloride
Tetrachlorethylene	Ethyl alcohol
Butyl alcohol	Benzene
Pyridine	Propyl alcohol
Toluene	Triethylamine

Taylor, R. S.: Heat Operated Refrigerating Machines of the Absorption Type, Refrigerating Engineer 17:136 (May) 1929.

Most of the substances named in this table, however, are unsuitable for household refrigerants, chiefly because their physical constants are such that their latent heat cannot be rendered available without the use of special machinery.

Table II includes a list of the present day refrigerants.

TABLE II

Refrigerant	Symbol
Carbon Dioxide	CO ₂
Ethane	C ₂ H ₆
Ammonia	NH ₃
Propane	C ₃ H ₈
Methyl Chloride	CH ₃ Cl
Sulphur Dioxide	SO ₂
Isobutane	C ₄ H ₁₀
Butane	C ₄ H ₁₀
Ethyl Chloride	C ₂ H ₅ Cl

- Dichloromethane CH_2Cl_2
 - Dichloroethylene $\text{C}_2\text{H}_2\text{Cl}_2$
 - Trichloroethylene C_2HCl_3

This is the list of refrigerants mentioned in the Safety Code for Mechanical Refrigeration approved by the American Society of Refrigerating Engineers.

Those refrigerants marked with a circle are used chiefly in the small household units. The ones marked with a dash are high boiling refrigerants used for air conditioning. One other quite recent refrigerant may be added to this list. It is dichlorodifluoromethane. Its boiling point lends it to use in the small machine.

Since the application of chemical refrigerants (that is refrigerants other than ice, water, and air) to all phases of our industrial and domestic life, the requirements for a refrigerant have vastly changed. All the refrigerants in common use are toxic substances so if we are to have them in our home we must know their properties. Their regulation becomes a health problem of first magnitude. Before the advent of the small machine the specifications for a refrigerant dealt only with its physical characteristics. Today the chemical and physiological properties are of at least as much importance. Also its cost of production must be considered.

Now what are the characteristics of the ideal refrigerant?

1. It must be non-corrosive.
2. The larger its latent heat the more possibility of its being efficient.
3. Its boiling point must be such that it can be liquified and vaporized without great pressure or excessive vacuum.
4. It should be non-toxic.
5. It should be non-flammable.
6. It should be non-explosive.
7. It should have a characteristic odor.
8. It should lend itself to detection of leaks.
9. It should be stable.
10. It should be incapable of forming toxic or objectionable substances if exposed to flame.
11. It should have a low cost of production.

We have here a list of chemical, physical, and physiological characteristics for the ideal refrigerant to approach. It is a very large order, and we can safely say that the ideal refrigerant, like the ideal gas or ideal solution, is purely a figment of the imagination. If we attempt to rate the chemical substances that can be used as refrigerants we find that they all fail in at least one particular. They are all toxic and cause discomfort and even death if in sufficient concentration. Even carbon dioxide is harmful. Air and water are not possible because of improper boiling points and hence require excessive pressure on the one hand to cause liquification, and high vacuum on the other to produce vaporization. We can construct a table of the substances whose boiling points and critical temperatures enable them to be used easily and economically as refrigerants in household units and state the qualifications we have outlined. We will have seven substances in our table if we include the latest discovered refrigerant dichlorodifluoromethane.

TABLE III

	NH_3	SO_2	CH_2Cl	$\text{C}_2\text{H}_2\text{Cl}_2$	C_2H_4	CO_2	CCl_2F_2
Latent heat Btu/lb. at 5°	565.6	169.4	178.5	177.0	169.5	115.3	71 ?
Boiling Point 1 atm.	-28.03	14	-10.65	53.9	33.1	-109.4	-22
Corrosiveness	Corrodes copper	Cor- rodes	No	No	No	No	No
		if water present					

Flammability	In cer- tain proportion	No	In cer- tain proportion	In cer- tain proportion	Yes very	No	No
Explosiveness in air	Slight- ly	No	Slightly	Slight- ly	Yes	No	No
Odor	Yes	Yes	No	No	No	No	No
*Toxicity (im- mediate)	5	6	4	3	1	2	1
*Toxicity (de- layed)	1	1	6	1	1	1	1
Leak Detec- tion	HCl easy	NH_3 easy	Cu and flame	Cu flame	No	No	Cu flame
Stability	500° almost completely decomposed	Stable to 2000°	500° de- composed slightly to $\text{C}_2\text{H}_2\text{Cl}_2$	Decom- posed 520° to Ethylene 55%	Stable to 600°	Stable to 2000°	?
Formation of Toxic sub- stances in flame	No	No	HCl gas	HCl gas	No	No	HCl HF

*The toxicity of these substances is rated from 1 to 6. No. 1 being least toxic.

We note from our table that the boiling point limits of the ideal refrigerant for small machines is from about -30° to +30°. We also discover that two of our common refrigerants are corrosive, four are flammable, and three are explosive in a degree. Only two have a marked odor and, as previously stated, all would be toxic in certain concentration. We also note that two are easy to detect, three would be recognized only by an experienced person, and two only by a chemist. In regard to stability, two are very stable and the other five would be rated as unstable. It is also notable that while four would form no toxic substances in a flame, three would very likely do so.

Another table rates these seven refrigerants in order of their conformity to certain desired characteristics. The lower the score, then, the nearer a given refrigerant approaches the ideal standard.

TABLE IV

	Ammonia	Butane	Carbon Dioxide	Ethyl Chloride	Methyl Chloride	Sulphur Dioxide	Dichloro- difluoro- methane
Immediate toxic effects	6	1	2	3	5	7	1
Delayed toxic effects	1	1	1	1	7	1	1
Flammability	4	7	1	6	5	1	1
Efficiency	2	5	6	2	4	1	3?
Pressure developed	6	2	7	1	4	3	5
	19	16	17	13	25	13	11

Journal of the American Medical Association, June 7, 1930, Vol. 94, pp. 1832-1838 and 1842 and 1843.

So averaged, none of these substances achieves a perfect rating, and it must be remembered that this rating may be very deceptive since one characteristic is omitted; namely, the chemical behavior in contact with an open flame.

Carbon dioxide is little used in small systems because of the heavy machinery necessary to liquify the gas. In other words, too great a pressure is required on the high side, one thousand pounds per square inch is not uncommon. It is non-corrosive. Its toxicity is small. We find from .03 per cent by volume to as much as 20 times this amount in crowded rooms. This concentration produces no ill effects. The only effect of excessive concentration such as 3 to 7 per cent is to augment breathing and produce fainting. When the oxygen content of the air has been reduced to 14 to 15 per cent, ill effects appear, and a reduction to 8 or 10 per cent becomes dangerous to life. Carbon dioxide is not flammable, in fact smothers fire, is quite stable to 2000°, and is non-explosive. Leaks, on the other hand, are difficult to locate and there is no warning odor. It is easy of production, quite cheap, and cannot possibly be a fire hazard. Carbon dioxide would be a desirable refrigerant if it lent itself to use in a small machine.

Methane, propane, butane, and isobutane are hydro-carbons, belonging to the paraffin series. They are simply asphyxiants with possibly some anesthetic properties. They are stable, non-corrosive, have suitable boiling points, and are non-toxic. However, they are flammable and explosive in proper air or oxygen contact. They have no odor and are hard to detect. These substances are far from ideal.

Ammonia ranks high as a refrigerant and is largely used. This gas is not particularly stable, is corrosive only to copper and brass, and has a suitable boiling point. It is easily detected, has a warning odor since it is highly irrespirable, and is quite toxic. It is combustible when mixed with air in the proportion 16 to 26 per cent by volume. It is unstable. High heat above 500° will decompose it to N₂ and H₂, and increase the pressure and an explosion under such conditions will liberate large quantities of H₂, a highly explosive substance. It is easily detectable and economically feasible. With hydrogen chloride gas leaks could be readily located.

Sulphur dioxide is the most widely used refrigerant and has the best rating of the accepted refrigerants. It is stable and has a suitable boiling point. From the point of view of refrigeration efficiency it ranks first. It also stands first in ease of detection for it is a violent respiratory irritant and gives warning of the slightest leak. It is corrosive if in contact with water, forming acids that act vigorously on iron and steel; therefore, it must be carefully dehydrated. It is quite toxic and there seems to be no foundation to the theory of its being a cure for respiratory lesions. It is known to aggravate bronchitis. Its leaks are easily located with ammonia. It is stable, inert to flame, and non-explosive.

Dichlorodifluoromethane seems to rate very high as a refrigerant. Its production is a tribute to the research chemist, producing in his laboratory a definite substance having proper physical characteristics for use in a certain capacity. Its thermodynamic properties and its physiological properties seem to mark it as an ideal refrigerant. Its toxic properties have been investigated and at present its performance seems entirely creditable in this respect. However, there is one aspect on which further investigation seems desirable before this substance is adopted as a refrigerant that might be placed in quantities of as much as 1000 pounds in apartment houses and similar places of human occupancy. That is, the matter of its chemical properties—its stability, and conduct in flame. It is known that carbon tetrachloride, a well known fire extinguisher, is not a suitable substance to use in hot flames. This substance will extinguish a small flame, but in a hot flame gives quantities of COCl₂ and HCl. Its use has had to be prohibited in fighting laboratory flames, for instance. Now CCl₂F₂, escaping in the region of a fire will produce quantities of HCl and HF. These are extremely toxic substances. To have a large quantity of any chemical refrigerant except CO₂ located so that it may escape in time of a fire is a hazard. Small machines give less trouble but large quantities should be introduced certainly only after careful investigation and thorough safeguarding.

In regard to the introduction of warning substances into otherwise odorless refrigerants we can only say that this is a doubtful expedient at best and should be used only after thorough investigation. A small amount, say 10 per cent, of sulfur dioxide introduced into methyl chloride for instance; any water present may cause this percentage to become so low that no warning will be given and a false sense of security lead to disaster. Suppose, for example, that the original 10 per cent becomes 5 per cent. If the solution contains 5 per cent SO₂ there is no reason to suppose that the content of the escaping gases will be 95 per cent methyl chloride and 5 per cent SO₂. In fact we are quite sure that the gaseous phase will contain less than 5 per cent of the high boiling constituent which is SO₂. It might contain no more than 2 per cent of the SO₂. Now a toxic concentration of methyl chloride will contain only a very small concentration of SO₂ and since this gas is heavier than methyl chloride and diffuses more slowly, it would be found in the greatest concentration near the floor. It might be quite possible to be so poisoned with methyl chloride that the warning gas would be of no avail.

Again there seems some basis for the opinion that small amounts of sulphur dioxide mixed with methyl chloride corrode pipes very badly.

The use of other warning agents without proper research is not to be recommended. Some of the substances recommended polymerize readily and in the course of time would very likely cease to function, giving again a false sense of security.

With the ordinary refrigerants in common use, of course the grave danger appears only when large quantities of the refrigerant are involved, as in multiple systems, where a leak in one unit may precipitate at that point the entire gaseous content supplying many such units.

VIC-CHAIRMAN ROACH: The next paper was prepared by Mr. E. B. Besselievre, of the Sanitary Engineering Division of The Dorr Company, Inc. It will be read by Dr. G. P. Edwards, chemist, Sanitary District of Chicago.

The Hazards of Chemical Wastes and Their Safe Disposal

By E. B. BESSELEVRE

Sanitary Engineer, The Dorr Company, New York City

Pure air to breathe, pure water to drink and clear skies for clear vision are the natural heritage of mankind. Any encroachment upon these prerogatives is not consistent with the spirit of true civilization.

In the tenseness of modern life and the urge to forge ahead in this industrial age and nation, these things have been forgotten, or perhaps we may better say side-stepped. This attitude is not intentional or with malice aforethought, but is an unconscious contribution of our fast moving times to the problems and perplexities of life. In the face of keen competition, industries have striven to live and grow, and in order to show a profit to their owners and stockholders, have at times neglected to consider public comfort or the inherent rights of others in nature's products. The human body was conceived on the basis of pure air to fill our lungs and maintain the purity of our blood. Those of us who reside or work in localities where the air is unsullied do not think of the dependency of our health upon this factor. But to those who are forced to live in those localities where the air is tainted with the fumes of industry, the shorter life, the prevalence of diseases of a pulmonary nature are mute evidence of the dangers that exist.

Pure water is another necessary fluid that was provided by Nature to flush our systems of waste products. Until comparatively recent years, little thought was required to procure this "Adam's Ale" pure and safe to drink.

Increasing density of population and the indiscriminate discharge of human and industrial wastes into the waters of our streams has made it necessary for municipalities to spend millions of dollars to install filtration plants to prepare the water

for fit use as a beverage. Before this widespread adoption of filtration, hundreds and thousands of lives were lost in the typhoid toll, due entirely to drinking of polluted waters. Modern science has made it possible to remedy this condition and make the waters safe to use, but this is wrong in principle. The common law prescribes that a man is entitled to a supply of water pure and of sufficient quantity to supply his needs, and calls upon the man above him on the stream to return the water to the stream in that condition. But rarely does he do this. The manufacturer takes the water from the stream, uses it in his plant in the numerous and complex processes of manufacture, and discharges it to the stream again carrying its unholy burden of poisons, color and other matter obnoxious to the nasal and visual senses of man. The man downstream says nothing, thinks a lot and spends his good money to filter this water and make it fit for use.

Since our first days, we have been taught to look upon the clear blue of the sky as a criterion of all that was pure and beautiful. In the early history of our country one could go out and look at the sky and really appreciate its beauty, but in many sections, now, it is a myth. Even on the clearest of days, when the skies are unclouded and the sun should shine through with its beneficial effect upon our health and the life of our flora, some sections are overcast with a drab, dense, impenetrable cloud of smoke or fumes from nearby industrial plants. Regardless of the proven lack of harmful effect of leaden skies on health, the sunshine and clear air are synonyms of health, activity and the joy of life. The mental attitude of one living in such an environment cannot help but be stilled and warped. Crimes and vice are the outcome of depressed and mentally warped humans. I repeat that this pollution of our air, our water and the defiling of our atmosphere and vision are not deliberate on the part of our industrialists.

On the other hand, I know from experience that many of the high-minded men who have developed these giants of our industrial age deplore this condition and are willing to do their share toward its alleviation. But measures of remedy cost considerable, and frequently it is a question of continuing a given factory at a profit by allowing the pollution, or of stopping the pollution at an expense which may force the offending plant to close down. Localities depend for their continuance upon their growth, for their prosperity upon local or contiguous industries, and to shut them down blindly would be to reap irreparable damage to many. No, the remedy is not indiscriminate demands for cleaning up pollution, regardless of expense or without regard to the best things for the majority, but it rests in the intelligent study of these problems by those with knowledge of all the determining factors. It calls for the whole-hearted cooperation of those in power to compel action with those who are the offenders, unwittingly or not, and with those who are qualified to advise as to means of remedying these problems at a cost consistent with possible continuance in business.

Modern medical science has demonstrated that the direct rays of the sun are beneficial to health, but in many industrial centers the pall of soft coal smoke mollifies the strong actinic rays and makes the wan sunlight of these places less beneficial than seashore or mountain resorts.

The dangers to health attributable to industrial pollution are legion, and in the short period allotted to this paper one cannot do more than give a brief resume of these dangers and a suggestion as to their remedy.

Industrial wastes are discharged in three general forms: solids, gases, liquids. Each of these has its definite effect on the health and comfort of those resident nearby. There is a fourth sub-class of wastes that are chiefly liquid, but carry a certain proportion of solids, both components being deleterious in different ways. It is best to take each one of these classes separately and consider the sources and components, and their effect. Solid wastes are usually the scraps remaining from the process work in the plant, or by-products of the plant. Some are thrown out in a solid form and remain stable, the problem of their final disposal being a place to put them out

of sight. Combustible wastes in the solid form may be readily burned in municipal or private refuse incinerators, depending upon the quantity, the proximity of the public incinerator to the plant and the charges made by the municipality. Some solid wastes, such as saw mill refuse, may readily be used as fuel and some revenue be derived from them by savings in the purchase of other types of fuel. Usually, also, wastes of this type may be suitably disposed of by dumping in low spots and covering with earth.

Wastes of a solid nature, that are in themselves decomposable or contain decomposable elements, are a far more serious problem and require different handling. If such wastes are allowed to lie around in uncovered piles, they will soon cause obnoxious odors in the vicinity and arouse complaints and causes of civil action. Organic solid wastes may be adequately disposed of in some instances by putting them in closed receptacles and allowing them to undergo their natural process of decomposition. Under certain circumstances, such solid wastes as cannery refuse, meat packing plant waste may be thus digested, and in the process of this digestion produce a large volume of gas. This gas has a high calorific value and may be utilized in producing power or used as fuel under boilers, etc.

Solid wastes, such as slag from furnaces, scraps of iron and other metal, tailings from metallurgical operations, may be disposed of as fill. If this is done sensibly, low, swampy places may be reclaimed and be the source of considerable revenue for factory sites. Judicious piling of this material to a height consistent with the surrounding ground elevation will neither cause obstructions to traffic nor be obnoxious to the eye, and, on the other hand, may open up new avenues of approach to land developments, thus saving time for those who reside or work in the vicinity. A noteworthy example of this type of disposal of a solid waste is at the plant of the Martin Dennis Company, at Kearny, N. J., where, by means of a system of industrial railways, they have reclaimed a number of acres of swamp land adjacent to their plant, thus making for themselves and their neighbors a much more presentable terrain, reducing mosquito nuisance and adding valuable building areas. Their potential disposal grounds are immense, as there are thousands of acres of the low land close to their plant, and it is probable that the owners of this land will be glad to grant the Dennis Company the right to fill their swamps on the same basis.

Indiscriminate piling of wastes serves no useful purpose. The huge piles of waste phosphate rock in Florida, the tailings piles at the copper mines, the waste piles at Syracuse, N. Y., are mute evidence of misplaced disposal. There is low and waste land in the vicinity of any of these places that could be restored to useful and productive purpose by careful and studied dumping. Health officials can have no jurisdiction over such affairs, but municipal authorities can logically, and should exercise some measure of control over these waste dumps.

Gaseous wastes are those emanations of plants which are usually the result of processes involving combustion, either of fuels for power and heating purposes, or for roasting of ores, smelting of metals, gas manufacturing, acid manufacturing plants, incinerators and the like. In many of them the gases thrown off are visible, being colored the familiar yellow of sulphur, black when soft coal is used, and the white ash-laden smoke of an incinerator improperly operated. Flora in the vicinity quickly show the evidence of such pollution, trees and plants dying, and soon there is a dearth of foliage round about. Seeing the effect on foliage, one must needs appreciate the great danger there must be to the human system from such fumes and gases. Pulmonary diseases are always intensified in such places, where the air is sullied. Children show the result in stunted growth and mentality, and the ratio of death is high. Inhalation of these noxious fumes cannot be helped, and surely, the inhabitants of a vicinity should not be compelled nor expected to go around with gas masks clamped to their mouths all the time because a manufacturer is either too short-sighted to see the advantage of protecting public health or is too avaricious.

This is one field where the health authority may, and usually does, assert his jurisdiction, and the result is a clean-up.

Municipal refuse incinerators are in many cases notorious performers in the discharge of smoke carrying odors of unconsumed garbage; many small particles of ash which settle in a pall over the country-side and constitute a fire menace, as well as a menace to comfort and health. Where the incinerators are one of a recognized group, this is due entirely to faulty operation. Experience has proven that when the furnaces of municipal garbage and refuse incinerators are kept at a heat of between 1200 and 1400 degrees F, perfect combustion of the refuse will result, there will be no smoke, no odors and no powdery ash. Allowing the heat to drop below the danger point of 1200 is due to carelessness, insufficient combustible material to maintain the heat or lack of care in the mixture of garbage and rubbish.

All gaseous wastes may be readily controlled. Frequently a check-up in the plant itself will disclose leaks and sloppy operations, which, when corrected, will modify the trouble to a marked degree. Odor-destroying devices have been developed and are in successful use. Washing of gases and fumes will frequently suffice to remove solids in suspension in the gas. A number of successful plants are now functioning where plain settling tanks have been employed to recover flue dust, and several types of scrubbers are in use in gas plants that will reduce the odor nuisance. The use of chlorine has been found effective in a number of cases in preventing stack odors. Usually, a scrubbing or washing operation will remove sufficient of any

Liquid wastes are, of the three main types, the worst to handle, are the greatest in number and present the greatest problems to the engineer and chemist. Because the nearest stream is usually the means of disposal first considered, the pollution is immediately transmitted to an innumerable body of innocent humans and animals who either depend upon these streams for their source of potable water, or for industrial purposes or for watering stock. What may appear on the surface to be a small volume of waste from a relatively small industrial plant may easily destroy the value and safety of a water supply for thousands of people. This entails great expense on the part of the officials of these communities in which those people live, to provide filtration plants to remove the pollution and the danger. Fortunately, our health authorities now recognize that the inherent rights of the multitude are the governing factor in such cases and do not permit a single industry to endanger the health and well-being of a large population.

Liquid wastes are usually large in volume and contain a great array of materials which may be classed as pollutants. Some of these elements are in suspension, some in solution and vary in color and concentration. It is not necessary that the large volume of water usually discharged from industrial plants be diverted from the stream because of pollution, but, rather, it is essential that the pollution be removed. Large volumes of water taken from a stream and used in the various industrial plants that line its banks should logically be returned to that stream after use. The common law says that it must be in the same volume and condition. An example of this policy of diverting water from a stream was evident in the Passaic River, in New Jersey, until recent years. The large textile mills at Passaic, Paterson and the other towns along this river required enormous volumes of water each day, one plant alone taking 15 millions of gallons each day, enough water to satisfy an ordinary city of 150,000 people for its normal uses. The total reduction of the river flow through the pipe line used by these textile mills was so great that, except at flood times, when the dam overflowed, the river bed ran almost dry and was a sore sight, being the recipient of all manner of debris. Regulation of this by requiring the users to return a certain proportion of the water used to the river has again resulted in the Passaic being classable as a river.

It is true that in many plants a large volume of water is used in cooling and other purposes which may not entail contamination. This water can be, and usually is,

discharged directly to the stream, if found to be safe. On the other hand, it is sometimes more economical to treat wastes which are highly charged with pollutants than a highly concentrated waste, and in a number of instances it has been found advantageous to combine some of this clear water with the wastes, in order to obtain the reaction that an alkaline water will produce on an acid waste. This method may be shown in certain cases to save considerable money for a client. For instance, where color removal is the desideratum, and as in dye manufacturing wastes or textile plants, it is difficult and expensive to remove the last trace of color by chemical means, the lighter shades of color may be entirely dissipated in a large volume of clear water, so that the resultant discharge to the stream is safe and unnoticed. To overlook this when advising a client on treatment is perhaps to put an unwarranted burden of expense on the client.

Many liquid wastes are menaces to health because of their content of organic solids. These settle out in the stream, and, due to their avidity for oxygen, soon make the stream odorous and destroy the use of the water for potable purposes. By reducing the oxygen content, fish life is endangered or destroyed and bi-valves are rendered unsafe to eat. Many of the famous oyster beds of the country have been closed down, due entirely to pollution, either from industrial plants or municipal sewage.

The wastes from tanneries, meat packing plants, glue factories, canneries and milk products plants are notorious offenders against the purity of streams. Usually, these industries concentrate in given localities, so that the pollution problem is intensified, due to excess concentration. Until recently, it has been the custom for tanneries to locate in country and wooded districts, mainly because of the need for oak and chestnut bark for tanning materials. Consequently, most of the small streams of those states, such as Pennsylvania, Wisconsin, Michigan, Massachusetts and Virginia, which are the tanning centers, have been rendered useless for drinking purposes or for fishing.

Steel and wire mills, coke plants and large textile mills are polluting in that their wastes contain large quantities of mineral salts, acids, chemicals, dyes in solution, and not only do they pollute by discoloring the streams, but they actually poison the water. Coal mines produce large volumes of pollution known as "acid mine water", which, flowing through the opened veins, gets into the streams and renders them unfit for steam purposes. To neutralize these acids, large quantities of alkalis are needed, and these in turn harden the water, thus entailing a second operation of softening to render the water useful for laundries, boilers and even for human consumption. Mine drainage is a natural function and is expensive to control, and it seems a travesty of fate that some of the worst offenders from this source are abandoned mines. Having no one interested in them, there is no one to spend the money to cure the disease, and unless public funds are available, nothing is done.

A noteworthy effort to control such pollution was worked out in Pennsylvania by a number of mines whose discharge eventually found its way to Indian Creek, a stream used by a large railroad system for its water for its engines. Faced with suits and an adverse decision in the courts, the companies banded together, and, instead of putting in neutralization plants, they constructed a tunnel quite a few miles long, through a mountain, at an expense of over \$100,000, and thus eliminated the particular source of trouble. But all they did was to transfer the pollution from one stream to another—a temporary expedient. Sooner or later the pollution in the stream now used will increase to the danger point, and it will then be necessary to spend more money to go elsewhere, or in the end treat the wastes.

Where there is concentration of industry in a given locality, splendid results may be obtained by the provision of a common fund, by the members of the industry, to finance the experimental work necessary to develop a successful and economical method of treatment for the wastes of a given industry. Cooperation of these groups with state health officials is usual, and it is a wise move, as it serves not only to forestall

action, but to call the attention of the state to the problem and to keep them posted as to the efforts of the polluters to find a remedy.

The tanners of Pennsylvania, in combination with the State Water Board, have done a noteworthy piece of work in investigating the treatment of wastes from tanneries located on small streams. The coke manufacturers, due to the intensified pollution caused by the phenols in their wastes, have spent large sums in endeavoring to find means of relieving this trouble. Processes of absorption and evaporation have been the result. The paper and paper pulp manufacturers, who have a problem of large volumes containing high percentages of waste fibre and sulphite liquors, have been working for years under intelligent guidance and in harmony with the officials of Michigan and Wisconsin, and have had marked success.

The meat packers have done a great deal of work in Chicago, Fort Worth and other places to develop a means of handling their wastes. In one instance this has resulted in the development of a method of treatment which, at the plant where it was originally developed, shows a considerable annual profit in the recovery of valuable by-products and their use as hog feed and fertilizer. More and more of this concerted action will undoubtedly be done in the course of time, and eventually all large industrial organizations will be brought to see the advantages of research properly conducted.

The ramifications of methods that may be employed to treat wastes of a liquid nature are so wide that it cannot possibly be more than touched upon in a broad manner in this paper. It must suffice to say that in the writer's experience in dealing with a total of several hundred waste problems of all kinds, he has never found it impossible to treat a waste to produce the desired result. However, it is the writer's belief that success in waste treatment is only success when it is economical. Many times it has been found that wastes could be treated to reduce the color or the suspensa to a minimum, but that when all the figures were cast up, it would be business suicide for the plant owner to attempt to carry out the treatment. That is why intelligent investigation of a problem is so important, research is a cardinal factor and thorough cooperation between the health officials, the plant owners and the consultant will eventually produce a result satisfactory to all.

In general, it may be stated that wastes containing fibrous matter, such as tannery, canmery, glue, textile, beet sugar, etc., may be treated primarily by means of screens to remove these fibres. The solids in suspension may be readily reduced by means of sedimentation basins, usually mechanically cleaned. The solids in solution usually must be precipitated chemically or filtered out, and this entails equipment for adding chemicals, mixing and the following quiescent sedimentation period. Some waste containing fibres, suspensa and dissolved materials may require a plant embodying all three methods of screening, sedimentation and chemical precipitation.

The main effort should always be to produce the desired result at a reasonable cost. Reasonable cost means a price that will be considered within the range of possibility by the plant owner. A sum that would sound small to one man would be a considerable item to another. All of these points are taken into consideration by the consultant or technician who goes in the right direction—toward the light.

The problem of wastes from industry, and their effect on health, is a great one for the safety engineer to face, and the writer considers that it is as much a part of the work of the safety counsellor to an industrial plant as it is to see that the fire-escapes are safe or elevator doors are closed or machines properly guarded. An epidemic or disease or illness caused by pollution of the air or the water may cause time loss in a plant which, in the long run, will be more serious in a financial way than one or two accidents within the plant.

Cooperation between the safety engineer and the public official, especially the health official, to work out solutions for this phase of safety work, will result in widespread satisfaction to a greater number of people—lives will be saved—homes protected and in general everyone will be better off.

VICE-CHAIRMAN ROACH: Is there any discussion?

DR. W. D. McNALLY (Consulting Chemist, Chicago, Ill.): I want to discuss the phase of the excellent paper given by Dr. Evans on tracer gases.

I want to give you some figures from the actual use of tracer gas in the city of Chicago, where we have had so much trouble from the refrigeration industry. Electrical refrigeration is here to stay and we should encourage safe chemicals, safe apparatus, and the refrigerants now in use should be made safer by any means at our disposal.

One of the things at our disposal is the addition of a tracer gas, such as sulphuric acid and acrylic aldehyde. Sulphuric acid when mixed with methyl chlorid can easily be detected in the air in parts two per one million. Five parts per million in the air is an irritating gas.

I have a drum of methyl chlorid with acrylic aldehyde which is now two and one-half years old, and there is still enough acrylic aldehyde in there to drive you out of the room. So it does not polymerize easy in the presence of methyl chlorid. It will polymerize in the presence of moisture and some metals and other substances, but in the refrigerating system it has proved a very efficient means of the manufacturer checking up his apparatus.

I will give you some figures to illustrate that from a practical standpoint. From November, 1928, to November, 1929, in the city of Chicago we had 205 people made ill by refrigerating gases. There were ten deaths. There were 879 people driven from their homes. This included 539 leaks reported to the Fire Department and to the Health Department. In contrast to that, for the period of 1931, lacking one month, there have been only 88 calls or alarms on account of leaks in electrical refrigeration. There have been no deaths and there have been no serious illnesses. This I attribute to the safer use of electrical refrigerating equipment, made safe by the use of these tracer gases.

VICE-CHAIRMAN ROACH: I hope you won't let that paper on chemical trade wastes pass by without some discussion. We have been trying for seven years to get somebody to write a paper of that kind, but the subject seemed to cover such an extensive field that we were never able to do it until this last year.

Most of us who have lived a normally long life know the stigma that for many years has attached to the chemical producing industry because of careless and unwise and thoughtless production practices that permitted corrosive gases to pass out into the air to injure people's lungs, foul fluids, to pollute water courses that made people sick, and last, but not least in my judgment, these obnoxious, unsightly heaps of waste, trade refuse, that were just as offensive to an ordinary person's sense of fitness and beauty. We have a right to a decent landscape, and I question the right of anybody, ethically or legally, to pollute the air or the water or the landscape.

During the war in our state, when industry was speeded to its highest pitch, trade practices in the chemical industry in many places were far from being above criticism, and only the exigencies of our situation at the time permitted the authorities to allow those practices to continue.

There is no reason why chemical plants can't be made orderly if not beautiful. There is such a thing as orderliness in the arrangement of industry. I have in mind a plant that ten years ago was a most unsightly place for anybody to see. They discharged their gases in the air, their waste fluids out into a field, and their waste solids were permitted to accumulate into heaps. But that condition changed. Along the entire front of the plant they have graded and beautified with landscape gardening on the premises so that one of the oldtimers wouldn't really believe it was a chemical plant.

I can take you to tanneries now that are operated in such a clean way that they are no more obnoxious than a well-run kitchen. But twenty years ago there were tanneries in the city of Newark that were so unsightly and obnoxious to the ordinary run of people that no one would live in their neighborhood, except the workers who were accustomed to the odors and waste heaps during the course of their employment.

That is an important subject, because civilization in our country is becoming more complex all the time. We can't discharge waste products out into a stream and expect the water to carry it out into the ocean. That is not possible any more. We have to use scientific, intelligent, chemical engineering to recover these wastes before they become obnoxious to anybody.

I should like to hear the members of our Section discuss that subject now.

A. H. ZIMMERMAN (Ventilation Engineer, Chicago Health Department, Chicago, Ill.): Along that line, I think it might be wise to say that within the last five or six years we have had some very satisfactory results in Chicago in reducing atmospheric pollution from industrial processes, aside from smoke pollution.

I think one of the outstanding industries has been in metal smelting, or the recovery of waste scrap metals; that industry particularly handling brass, copper, and lead. They have always been a source of contention because of the fumes especially from the metals and acids which are given off, and it has been quite a problem to know just how to collect these waste products. The main thing was to get somebody started. After we got one or two of the plants started, things went along rather smoothly. Today I would say most of the larger plants either have complete installations or are in the process of putting in installations for the collection of these waste products.

I can name one plant in particular where the biggest item was the smelting of brass and copper which produced immense amounts of zinc oxide that was given off as a waste product. It was located in an industrial neighborhood, but there were quite a few people living there. Not only were the residents complaining, but the industries were complaining. They worked on the problem, and now have installed a collecting system whereby the zinc oxide is filtered out. We don't know how much was discharged in the air three or four years ago, but we do know that within the last year they have collected over 1,000,000 pounds of zinc oxide that has a market value, when times are right, of about one and one-half or two cents a pound. I believe their total installation amounted to about \$35,000 or \$40,000. When they are going full blast, that system has more than paid for itself in a short time.

Since they have started, the others have gone along in the same manner. Of course, some have had a little different problem, as in the case of a battery company where they have the acid. There were two problems there, collecting the lead oxide and also some of the acid fumes, but they have installed acid neutralizers which use straight lime, and they are now collecting lead oxide which will pay for the installation.

JRA V. KEPNER (Pennsylvania Salt Mfg. Co., Philadelphia, Pa.): Mr. Chairman. I wish to move that inasmuch as our Chairman, John Shaw, is detained at home on account of the severe illness of his wife, we send an appropriate telegram to him expressing our sentiments.

VICE-CHAIRMAN ROACH: A motion has been made that we send a telegram to Mr. John Shaw expressing our regret at his absence from the meeting.

(The motion was regularly seconded, was put to a vote and carried.)

VICE-CHAIRMAN ROACH: Mr. Kepner, will you prepare the telegram?

ADJOURNMENT

Tuesday Luncheon Session
October 13, 1931

JOHN ROACH, Chairman

Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.

The luncheon session of the Chemical Section convened with Vice-Chairman John Roach presiding.

CHAIRMAN ROACH: I regret very much to inform the Section that Dr. Charles M. Stine, Vice President of the E. I. duPont de Nemours and Company, Wilmington, is unable to be present on account of sickness. He has written a very interesting paper, however, and Mr. Stephen Whiting, Liberty Mutual Insurance Co., Boston, has kindly consented to read the paper.

Science and Civilization

By CHARLES M. A. STINE

Vice-President, E. I. duPont de Nemours & Co., Wilmington, Del.

A few centuries ago if a man happened to be of a scientific turn of mind—that is, if his thoughts were based on the observation and study of natural phenomena rather than on the existing traditions and superstitions—he was classed as a trifler, a heretic, or an imbecile. From observations made by the use of his telescope, Galileo concluded "that the sun is at the center of the universe and is immovable, and that the earth is not the center and is movable." This doctrine was contrary to the existing beliefs and for this meddlesome intrusion into the domain of a presumably sacrosanct belief with a desire to subject it to experimental proof and base conclusions upon observations, Galileo was imprisoned and persecuted. As he rose from his knees after being bound by oath to adhere to the doctrine that the earth does not move, it is said that he muttered under his breath, "nevertheless, it moves."

Galileo was right; the world does move; it moves not only physically, but it moves spiritually and materially. It is at present a popular belief that it advances materially in direct proportion to the success of science in unraveling the laws which, when understood, enable us to progress. This is partially true and, like all half-truths, may lead to grave error, as we shall presently attempt to point out.

The application of science and scientific methods had been for many years prescribed by the established powers of church and state and the progress of material civilization in all those centuries was practically at a standstill. Even after the ban of political and religious authority was lifted from scientific discovery, our material civilization advanced but slowly, because of the backward attitude of the people in general in applying science to their problems.

Even as late as the 19th century, when Faraday discovered a means of producing electricity by mechanical movement, his work was looked upon as trivial, such a man as Gladstone commenting; "But, after all, of what use is it?" Faraday's discovery, because of the prejudices existing in his day, was not practically applied in the form of an electrical generator until fifty years later.

The science of agricultural chemistry probably had its inception in the latter part of the 18th century, when Priestly discovered that green plants breathe in the carbonic acid from the atmosphere, retaining the carbon as a part of their own structure and releasing the oxygen to the air. This represented the extent of scientific knowledge on the subject of plant growth at the time. Simply to have this fundamental information seemed of no particular importance, and, while the truth of the discovery was generally recognized and admitted, it was applied to no useful purpose, and no advance in agriculture was made until about 1840 when Liebig, the renowned

German chemist, began his studies in connection with problems of soil composition and fertility in an effort to increase the productivity of the soil. The importance of the chemical composition of the soil in relation to plant growth was definitely established by him, and the principle of replacing, by artificial means, the substances extracted from the soil by growing crops had its scientific foundation in Liebig's work. Liebig actually accomplished the feat of making two blades of grass grow where one had grown before. The agriculturists, for the most part however, classed the idea as impractical and it took many years of educational work to get them to realize the practical and economic benefits of artificial fertilizers.

Think of the toll which for many years was taken by epidemics such as typhoid, smallpox, cholera, rabies, diphtheria. As long ago as 1796 Jenner, an English medical student, successfully performed the first inoculation with cow-pox which proved to be successful in preventing smallpox. His discovery, however, met with the usual opposition to scientific discoveries and his views were opposed and misrepresented; editorials were written condemning inoculation and medical authorities of the day scornfully condemned it. For many years, although the scientific means to extinguish the scourge of smallpox existed, this dread disease continued to exact heavy toll because of the prejudiced public attitude.

We cannot know to what extent the advancement of our material civilization has been retarded because of the inability or the unwillingness of mankind to understand and accept and develop the scientific discoveries of our early scientists, as well as his failure to sponsor and encourage scientific work.

The accelerated pace in the development of our so-called modern science dates from the time that men began to go into the laboratory in order to subject to experimental proof the theories which they evolved.

Although the scientific truths discovered by the pioneers in science were not at the time applied to the amelioration of civilization, the scientific facts were, nevertheless, recorded. As time went on, these "eccentric scientists" accumulated increasing amounts of scientific data, building more and more upon the discoveries of their predecessors in their coordination of new observations. Men desiring to study the phenomena of nature and, with what we would call in modern parlance "a scientific bent", journeyed to a few great cities of that day in order that, by living together in the same cities, they might come into contact with one another for discussion and study. This really was the first application of our modern university methods and, eventually, resulted in the development of those earliest institutions of learning which we now know as universities. Men possessed of a scientific bent began to band themselves together into societies in order to correlate their work, and finally scientific universities were actually established. For many years all the pure science research was carried out in the universities founded under the auspices of these early scientists, and many of our present day developments are but extensions of the basic knowledge created in those days.

About the beginning of the 19th century, people generally began to recognize the truth of these scientific discoveries but the application of them to any useful end was considered extremely remote. Industry, in those days, was based on rule of thumb methods that had been in existence for centuries. The owners and workmen were not receptive to new ideas and new methods, and thus the application of science to industry, because of this prejudice, was further retarded for a long period. Little or no assistance was rendered by industry to scientific work, but the workers in pure science persevered and through the years, in the face of incredible handicaps, these pioneers laid the foundation of pure science which, when recognized and applied to industry, enabled our material civilization to progress as it has in the last fifty years.

Doubtless the first applications to occur to us are the many contributions of the mechanical and electrical industries such as the railroad, the telegraph, telephone, the dynamo, the radio, etc. Fifty years ago the electrical industry was almost entirely a thing of the future, and the application of mechanical power in manufactur-

ing and transportation, which has produced such a revolution in our mode of living, was just beginning.

I should like to attempt to trace the development of our material civilization during the last hundred years by means of the chemical developments which have taken place. The application of the developments of modern science actually responsible for such industries as the automobile-tire industry, modern quick-setting cement, commercial high explosives and safety explosives, the fixation of atmospheric nitrogen, the manufacture of synthetic dyes and plastics and molding compounds and many valuable pharmaceuticals. While glass had been made since the earliest times, and the spade of the archaeologist seldom fails to turn up some example of man's early efforts in the manufacture of glass, such special glasses as heat-resisting glasses, plate glass and optical glasses, glasses showing varying degrees of transparency to various portions of the spectrum, are all very late developments. The development of the modern metallurgical chemical laboratory and the applications of metallurgical chemistry have resulted in very important developments in both the ferrous and non-ferrous metals and alloys, such as acid-resisting steel and light, strong, non-ferrous alloys.

The fundamental importance of the assistance which the chemical and bio-chemical laboratories have rendered to agriculture, sanitation and public health—many of the problems themselves the result of our modern urban civilization—is, no doubt, completely recognized. One has but to read one of the medieval treatises upon medicine to note the barbarous methods employed in the practice of medicine and surgery of the day, and to peruse a list of the nauseous doses prescribed by the rudimentary pharmacopoeia of that by-gone, unscientific age to realize the tremendous steps forward which this fundamentally important science of medicine has made. Even today, it is still true that just in proportion as the medical practitioner lays aside his frock coat and silk hat and betakes himself to the laboratory—in just that proportion do the hopes of mankind increase that its diseases and its fatal illnesses may be better understood and more specifically dealt with.

While the developments of the electrical industry have been primarily responsible for bringing about the revolution in the illumination of our modern cities and of our homes, nevertheless, chemistry has played a very important part in this connection. The candles, the soap, the coarse clothing, the porcelain, glass and domestic crockery of a by-gone day would find no ready market today, although the fine Chinese porcelains and a few other ancient fine porcelains are notable exceptions to this statement.

The refrigeration of foodstuffs worked a tremendous change in the diet of man in civilized countries where cold storage is available for perishable foods, and a further revolution impends by virtue of the development of modern quick-freezing processes. No longer is scurvy the despair of the sailor, and the significance of the old expression "a lime juicer" is lost to the modern man.

You are all sufficiently familiar with the developments in modern transportation, but I cannot forbear to point out that the internal combustion engine; the availability of cheap, abundant high explosives for grading and quarrying and road construction and for the mining of metals; the electrification of steam railways; the new metallic alloys of special properties; all these have chemical developments intimately interwoven with the tangible results which are so much a part of our daily life.

We might summarize this by the statement that because science had not yet penetrated industry, our material comforts one hundred years ago had not made appreciable advances over the living conditions of many prior centuries. So long as man was dependent upon the horse for transportation, upon vegetable and animal fats for illumination, upon animal and human labor for prime movers, upon the wind to blow his ship to the far away Indies, upon stone and wood for the construction of his houses and upon hewn stone blocks for the paving of his highways, upon vegetable dyes and a few mineral pigments for coloring and beautifying his clothing and his

dwellings, upon wooden wedges for breaking out stone, upon animal manures for fertilizing his fields, and in surgery had to subject himself to the heartbreaking torture of an operation without anaesthetics—through all these centuries material civilization and the amelioration of living conditions made no appreciable progress.

Let us amuse ourselves by recalling the birthdays and the age of a few of the essential components of our modern living conditions. Charles Goodyear discovered his process for vulcanizing rubber in 1839. Before rubber was vulcanized it was "r u b-b e r", i. e., an eraser. Petroleum was discovered in Pennsylvania in 1845. It had been known as "Indian Oil" and "Seneca Oil"; in other words, it was a part of the American Indian's pharmacopoeia of a by-gone day. Perkin made the first synthetic coal-tar dye in 1856. Thomas A. Edison is said to have invented the incandescent lamp in 1880, but approximately 1900 is given as the time at which the use of incandescent electric lighting had become well established. About this time the telephone came into fairly general use. Think of it—only 31 years ago!

I, personally, remember when gas lighting in the home began to eliminate the use of the kerosene lamp and when the electric wiring of modern homes began to displace gas as an illuminant. Many of those in this room used to ride on horse-drawn cars instead of electric cars; most of us remember the first time we saw an automobile, and all of us remember our first airplane, our first wireless telegraphy, our first radio and our first moving pictures. I think all of us recall the days when carloads of ice, dripping on the local sidetracks, were the distributing centers for the local ice industry. That ice usually came from New England. Most farmers tried to harvest the ice on their ponds, and large storehouses of ice have even today not run completely to ruin. Modern household refrigeration with individual refrigerating units is only a few years old, and I suppose the next step will be economical refrigeration for cooling and dehumidifying our houses in summer, which will be as important a step in some of the tropical portions of the earth's surface as the application of domestic heating has been in home comfort for the inhabitants of the colder zones.

I hope that new serums, new pharmaceuticals, new specifics for various diseases will make notable progress in the next decade. Certainly, such progress might be safely predicted if the establishment of well equipped laboratories, manned by a staff of competent scientists trained in biology, chemistry and physics, were as important news items in the public mind as homicides and other forms of over-advertised crime.

Notable advances in all branches of science have been made within the past year and, since this happens to be a gathering of men interested primarily in safety, I shall mention a few of the developments which have a direct bearing in connection with safety.

In the field of aeronautics, Dr. W. C. Geer of Cornell University, an outstanding rubber chemist, has developed an expanding rubber leading edge for airplane wings called "airplane overshoes" to prevent the formation of ice on the wings which has always constituted a grave flying hazard. The United States Bureau of Standards at Washington has developed a radio landing beacon which enables planes to land safely in darkness or fog.

An important chemical development in the interest of human safety was the discovery of a new gas for use in electric refrigerators. This gas is said to be non-poisonous and non-inflammable. It is a compound of carbon, chlorine and fluorine.

A device for removing carbon monoxide from the exhaust gases of automobiles by means of a catalyst was demonstrated at the Johns Hopkins University. The practical application of this scientific device may result in saving lives.

A new device known as the "electric eye" has been developed within the last few years. This apparatus is so sensitive that it responds instantly to slight changes in the intensity of light. Many novel applications of the device have been demonstrated, and one of the most important is its use in fire protection as demonstrated in 1929 by John V. Briesky of the Westinghouse Electric and Manufacturing Company. A

pan of gasoline was lighted with a match, and as the first wisp of smoke passed a photo-electric smoke detector, the light-sensitive apparatus responded by releasing carbon dioxide from a cylinder and the fire was instantly extinguished. This method of fire-protection represents quite an advance over present methods in which alarms are sounded or sprinkling systems are turned on only after the fire has gained sufficient headway to operate these devices by temperature changes.

You are all more or less familiar with "safety glass" which, while not quite so recent a development as the examples which I have just cited, has only in the past few years come into extensive use. It is now used almost exclusively in the windshields of automobiles. While safety glass looks much like ordinary plate glass, it is really a sandwich composed of a thin sheet of transparent Pyralin cemented between two panes of plate glass and is shatter-proof. It is a product of many years of scientific research in which all sorts of problems had to be solved in order to produce a glass sandwich that would be satisfactory from the standpoint of transparency, resistance to light and heat, etc., as well as have the important feature of being non-shatterable. In many automobile accidents the only injuries received by the occupants of the cars are caused by flying glass. The development of "safety glass" has been an important factor in decreasing the number of injuries caused by such accidents, and with the extension of its use for the side windows, as well as for the windshields of automobiles, the "cut by flying glass" hazard will be almost completely eliminated in automobile accidents.

And so, we move on apace. From the same basic raw materials which have always been available to man, new finished products are constantly being made. The finished products of industry which enter into our commerce today are quite different from the finished products of our industries fifty years ago, or even ten years ago, and science is the tool which enables us to fabricate these new and more complex finished products to meet the growing demands of our advancing civilization. Today our industry, our agriculture, modern transportation and communication, the public health—in fact, every phase of our modern material civilization is largely dependent for its existence upon the application of scientific principles. The recognition and application of science is practically complete in what we call the civilized countries. In direct contrast to the man who dared express his scientific thoughts a few centuries ago, the man of today who does not readily recognize science as the base on which our modern civilization is built is the exception. It is characteristic of our age to be "scientific". Science has served us so well that it has created in us a sense of material security, and there are many who believe that science holds the solution to all of our problems—that science is not only the master of matter, but the mold of spirit.

We have just been considering the advancement of civilization by means of the material values which accrue to mankind as a result of his advance in physical knowledge. I have said also, that the world moves spiritually as well as materially, but probably because of the emphasis which has been placed on material advancement in the past fifty years, we have been lax in appreciating that our spiritual advancement is also important, if our civilization is to continue.

We are a people of attitudes; we may develop an attitude of greed or conquest, or we may develop an attitude of unselfishness and charity and these attitudes may become national in their scope and expression. Our individual attitudes of greed find expression on our roads today. Notice the great number of motorists who "hog the road" and drive to gain a few minutes time for themselves, often with a complete disregard for the rights and safety of others. These motorists have at their disposal and under their control a powerful machine—a triumph of modern science. Used with a properly developed moral sense it is a boon to our civilization; used with an attitude of selfish disregard of others it becomes an implement of destruction.

Today, in the face of all our material progress, we find our world civilization facing a grave crisis—a crisis that we cannot call upon science to prevent. Every-

day we hear of grave world problems involving armaments, reparations, economic depression and political and social revolutions, our civilization is actually challenged. But certainly these problems have not arisen because of a lack of scientific material advancement.

President Comstock of Haverford College, has recently said:—

"Our age is characterized by a great emphasis on physical things and is distinctly non-spiritual. The best minds are engaged toward means for the further utilization of power and the advance of mechanical facilities. There are, however, other values in life such as courage, truth, cumulation, fidelity, love, which are not attainable through mechanical means and without which man, who is a thinking being and who has a soul, is unhappy. . . . What, then, is wrong with our age? Two things may be mentioned. (1) We are trying to produce happiness exclusively by mechanical means. These touch only the grosser layers and leave the soul untouched. Well might we be said to have a 'religion of bells'. (2) Our contact with physical things is second hand and we have lost the exercise and discipline from effort put forth to attain things."

George Santayana, Professor of Philosophy at Harvard, writes in "Character and Opinion in the United States":—

"Civilization is perhaps approaching one of those long winters that overtake it from time to time."

President Glenn Frank, of the University of Wisconsin, writes in the *Century Magazine*:—

"I believe we shall inevitably enter a new dark age, a period in which civilized values will go into decline and the race be thrust back into the precarious existence of its primitive ancestors, unless we begin with promptness to remove the legitimate grounds for these fears."

Francis Gribble in the *Nineteenth Century* says:—

"The historian of the future will write that 'some time in the early part of the twentieth century, the last and most highly organized of the world's civilizations deliberately committed suicide!'"

Dean Inge, the English Dean, writes:—

"We are witnessing the suicide of a social order, and our descendants will marvel at our madness."

Ferrero says:—

"We are traveling, step by step, back toward paganism."

Alfred Russel Wallace said on his ninety-second birthday:—

"Our science has outstripped our moral development. We have become possessed of greater forces than we are morally fit to use. We have not sufficient self-control or good will to use these gigantic physical energies for the well-being of mankind, and are daily turning them into weapons of destruction."

If material knowledge could be applied to the solution of these world problems, as it can to the solution of physical problems, they would soon disappear. These are problems arising from undeveloped spiritual character and requiring for their solution a renewed grasp of spiritual values, flowing from an appreciation of dependence upon divine providence. The solution of these problems is beyond the scope of science because the foundation of all respect for law is reverence for divine law, and Christian charity between nations is only an expression of the same attitude among individuals.

It is undoubtedly true that our happiness is, after all, not dependent upon science. It is true that science can, and should be, an aid to our happiness, but when we use science solely for the advancement of our material civilization to the exclusion of, and at the expense of, our spiritual development our lives and our civilization become unbalanced. Our civilization today is out of balance because our spiritual and moral development has not kept abreast of our material development. We have been living in an age of material riches and spiritual poverty. The solution of great world

problems, requiring a high degree of spiritual development in the hearts and minds of men, demands for God and Christian charity, is not keeping pace with the solution of physical problems requiring a high degree of scientific, material development. That common material developments, used without the proper spiritual guidance, may bring destruction to our civilization is not beyond our imagination, but the development of science applied to the amelioration of mankind under the guidance of a highly developed spiritual and moral sense, the product of Christian idealism, might build for us a well-balanced civilization in which universal struggle and strife give way to universal peace and happiness, the highest ideal for universal safety.

CHAIRMAN ROACH: That was a very wonderful paper. I am sure you all enjoyed it as much as I did.

I would like to hear some discussion on the general subject matter.

STANLEY WENZALA (The Calco Chemical Company, Bound Brook, N. J.): That was indeed a paper to provoke a great deal of serious thought, a paper that one could well afford to take with him and hide somewhere away from the telephone and other everyday distractions, and give thought to it. It is my impression that while we have made stupendous progress in material matters, if we are not standing still we are going back spiritually.

I wonder if that is the fact. I wonder if the author of the paper hasn't been overwhelmed somewhere by material accomplishments, by the implications of them, and has not had as complete a view of matters spiritually as he might have.

He says there that science is the master of matter and the mover of spirit. Is it not just that? Have you not seen his own quotation there of what science has done; for instance, in the matter of safety in rubber expansion for airplane wings, in the non-shatterable glass for automobiles, and other things? In fact, science does not produce anything unless at the same time it carries with it somewhere the matter of safety. It would be useless to produce anything materially which, for instance, would annihilate us. We simply couldn't use it. Mankind couldn't make use of any such things. Therefore, whatever is produced carries with it somewhere the matter of safety, so that a man is able to take advantage of all these scientific accomplishments, put them into good use, and I think he is simply advancing both materially and spiritually.

Here we have in the city of Chicago, meeting in the biggest hotel in the world, a group of men who left home hundreds, perhaps thousands, of miles away to come here and consider industrial and other safety. Where will you credit that—to material consideration or to spiritual consideration?

I do say that, paralleling the progress that has been made materially, we are certainly doing as well spiritually.

CHAIRMAN ROACH: Those were very interesting observations.

I feel, myself, that the chemist is coming into his own, if he hasn't been coming into it for the past 150 years. I come from a great leather producing center in Jersey. Our people were nearly all engaged in the leather business, and I do happen to know that one of the great early chemists, Sir Humphrey Davis, was one of the first men ever given governmental recognition on account of his accomplishments in the field of science when he was able to produce perfect leather after a period of six months' work.

Today, in the cities of Wilmington, Philadelphia and Newark they take a batch of skins, and by the application of scientific knowledge and research work that came from the laboratory, start the process on Monday, and the next Monday you will find those same skins trotting around the streets of our cities on the feet of the people.

That is a tremendous accomplishment. It has created more comfort in the world, and I think it has given us more time for spiritual thought. In the old days there wasn't very much spoken about the spirit. In the early days I think the only people

who were given public recognition were the great soldiers and the great destroyers of the race. Of late years, we notice that in the halls of fame we don't find so many people waving a sword in the air, but we do find men of science, men of deep research who have dedicated their lives to finding the truth, and who are the ones who will perpetuate and not destroy the race.

My good friend, Steph Whiting, suggests we call on Dr. Leake.

Dr. J. P. LEAKE (U. S. Public Health Service): I feel out of place at a chemists' meeting, although I admire the science very much.

I think I can agree with and appreciate what our chairman has said, but I think I can also agree with the senior discussant and the author of the paper. We do need to pause and think where we are going. I do believe, though, that all of us who look around, even in this period of depression, will think the world is growing better and we are planning more scientifically. Scientific thinking and morals go together to a certain extent. Possibly that is one reason we are all here, because we are interested in compensation and so forth, but the financial situation alone, insurance rates, and that sort of thing, wouldn't bring us here. It is the human interest and regard for our fellowmen that really is the impelling thing that brings us here, whether we come as individuals or as representatives. I believe we should look broadly for the other fellow.

ADJOURNMENT

Tuesday Afternoon Session
October 13, 1931

Joint Meeting of the Chemical and Industrial Health Sections

JOHN ROACH, Chairman

Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.;
Vice-Chairman, Chemical Section, N. S. C.

The joint meeting of the Chemical and Industrial Health Sections was called to order by Mr. John Roach, vice-chairman, Chemical Section.

VICE-CHAIRMAN ROACH: The first number on the program this afternoon will be a paper written by the late Dr. Eugene L. Fisk, of the Life Extension Institute, Inc. It will be presented by Dr. Louis W. DesPrez, Medical Director, Life Extension Institute, Chicago.

The Care of the Older Employee

By DR. EUGENE L. FISK

Medical Director, Life Extension Institute, Inc.,
New York City

In my view, the health problem of the older employee does not differ materially from the health problem of the younger man, except perhaps in degree. Nor is the question of industrial health unique or unrelated to the question of the fundamental physical status of civilized man. The subject of this paper, however, limits consideration of the problem to the older man in industry, concerning whom so much solicitude is felt nowadays.

Perhaps I should say at the outset that I am not attempting here to offer a solution of this very important question but rather to offer a statement of fact, and a diagnosis of the ills to be treated.

The so-called older employee—the man over forty—is not a fixed quantity. We find him a certain type merely because certain average factors have assailed him in the course of his existence in a certain average degree. That the man over forty was born some forty years ago, according to the calendar, does not explain the man or why he is what he is. He is what he is—this man in early middle life—partly because of attributes passed on to him by his ancestors; partly because of the character of his nutrition not only from the hour of his birth but in his prenatal existence; partly because of infections that have assailed him from childhood on; partly because of suggestion absorbed from his environment—and so on and so on to include a vast number of factors which cannot be discussed within the compass of a brief paper.

I have expressed this otherwise—that we are not chased to the grave by an old man with a scythe and an hour-glass, but by ignorance, apathy, poison, infection and acute and chronic disease. The man of forty is what we find him because of the factors that have molded him in his lifetime.

Men in the age period 45 to 65 are never considered without some emotional bias. The verdict of military leaders is conclusive in this matter as applied to war service. Pershing has given us his views on the "softness" of the elderly military officer, and in the World War rigid lines were drawn in order to screen the older officers from service across the seas. Oftentimes this exclusion was practiced for

the good of the army on the general principle that there must be no physical liability carried to France, and undoubtedly such ruling was for the greatest good of the greatest number. There have been notable exceptions, however, even in this field, and Pershing himself, as well as Foch, Pétain, Clemenceau and Lloyd George are examples of aged men who have carried tremendous responsibilities with conspicuous success during the years of late middle life.

Military service, of course, is not completely comparable to industrial service. In the field of industry, however, the quality of health and physical fitness and the endurance to life strain spread over the years of early maturity and middle life are intrinsically bound up with the continuity of labor and the productivity of the worker.

What are these average conditions that we find in the average man over forty? I am reminded of the remark made by a leader in industrial medicine a few years ago to the effect that it was unnecessary to examine men over the age of forty-five for employment because the game wasn't worth the candle. Too many were found physically incapacitated to warrant the expense and trouble! Such a conclusion could only be justifiable on the hypothesis that the source of workers is inexhaustible, and also that the average industry can secure enough physically fit men under age forty-five to run the works. This is by no means true.

While interest in war figures is not so keen at the present time as formerly, it is well for us not to forget the lessons that were drawn from those studies. We are all familiar with the fact that approximately one-third of the men between ages 18 and 31 examined in our own draft were declined for active service. This did not mean that those accepted were perfect. It merely meant that they had no disabilities which rendered the risk unduly heavy during the period of war service.

In Great Britain where the higher age groups were entered, more informing data were found as to the state of civilized man and his progression in deterioration with advancing years. For example, representative groups showed a rejection rate for ages 18 to 42 of 64 per cent. Estimates based on the examination of about two and one-half million men showed only 36 per cent acceptable in Grade I as eligible for full active military service; 22 per cent in Grade 2 in which grade men were grouped who were regarded as incapable of any physical exertion involving severe strain; 31 per cent in Grade 3 which was made up of those presenting marked physical disabilities; and 10 per cent in Grade 4 which group men judged to be totally and permanently unfit for any form of military service.

Important information and statistics bearing upon the physical status of industrial workers have been made available through the physical examination of large numbers of employees from the point of view either of eligibility for employment, or periodically, for the improvement of their health.

In more than one hundred plants, where periodic examinations of supposedly well employees were made by the Life Extension Institute, for the purpose of detecting early signs of physical impairments and offering counsel as to their correction, the following conditions were found in representative groups of more than 10,000 people actively engaged at work:

Average Age 34		Percent
Class 1. No physical defects or errors in hygiene.....		0
Class 2. Very minor defects requiring attention or observation.....		10
Class 3. Minor defects requiring hygienic correction, or minor medical, surgical or dental attention.....		41
Class 4. Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity.....		35
Class 5. Advanced physical impairments requiring systematic medical or surgical attention.....		9
Class 6. Serious physical condition requiring immediate medical or surgical attention.....		5

It should be noted that the average age of the groups studied was only 34!

The testimony of the draft, which is supported by sickness surveys in industry and the general population, clearly indicates that a great opportunity exists for improving the vitality and productive power at the younger as well as the older ages. There is much evidence available to show that the average human being under forty is by no means a perfect physical specimen. The industrial worker does not, without previous physical impairment or ill health, suddenly, at a given age, become a liability on the plant.

A higher rate among the younger age groups has been shown in certain sickness surveys made, which is rather inconsistent with the testimony of other researches into the subject of disability and absenteeism in various age groups. The accompanying chart on what I have called "silent" sickness sheds some light upon this matter.

SILENT SICKNESS

PERCENT OF TOTAL



Based on sickness records of 750 white persons of all ages and mortality among total white population of Hagerstown Md. over a period of 76 months.
(Records compiled by U.S. Public Health Service)

This chart presents graphically the results of a sickness survey made at Hagerstown, Maryland, by the United States Public Health Service, which disclosed that while the sickness rate from respiratory diseases was 59.7 per cent, these diseases constituted only 19.6 per cent of the death rate. On the other hand, while only three per cent of the reportable sickness rate was contributed by diseases of the heart, blood vessels, and kidneys, these maladies contributed about 35 per cent of the death rate.

The outstanding feature characteristic of the man over forty is the prevalence in that age group of "silent" sickness—that is, chronic deterioration of the organic tissues of the body which does not manifest itself in disability until the organs fail in their function; in other words, sickness which may be present for many years without "speaking" in terms of disability or obvious illness. When I tell you that one authority has claimed that 50 per cent of the kidney tissue may be destroyed before the kidney function breaks down, you will readily appreciate the situation. Many of those who battle with this "silent" sickness over years of time may survive into the later ages and constitute the problem of the elderly employee, with which industry is so much concerned at the present time.

In my judgment, so-called industrial fatigue is closely related to this condition of underlying pathology. How much fatigue is really silent sickness? Can we charge up to mere work what is really due to infection or poisoning or frank physical de-

iciency? How much of the fatigue problem would disappear if we could remove a major part of the 53 per cent of defective vision that exists, or the 85 per cent of focal infection, or the 13 per cent of overweight, to mention only a few of the physical impairments which periodic health examinations reveal in any industrial group? What is the part played by these chronic maladies in lessening the efficiency of the industrial worker and shortening his work cycle?

It is impossible to consider the question of fatigue without being at once led into the question of the longevity of the worker, his physical efficiency at the various decades of life, and therefore of the final problem of why the worker in industry is assumed to be more or less a liability at middle life and later. There is a certain naivete in so carefully discussing all of these fatigue states as a reflection of work itself.

We have not as yet secured satisfactory answers to two questions which seem to me fundamental and important:

Does the output fall because the worker is tired or because he is physically deficient?

Is the worker ill because he is tired or tired because he is ill?

The testimony of the periodic health examination in industry which reveals a high percentage of "silent" sickness among supposedly well people active at their work, is particularly important in considering the problem of the older employee. The fact should not be overlooked that workers reporting sick suffer mainly from minor disabilities. A large percentage of workers, especially those in the older age groups, with unquestioned chronic and progressive diseases, carry on, conscious of no need for medical attention.

It is often stated that men reach the peak of their efficiency and are considered to be in their prime between the ages of 35 to 40. The most elementary figure in vital statistics is the death rate, which finally answers the question as to the quality of any particular group. And it is a significant fact that for the past twenty years there has been a general trend in this country toward a higher death rate at middle life and later.

The loss in the expectation of life in the United States Registration States from age 37 onward is indicated in the following table:

Age	1921	1927	Loss
37.....	32.86	31.47	1.39 years
47.....	25.01	23.68	1.33 years
57.....	17.72	16.57	1.15 years
67.....	11.50	10.60	.90 years

What is the explanation of this sapping of vitality at the ages which are commonly looked upon as the most vital and productive in the life cycle? The problem is evidently one related to American civilization since we do not find this rising mortality in elderly life in any other civilized country.

There is no use saying that the man over forty-five is not adaptable to industrial employment, because he is there—millions of him—hard at work and doing good work. The peak in the age distribution in industry is between ages 25 and 45, where we have approximately fifteen millions among the gainfully employed.

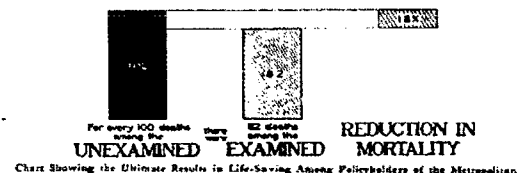
In attempting to arrive at a solution of this problem we must have clearly in mind the standards by which we judge a man to be in his prime. If we are considering the physical state of his body, and the death rate which continues to increase decade by decade, he certainly is not in his prime at those ages. Nevertheless some of his deficiencies are compensatory in a measure. His waning vitality makes him more conservative. His training and experience count for a great deal, and he is more stable in his attitude toward employment than is the younger worker.

What shall we do with this man who does thirty-four per cent of the world's work? Surely we cannot lay him on the shelf at forty or forty-five even though we know that every day in every way he is *not* getting better and better.

DO EXAMINATIONS PROLONG LIFE?

A study of 6,000 policyholders of the Metropolitan Life Insurance Co. shows
18% REDUCTION IN MORTALITY
among those examined from 1914 to 1924 by the

LIFE EXTENSION INSTITUTE



In the course of periodic health examinations we find a systematic and orderly analysis of this human picture and coincidentally important evidence of the efficacy of such examinations in meeting these sociological deficiencies.

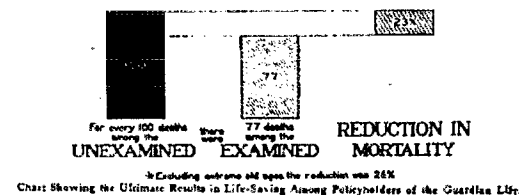
Confronted by this evidence, we are challenged by the question, Is this progression in deterioration according to a fixed law? Is there any escape from it? There are some people who hold to the view that the life cycles of living organisms are fixed. My claim is that this could only be done by supernatural edict and decision. I have disclosed my own philosophy as holding that a man's condition at any age period, his death rate, and his life cycle are governed by physical factors in his environment, and that as these are subject to modification and control, ergo his life cycle, his work cycle, and his health cycle are likewise subject to modification and control. Some proof of this is offered in the experiences in our own field of life extension.

Prolonging the lives of their policyholders is a matter of great interest to insurance companies both from the point of view of human service and economic

DO EXAMINATIONS PROLONG LIFE?

A study of 3,663 policyholders of the Guardian Life Insurance Co. of America shows
23% REDUCTION IN MORTALITY*
among those examined from 1914 to 1925 by the

LIFE EXTENSION INSTITUTE



STUDY OF GROUP OF 1000 INDUSTRIAL WORKERS SHOWING GAIN IN GOOD HEALTH BY CORRECTION OF DEFECTS NEEDING MEDICAL ATTENTION AS REVEALED IN PERIODIC HEALTH EXAMINATIONS

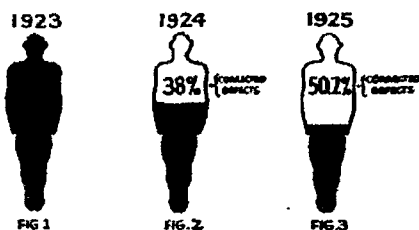


Fig. 1 represents the total number of defects found in group on first examination. (Need for correction then impressed upon worker.)

Fig. 2. Of these defects, 38% were corrected by the time of examination in 1924. (Attention again called to uncorrected defects.)

Fig. 3. A year later, 50.2% of defects had been corrected.

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gain. Direct testimony as to the dollars and cents value of these examinations in the insurance field has been made available in actuarial studies on large groups of policyholders examined by the Life Extension Institute for their insurance companies, with a view to prolonging their lives. These studies reveal savings in mortality of from 18 to 23 per cent on the groups as a whole; and—significantly in so far as this discussion is concerned—a saving of more than 50 per cent in the older age groups where the impairment rate and death rate are so high.

That this is not an accidental thing but the reflection of a scientific mechanism that works, is shown in another chart herewith reproduced, from which it will be observed that the impairment rate is cut in half in the course of three years under the influence of these examinations.

It is an interesting fact that study of a group taken at random from the industrial field where health examinations were made by the Institute shows exactly the same ratio of corrected disabilities.

At one end of the scale we have the mechanism at work; at the other, we have the product of the mechanism reflected in the lowered death rate.

STUDY OF GROUP OF 1000 POLICYHOLDERS SHOWING GAIN IN GOOD HEALTH BY CORRECTION OF DEFECTS NEEDING MEDICAL ATTENTION AS REVEALED IN PERIODIC HEALTH EXAMINATIONS

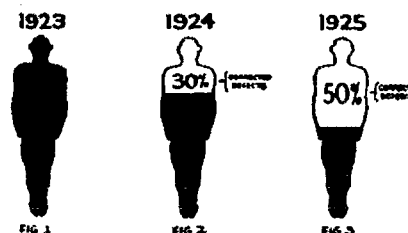


Fig. 1 represents the total number of defects found in group on first examination. (Need for correction then impressed upon worker.)

Fig. 2. Of these defects, 30% were corrected by the time of examination in 1924. (Attention again called to uncorrected defects.)

Fig. 3. A year later, 50% of defects had been corrected.

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What shall be done with this man over forty whom I have endeavored to picture? Obviously, the first and most elementary step toward decreasing the liability in this group, is to approach him early enough and keep him on this side of forty as long as possible—that is, this side of forty in a *physical* as distinguished from a *calendar* sense. This may be done by careful examination before employment—not so much with the idea of excluding a man from employment, as adapting him to employment within his powers—and by subsequent health examinations in order to protect him from the development of unsuspected latent silent sickness or other disability.

Dr. W. Irving Clark has shown that in groups accepted for employment, notwithstanding certain defects which in many plants are considered ground for rejection, the disability rate was lower than the general sickness rate. These men, knowing their disabilities and safeguarding themselves, reflected the principle laid down by Oliver Wendell Holmes that in order to live long one must acquire some incurable disease that will compel one to take care of one's health and keep out of danger. That is a philosophy which can easily be misapplied and misunderstood, but there

is a certain measure of truth in it. Certainly a man with undetected hernia taking reckless chances is in greater danger than a man with a known hernia who keeps away from unusual strain. In every unexamined group there will probably be at least three per cent of men with hernia. There are many conditions the correction of which will take men out of substandard jobs and fit them for standard jobs.

We have lately heard that there is no known reason why men in later life cannot show initiative and originality and the ability to learn. This theory has not yet been placed on a quantitative basis and it cannot be said whether such capacity is latent only in exceptionally endowed individuals or disseminated throughout the mass. Professor Edward L. Thorndike in his studies covering the learning ability of elderly students at Teachers' College has found the middle aged and elderly superior in fact to the adolescent. However, it might be necessary to modify and relax these judgments when considering the mass of industrial workers and their adjustment to the work in hand.

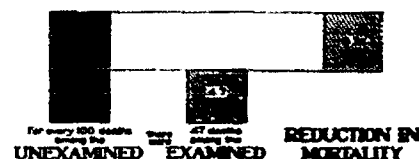
DO EXAMINATIONS PROLONG LIFE?

A study of policyholders of the Metropolitan Life Insurance Company having important experience in substandard lives shows

53% REDUCTION IN MORTALITY

among those examined from 1914 to 1920 by the

LIFE EXTENSION INSTITUTE



Whether or not there is found in the man over forty the same plasticity and learning ability as that found in younger men, may still be problematical so far as the mass of industrial workers are concerned. But that the working period of men in these later age groups can be prolonged by systematic health supervision, the early detection and correction of physical impairment and hygienic guidance in the matter of living habits, has been established beyond any doubt.

We should not, therefore, view the situation with discouragement but rather view ourselves with a degree of discouragement because of our failure to apply to the great masses of workers existing scientific knowledge which would unquestionably influence the ageing of the human body and the gradual impairment of its efficiency.

In the interest of increasing human power and satisfaction in living, the first step is the conservation of the health of the worker and the prolongation of his working period. In any constructive health program we must consider not only the man who appears on the sick list, but the man who, while reporting regularly for work, is in reality one-half sick or one-quarter sick or even one-tenth sick. As I have already pointed out, few people can be said to be in a condition of perfect health. They may be able to draw upon their resources and overcome certain disabilities for a certain length of time, but these disabilities are liabilities and their cumulative effect is what determine final physical incapacity and breakdown.

As suggested in the beginning of my remarks, it is no part of my thesis to offer

a final remedy or to enter into a discussion of the economic aspects of this question. However, having considered the extent of this liability, it may not be out of place to offer as a possible solution a combined health and thrift plan that will set the worker on his feet, protect his health so far as may be, and land him in old age, not the recipient of bounty from the state or from his employer, but rather a small capitalist, quite able to take care of himself.

Any program that compromises with the situation and consents to the adjustment of working conditions to men who are physically more or less incapacitated, is fundamentally unsound and without constructive merit. On the other hand, any program that seeks to aid the working man to detect the earliest signs of a bad physical trend and correct this trend, is wholly on the constructive side.

It may be said without exaggeration that a thorough-going program of prevention along the lines discussed here, especially one joined up to the mutual benefit association which brings the employee into partnership in the business that he serves, will produce infinitely better results than the segregation of sums of money from that business to a mere interest-bearing fund—whether the worker contributes to it or not.

Harold A. Ley, president of the Life Extension Institute, has for many years interested himself in this problem and has worked out the details of a plan, which may be of interest to some of you. I have here a small supply of one of Mr. Ley's addresses in pamphlet form which is available to any one who may be interested.

As in community hygiene, progress in the solution of the problem considered here today can only be made by courageously facing the facts. Knowing the movement of mortality in these older age groups, it is to be hoped that those sociologically conscious will be moved to act constructively in the matter of preventing the organic troubles which we know are increasing year by year and creating a special problem for the middle-aged man in industry.

VICE-CHAIRMAN ROACH: It seems to me this is an important subject, because industry is gradually accumulating a tremendous number of by-products in broken men. Somebody must care for them, either the state or private resources, and what is to become of them seems to be a good deal of a problem.

Most of us know that now that we are going through a period of intense industrial depression, many in the older group who are not altogether fit from the modern standpoint of production are being dropped. Someone must care for them, either society as a whole or private philanthropy. I thought someone here would like to discuss that phase of it.

STANLEY WARZALA (The Calco Chemical Co., Bound Brook, N. J.): Doctor, you mentioned the fact that there was a survey made in 100 plants of employees of 34 years of age. Have you the figures showing the number of employees that are involved?

DR. LOUIS W. DESPREZ: That study was taken from a group of 10,000 employees of the average age of 34.

WILLS MACLACHLAN (Consulting Electrical Engineer, Toronto, Ont.): In the public utility industries we have been interested in the periodic physical examination. In one public utility that I happened to have something to do with over a period of seven or eight years, instead of starting with the average employee we started with the senior executive and carried out that periodic examination every six months, with rather wonderful results in improving the health of those men.

In speaking as chairman of the Health Committee of the National Electric Light Association, I just wanted to advise that through the good work of Dr. Sappington and Dr. Hart E. Fisher, and other doctors, and some laymen, we have prepared a report dealing with building and conducting a health program, particularly with reference to the public utilities. We have also brought out a manual on health entitled "Your Health and Your Earning Power." I think at this time, to the employee, the fact that there is a very definite connection between his health and his earning power should be emphasized. This manual is just off the press, and it can

be obtained by writing to the National Electric Light Association, 420 Lexington Avenue, New York City.

Dr. W. R. RADDEN (Cleanliness Institute, New York City): I don't like to hear diseases that occur in people after forty referred to as degenerative diseases.

Back in 1923 I reviewed all the cases of heart disease that came to the Massachusetts General Hospital that had been unfortunate enough to die and go to autopsy. I reviewed that for a textbook on heart disease which Dr. Richard Cabot published the following year. In checking through we found that at least 75 per cent of those fatal heart diseases had their origin in infection anywhere from five to twenty-five years prior to that time.

Anyone who has a notion that the heart, as such, just wears out has no conception of the ability of the heart muscles to continue, providing the individual goes along and lives a fairly normal, active, physical life. There is much more danger of degeneration of the heart when there is no work than there is when there is work. In other words, even among athletes it is considered there is no such thing as an athlete's heart. I base my statement on what a physiologist at Harvard said to me when I was writing an article on resuscitation.

This brings me to the very important matter of the correction of defects, many of which are due to infection. Take the teeth, for example. In the state of New Jersey they have cured a number of people of insanity. For a while it looked as though they were going to clean out the insane asylums, provided they did enough corrective work on teeth.

At a dental congress in Michigan, a notable dentist from New York City said one individual who had recently been married committed a theft for the first time in his life. Investigation outside of the court, and later revealed in the court, showed that he had an infected tooth, and the psychologist, dentist and medical officer indicated that the man stole because of a bad tooth. The situation was cleared up and the man went along for ten years without any showing of mental deviation from normal. Then he again stole. He had been forgiven the first time by both his employer and his wife, and had gone on happily. I say he stole a second time, and the same process of reasoning was carried through. The individual was released on parole, the defect cleared up, and the individual had gone on for at least eight years without any further stealing.

Yes, we laughed at it, but if just cleaning up a few teeth in the matter of focal infection will do that sort of thing in the correcting of a man's mind and his social attitude toward a community, what may it not do for ears, eyes, and brain in the prevention of mental deterioration, or that old arteriosclerosis that comes along and rings down the curtain long before its time?

I can assure you I have given this careful consideration, and the degenerative diseases as such, especially when a bit premature, are usually due to some underlying infection or something other than just simply the wearing out of the machine. Yes, you can lose half your kidney supply and still go on, and you can lose two-thirds of your liver and still go on and function satisfactorily without looking yellow to the rest of the community.

So, if we industrialists are interested in the welfare of the worker who, because of the length of his employment, becomes more valuable to us, we are going to be interested in the failures that have been shown here this afternoon. They are among the most important I have seen.

I asked Dr. Dublin in the Public Health Association meeting in Montreal last month how much time was lost due to actual industrial hazards as compared to the total time lost due to sickness, as such, and he said, "Infinitesimal; you can't measure it. But I will tell you one thing: the industrialist loses eight years of life, which is cut right off, as compared to the other fellow of the same age group throughout." Eight years of life somewhere! How does he lose it? I think if we conduct medical examinations at the beginning of employment and as many times as possible thereafter, we may after ten, fifteen or twenty-five years discover the elements that are

playing a part in the loss of eight years of life to the worker who is most important to industry.

VICE-CHAIRMAN ROACH: I agree with you perfectly. That is the kind of discussion that enlivens a meeting like this.

J. F. GREEN (Western Cartridge Co., East Alton, Ill.): Inasmuch as the gentleman at my right stressed infection of the teeth, I should like to have your opinion regarding 100 per cent examination of each employee.

Dr. DESPREZ: That is a question that is rather hard to answer because comparatively few industries have gone so far as to even give them a physical examination.

We have one small group here in Chicago that we have had opportunity to study rather carefully because they have made the physical examination a condition of promotion. They do not compel anybody to be examined, but anyone who is eligible for promotion must first have a physical examination. This physical examination includes everything we can do physically, blood count, and X-ray examination of the teeth. From the X-rays of supposedly well people where they had no dental complaints, we found 63 per cent infection.

Mr. WARZALA: When you speak of blood count and so forth in the examination, what would such an examination cost per employee?

Dr. DESPREZ: A thing like that can only be worked out on a numerical basis. Obviously, the larger the group the less it will cost. We do about 100 examinations a year for this particular company, and they pay us 20 per cent less than the average individual would pay for that examination. This physical examination, which includes a specialist for the eyes, ears, nose and throat, X-ray examination of the teeth, blood test, and complete physical examination, costs the firm \$20 per capita.

HAROLD NULL (Kansas Electric Power Co., Lawrence, Kans.): I should like to know the experience of interesting employees in having examinations. That is a problem on our property. We have employees who need examinations. They have been examined when employed, but subsequently have not been examined. I should like to know what the experience has been in other concerns in getting them to come forward to be examined, and find out how other companies meet the matter of expense; whether the employee pays it, or whether the company pays part.

Dr. W. J. MCCONNELL (Metropolitan Life): I would say in 90 per cent of the industries the employer pays for the physical examination.

Regarding the examination itself, in Philadelphia some few years ago the Philadelphia Health Council undertook to make physical examinations of the employees in the smaller industries; that is, industries with employees numbering from 20 to 500. These examinations were made on a voluntary basis, and I think 95 per cent of the employees of these various industries volunteered for a physical examination. So I do not think it is any longer much of a problem to convince the employee of the necessity of a physical examination. I think if presented to them properly a large percentage of employees will voluntarily report for a physical examination.

Mr. MACLACHLAN: In certain groups we have found it an advantage to start at the top and go down through the organization. We find the employees come forward more quickly that way for their examination if they know the boss got through.

VICE-CHAIRMAN ROACH: Do you find the employees are afraid that this examination will be used as a means of depriving them of their employment in case they are found to be defective in some way?

Mr. MACLACHLAN: The medical department of the organization to which I referred has the same type of ethics regarding its employees that the family physician has with his patients. No information goes out from that medical department, and the employees know that, so there is no trouble in that respect.

Dr. A. S. GRAY (Connecticut State Department of Health, Hartford, Conn.): Are those examinations voluntary?

Mr. MACLACHLAN: Entrance examinations are compulsory, but periodic examinations afterward are voluntary.

VICE-CHAIRMAN ROACH: There are large groups opposed to physical examination of workers because they fear the examination will be a means of depriving workmen of the opportunity of obtaining employment, or of retaining it if they have it.

I am very much in favor of physical examinations properly conducted, with the idea of discovering physical defects and of correcting them and making the man a better and more competent man physically. If I didn't believe in that I wouldn't have taken advantage of the service this gentleman here has over in New York. It hasn't given me back my boyish figure, but I feel a lot better for knowing there are certain physical conditions that might affect me, but that don't.

The examinations must be made, and then, with a view to bettering the man, making the man a better and a more wholesome worker and citizen, and disabusing the mind of the public of the idea that it is going to be a medium of hardship for the worker. I feel rather strongly on this because we had a meeting in Harrisburg some months ago at which this matter was given a great deal of discussion. I took the position that physical examinations were good, while some of my associates at the convention were of the opinion that it was an infringement on the man's natural right to sanctity of person.

I think we will have the next paper, by Major General Harry L. Gilchrist, Chief of Chemical Warfare Service, War Department, Washington, D. C.

The Effects of Chemical Gases

By MAJOR GENERAL H. L. GILCHRIST

Chief of Chemical Warfare Service, War Department, Washington, D. C.

It is indeed a pleasure, a privilege and an honor to be permitted to take an active part in this important Congress, and I want to thank the Executives of this scientific body who made it possible for me to address you.

I have been asked to talk to you on the effects of chemical gases. Now, this is an extensive subject for a novice to attempt to discuss, especially when it is considered that there are over two hundred thousand chemical compounds, most of which exist in a gaseous state, and even if I were capable of undertaking such a gigantic task, to do so would require my time to be measured by the calendar instead of the clock.

Gas has occupied a strategic position in the study and the development of chemistry ever since the beginning of time, and I believe it can be said without fear of contradiction that much of the theory of chemistry has had its origin in the study of gases. One reason for this is the fact that gas is the most readily amenable to laboratory manipulation.

I believe, however, the real subject that you wish me to discuss today is the military and industrial application of some of the more important gases, together with their effects, and for that reason I will confine myself accordingly. During my talk I shall use illustrations when possible, for the reason I have found that the bringing into play of two of the special senses, that of sight as well as hearing, will better enable my listeners to comprehend the subject. Some of these illustrations were taken during the war—others since, and the statistical data to be presented are correct, having been taken from official government records.

Prior to the introduction of chemicals in the great war as weapons of offense, the average physician seldom encountered a case in which they were involved, unless he was closely associated with some chemical plant. But since that 22nd day of April, 1915, when five thousand cylinders, each containing one hundred pounds of liquid chlorine, were suddenly turned loose on the unprotected Allies, gases have gained a large amount of press notoriety which has continued up to the present.

As a result of the many misstatements concerning the action of gases, all sorts of ailments are being attributed to them, and for this reason they are being credited with more dire iniquities than have ever before been associated with any condition. It is true there are certain pathological changes which can be traced to the action of gases, but to what extent they should be held responsible for the great train of symptoms of which so many complain is still open to debate. Because of their questionable after effects, it is believed that many ex-service men and industrial workers are taking advantage of them and are endeavoring to attribute to gas every conceivable kind of ailment. Today there is scarcely a functioning organ of the body the disturbed action of which, either during or since exposure to gases, has not been laid at their door.

There is no doubt that a large number of persons who became incapacitated and who claim gas as responsible for their condition, were actually exposed at some time or other. But who is there in this room who has not faced the same condition? On the other hand, it must be remembered that a large percentage of these same individuals were also exposed to other conditions or circumstances, any of which could produce the same effects as gases.

A few words about the effects of gases in general. They may be very complex, and a number of different organs in the body may be simultaneously affected to degrees that vary with the concentration of the gas and the duration of the exposure. Frequently, however, their action tends to be specific in the sense that it is immediately limited to some particular part of the body, at least when its concentration is low. It is possible, therefore, to classify gases into four groups, according to the most prominent physiological effects they cause, but it must be remembered that many of them, to a certain extent, overlap one another.

First, there are what we may call true gases, for it is an anomaly of chemical warfare that many so-called poisonous gases are really liquids or solids. Chlorine and phosgene are typical of the first group and were the first chemical agents to make their appearance in war in quantity. They are actual gases at normal temperatures; they are poisonous when breathed but do not affect the skin and eyes in concentrations which might be deadly if drawn into the lungs, which are principally affected, and for that reason they are known as lung irritants.

All lung irritant gases cause, essentially, the same type of pathological effect, which is most pronounced in the air cells of the lungs and the smaller bronchial tubes, and the great danger to be feared is the onset of acute pulmonary edema or flooding of the lungs. It is, in the main, this condition which in the acute stage of poisoning endangers the life of the subject, for if abundant it causes death by asphyxiation, the patient, in fact, being drowned by his own exudation. The rate of onset and the degree of this edema are dependent on the particular gas and on its concentration, the length of exposure, and the body resistance of the individual so exposed.

The second group is the vesicant or blistering group. The principal gases here are mustard and Lewisite. These so-called gases are really liquids, the vapors of which are poisonous when breathed, and they produce severe burns and blisters wherever they come in contact with the skin. A drop of mustard on a man's clothing will penetrate through the cloth and cause a burn, the effects of which will last for several weeks. Because these gases evaporate slowly they are called persistent, and areas contaminated by them may be dangerous for two or three weeks.

As an example of the persistency of mustard gas, I might mention the following: During the war, I visited fifteen batteries of French Field Artillery, which had bivouaced overnight in a woods that had been bombed with mustard gas ten days before. Of the personnel of these batteries of artillery, 60 percent became casualties from this lingering gas.

Another dangerous feature of mustard gas is its lack of immediate effects. On exposure to the vapor, or even on contamination by the liquid, no signs or symptoms are apparent immediately. The only clue to contamination may be by detecting a

faint, characteristic odor, or by actually seeing the liquid or a stain. There is no pain or other sensation in the early stages; in fact, we could place a heavy concentration of mustard gas in this room and we could carry on for the next two or three hours without experiencing any inconvenience. However, after this period of time, signs of injury would appear. The eyes would first show signs of irritation; they would smart and water. The nose would commence to run, resembling very much the beginning of a cold in the head. Sneezing would develop and later the eyes would become reddened; then nausea and vomiting would appear, the voice become husky, and exposed surfaces of the skin would take on a reddish appearance, with a burning sensation.

One of the marked effects of this gas is on the upper respiratory tract, which becomes greatly inflamed, and in severe cases, the throat resembles very much one of a diphtheritic type.

The third group are the arsenical poisons, or sensory irritants, of which diphenylchlorarsine is typical. These gases have a very powerful irritant action on the mucous membranes of the eyes, nose and upper respiratory tract and they also produce painful blistering of exposed skin. They are dangerous for those working with them, since their vapors cause respiratory embarrassment, faintness, more or less paralysis of the lower limbs, together with marked anaesthesia.

After exposure their effects appear within a very few minutes and develop in rapid sequence; intense pain in the gums and jaws, aching pain in the eyes and severe frontal headache, tightness and burning sensation in the chest, nausea and vomiting, followed by loss of sensation over certain areas of the extremities. If the gas is absorbed in the circulation it causes destruction of the red blood corpuscles, the development of anaemia, jaundice and destruction of the liver and kidney cells.

A gas which might be considered with this group is hydrocyanic acid gas. The dangers from this gas in the open air have been greatly over-estimated. Of course, we are all familiar with its action in confined spaces. It was used extensively by the French throughout the war as an offensive gas known as "Vincennite," but it did not produce many casualties for the reason that concentrations sufficient to do so could not be built up in the open. Professor Barcroft, an eminent chemist of England, has proved by personal experiment that a concentration of one part of gas in two thousand would have to be obtained before much effect could be produced on troops in the field.

When death occurs from hydrocyanic acid gas, it is attributable mainly to the direct paralyzing effect on the respiratory center and the heart. The substance temporarily stops all oxidative processes in every cell of the body to which it has access, but the tissues may recover their full vitality if the circulation and respiration can be maintained. The poisonous substance is quickly eliminated.

Cyanogen chloride, a war gas, is so closely associated with hydrocyanic acid that it will be mentioned at this time. Until recently ships were fumigated with either sulphur dioxide or hydrocyanic acid, but both methods had numerous disadvantages. This led to the adoption, by the Public Health Service, of a gas now used, a mixture of hydrogen cyanide and cyanogen chloride. This cyanogen chloride is an excellent fumigant, combining as it does, the toxic effect of the hydrocyanic acid with the warning effect on operators of cyanogen chloride, which acts as follows: A very weak concentration causes lacrimation in a few minutes and a stronger concentration causes irritation of the throat and nose, in addition to lacrimation. Long exposure to low concentrations produces only slight conjunctivitis, hoarseness and occasional digestive disturbances.

The fourth group contains the so-called tear gases or lacrimators. They consist of a group of chemical agents which, in low concentrations, produce watering of the eyes, and in greater concentrations, they produce pain and smarting of the eyes, together with spasms of the lids so that it is impossible to keep the eyelids open. The consequent interference with vision is quite sufficient to put a man temporarily out of action.

As the concentration of the vapor increases, further effects show themselves. The irritant action of the respiratory passages and lungs is rendered evident by a burning sensation in the throat and a burning pain or discomfort in the chest, and unless the affected man can withdraw from the contaminated atmosphere, there may be retching, nausea and vomiting. Lacrimators seldom cause any serious effects, their striking feature being the rapidity with which patients recover soon after being removed from the contaminated atmosphere, and the symptoms of those who are more severely affected usually abate within eight or ten hours.

Tear gases or lacrimators are used today quite extensively by the police departments of the various cities for the purpose of dispersing mobs, quieting uprisings, etc., and the advantage of their use is that they accomplish the purpose without leaving widows and orphans.

Certain gases interfere with the respiratory properties of the blood. Carbon monoxide is an example. It is not a war gas and cannot be so classified, nevertheless during the war many casualties resulted from it. This gas formed in large volumes upon the detonation of explosions and was carried through the porous soil into the deep trenches and dugouts.

The great danger from carbon monoxide lies in the fact that it is colorless, odorless and non-irritant, and that the onset of symptoms is so insidious that very often the first effect of its presence is failure in the power of the limbs which often prevents retreating to safety. This gas owes its poisonous properties to the fact that it combines with the hemoglobin to form a dissociable compound.

Because of the importance of oxygen, its strategic value in the realm of nature, and the fact that many deaths attributed to the effects of carbon monoxide are directly due to a lack of oxygen, brief mention will be made of it at this time. It is quite common to attribute early deaths in connection with fire hazards to the effects of carbon monoxide; in fact, this point is so generally accepted by the medical profession that it is never doubted. As a result of research in connection with our activities, sufficient data have been obtained at our laboratories at Edgewood Arsenal to lead us to believe that many of these early deaths in connection with fire hazards are not due to carbon monoxide, but to a lack of oxygen.

This point was well brought out a few years ago when we investigated the cause of many deaths resulting from a fire and explosion accident which took place in a modern building in one of our large cities. In conducting this work, a replica was made of the building in which the explosion occurred and detailed attention was given to proportions. The fire and explosion resulted from the burning of 8,500 pounds of films stored in a room of 4,250 cubic feet capacity, or two pounds per cubic foot. This ratio of weight to volume was adopted as standard in all our group of experiments. Thus a sixteen pound charge of film was used in a two cubic foot chamber, and the gas and flame resulting from the combustion of this amount of film were thrown into a horizontal cylindrical steel tank adjoining containing 910 cubic feet for gas and animal study.

Animals were carefully examined before exposure to determine the percentage of hemoglobin in the blood as an index of the degree of lung edema developed. They were also examined to determine the degree of saturation of the blood with carbon monoxide.

After exposure they were again carefully examined and symptoms noted. In some instances animals which appeared normal were sacrificed and autopsied to be sure that no injury had been received. The organs of practically all of the animals dying or sacrificed were sectioned and examined microscopically.

As a result of these tests, it was found that the immediate deaths were due to three things: carbon monoxide, lack of oxygen and nitrous fumes. Animals that were brought out unconscious from carbon monoxide poisoning and revived, later developed lung edema from nitrous fumes.

A few words about helium gas. You have all heard of helium, that new non-combustible gas used for inflating dirigibles and balloons. The spectacular rise of helium

from a substance rarer than diamonds to a strategic source of peace and war forms an interesting chapter in the romance of chemistry. This gas has other values beside those mentioned. It is used for the purpose of preventing bends, that condition so prevalent among men who work at great depths, and who are compelled to breathe air several times its normal density, as a result of which it becomes dissolved in the blood. Heretofore, these workers, before coming back to normal atmosphere, were obliged to spend from two to four hours in decompression chambers; with helium much of this inconvenience is averted. The breathing of a mixture of oxygen with helium, in which the latter takes the place of nitrogen in the atmosphere, reduces this decompression period about 70 per cent.

Our Service has recently had its attention called to the alleged toxic effects of sulphur dioxide. While the general impression prevails that moderate concentrations of this chemical are more toxic for the botanical kingdom than for the zoologic world, there is nevertheless insufficient data for use to make positive statements. Our Medical Research Section at Edgewood is now engaged in trying to establish the actual facts concerning the toxicity of this material. We have only quite recently started this investigation; however, I can outline to you the nature of the problem and our plan of attacking it.

We intend to study the toxic action of this material when exposure is for a comparatively short period to comparatively high concentrations; also to investigate the effect of long continued exposure to low concentrations. By this I mean the daily exposure of animals for six or eight hours to minimum concentrations, far below that required to produce symptoms at a single thirty minute exposure.

We have started this experimental work and we believe that we are already justified in reporting that for single exposures to comparatively high concentrations the results appear to indicate that the animals are killed or make a complete recovery.

Thus far I have confined my talk to a discussion of the immediate effects of the more important gases and were I to stop here and say nothing about the after effects, or residuals of chemical gases, I would be doing the subject an injustice.

Because of the large number of ex-service men claiming disability as a result of having been exposed to gas during the war, a special board was appointed a few years ago to go into the subject and make a thorough study of the residual effects of these gases. This Board was composed of Chairman, Dr. Allen K. Krause, Associate Professor of Medicine, Johns Hopkins University, Dr. Philip B. Matz, Chief of the Medical Research Division of the Veterans Bureau, and the speaker. The problems confronting the Board were the following:

First: To establish whether any or all of the several gases used during the war left residua, either anatomical or functional, several years following exposure; and if such residua existed, to determine their nature and relative importance.

Second: To obtain the impressions formed by military men, sanitarians and others as to the after effects of warfare gassing.

Third: To conduct an analysis of the present disposition of those men who had war records of having been gassed in the service.

Fourth: To carry on an exhaustive analysis of the entire medical histories, including all "sick and wounded" cards, together with diagnosis tags, of a fair cross section of men disabled by the various gases, from the date of gassing, through all the various contacts with the Veterans Bureau since then, and up to the present time.

While a definite report has not been made by this Board, it was impressed with the following probabilities:

First: That ten years after gassing there was a small percentage of patients who were gassed and who exhibited definite residua, either anatomically or clinically, or both, that were due to either one or a combination of gases.

Second: That not infrequently there has been a complicating respiratory infection, which, as is well known, might potentially lead to the same effects.

Third: That chlorine gas, when used alone, is much less likely to leave residua than mustard or phosgene.

Fourth: That the most common organic residua as the result of gassing are pulmonary.

Fifth: That the most frequent pulmonary residuum is a bronchitis of varying degrees of severity, usually expressed more prominently clinically than anatomically, and prone to exhibit recurring and asthma-like features.

Sixth: That active pulmonary tuberculosis is not a prominent residuum of the effects of any of the gases.

In conclusion, the tendency to blame all sequelae on the effects of chemical gases is believed to be due to the confusion of sequence and causation. Many feel that they have a claim against the government, or a claim against industry, and it is very difficult for this claim-bound mental complex to make a recovery. No man is so hard to cure as the individual who is not sick. No man is so hard to cure as the man whose cure will react to his financial disfavor. No man is so hard to correctly diagnose as the man who has an axe to grind.

Possibly this gives us the best insight into the differentiation of chemical injury from certain constitutional conditions, and possibly more important, the differentiation of chemical gas injury from the so-called case of compensationitis. Chemical gas injuries have one characteristic that may be of great value in differentiating them from compensationitis. Chemical gas injuries tend to improve or get worse. They tend to be progressive, either toward a favorable or an unfavorable outcome.

Do not misunderstand me—I do not wish to leave you with the impression that chemical gases do not present a very serious and important problem. I do not believe any one has had a greater first-hand evidence of the fact that gases can and do produce casualties. However, since it is impossible for me to discuss the symptoms produced by the different gases and the varied disease process with which they are likely to be confused, I hope this general statement of this important differential factor will furnish you food for thought.

Discussion

VICE-CHAIRMAN ROACH: We have been splendidly instructed and entertained by Major General Gilchrist. I was wondering if any of you had questions you would like to ask him.

DR. E. E. WILLISON (American Red Cross, Washington, D. C.): In medical work, carbon monoxide is one of the big problems. You brought out quite well the value of bodily resistance in these other gases. Do we have any information on the value of bodily resistance in carbon monoxide poisoning, or does it have any effect?

MAJOR GENERAL GILCHRIST: I really don't know. I am sorry.

I might say regarding the clinical changes due to carbon monoxide, we examine these animals very carefully to find if there is any sign of carbon monoxide, and then we examine later on. We took the weight of these animals beforehand, and made a very, very careful analysis. The animal was put down as dead and taken out for the effects of carbon monoxide. We examined the blood and found there was no sign of carbon monoxide. They died from lack of oxygen. Some of them died from nitrous fumes. We found a great many of the early deaths were due to nitrous fumes.

Carbon monoxide is a problem. We are not doing very much. It is not a war gas, but it is an important problem.

The Russians have an element to combine with carbon monoxide to hold it down, and if they do they have a wonderful weapon. We haven't gone into carbon monoxide very extensively. I don't see why bodily resistance wouldn't be of as much importance with carbon monoxide as with any other gas.

DR. W. D. McNALLY (Consulting Chemist, Chicago, Ill.): On the subject of carbon monoxide, I was interested in what Major Gilchrist said regarding the lack of oxygen; that a number of these deaths were due to lack of oxygen. Having examined many thousands of cases of people who had died of carbon monoxide where it was alleged there was a deficiency of oxygen, I found these people died of carbon monoxide.

noxide, (covering a period of about seventeen years in the coroner's office here in Chicago). So I do not believe it is a lack of oxygen.

With other gases, like carbon dioxide that we had a discussion on this morning, death occurs there due to a lack of oxygen, especially when the percentages of carbon dioxide are over 23 per cent.

ADJOURNMENT

Wednesday Morning Session

October 14, 1931

JOHN ROACH, Chairman

Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.

CHAIRMAN ROACH: The first paper will be presented by Mr. C. L. Jones, of the Hercules Powder Company.

Accidents With Tanks and Pipe-Lines—Preventive Measures

By JOHN S. SHAW and C. L. JONES
Hercules Powder Company, Wilmington, Del.

Safe Practices Pamphlet Chemical No. 1 embraces a very large field, namely "Pipe-Lines and Tanks as Causes of Accidents." It is practically impossible to cover fully this field in a safe practices pamphlet and a great deal of ground is covered in a very limited space. Between the lines of this pamphlet, one must constantly read the words, "Use common sense." For although the type of construction and installations of equipment may be as safe as we know how to make them, there is probably a higher percentage of the human element problem in a chemical plant than in most other lines of manufacture.

In this paper we shall not attempt to discuss in detail, step by step, the items included in Safe Practices Pamphlet, Chemical No. 1. A brief effort only is made to give you a synopsis of experiences with accidents with which the authors have personally had close contact or first hand knowledge during the past twenty-five years.

Tanks

No. 1. Mixed acid department. Mixed acid was blown from tank cars into a vertical steel tank, the acid entering the bottom of the tank through a stand pipe in order to introduce the mixed acid at the lowest point of the tank so that it could rise through sulphuric acid previously placed in the tank. This was a gravity mixer. The air compressor in the power house broke down and, as there was a slight stoppage in the vent of the tank, acid backed up into the air-lines through the coil agitator. The air receiver in the power house was inadequate, so when the compressor resumed operations mixed acid was distributed throughout the air system on the plant. The acid was then blown into nitro-glycerin pre-wash tank where nitro-glycerin was being washed at the time, the air containing the acid being used for agitation of the charge. So violent was the action that the bottom of the wooden tank was charred. Fortunately, the nitro-glycerin was not permitted to become hot enough to cause trouble. It was a narrow escape.

REMEDY: Ample vents for mixing tanks and large air receivers and the air-lines drained daily.

No. 2. An operator was getting ready to pump mixed acid from the scale tank on the ground level to an overhead tank containing 100,000 pounds of acid. The scale tank had all valves set, both in suction and discharge ends of the pump. The line to the overhead tank was equipped with a quick opening valve and entered the bottom of the tank. This valve was kept closed to hold back the flow of acid from the tank. The operator started the pump and attempted to open this quick opening

valve in order to deliver acid into the overhead tank. The valve stem and handle pulled away from the valve, causing the acid to spray over him. He was severely burned about the face, neck, and eyes.

REMEDY: The line from the pump should have delivered the acid into the top of the tank, and a suitable type of acid cock is preferable to a quick opening valve. It is always bad to attempt to open any kind of a gate valve with pressure on the line.

No. 3. An explosion occurred in the nitrate of ammonia evaporating pan. The evaporation of nitrate of ammonia solution was about complete and a charge was being drawn into the crystallizing kettle. When the crystallizing kettles were charged there was a small heel of molten nitrate of ammonia remaining in the bottom of the evaporating pan, and it is supposed that the steam coils in this pan were only partially submerged, which resulted in superheating the heel of nitrate of ammonia and causing the explosion. It was determined afterward that there were impurities in the nitrate of ammonia which could have caused the rapid decomposition of this salt. One employee was killed and the supervisor severely injured. The total expense incurred due to this accident was over \$21,000.

REMEDY: All hot salt solutions should be protected from superheating by preventing the exposure of the heating element above the surface of the salt solution. The operator should have shut off the steam immediately and opened the bleeder-line between the steam valve and heating coil before charging the crystallizing kettles. Immediately on completing the charging of the kettles, dilute solution should have been run into the evaporating pan.

No. 4. Operator was standing on top of an 8 foot x 17 foot tank while agitating a 3 inch depth of acid mud with an air-pipe 14 feet long. As he stood over the manhole, stirring the acid mud with the air-pipe, the acid spurted into his eyes.

REMEDY: Suitable acid mask, or at least goggles, always should be worn in performing a task of this kind.

No. 5. A repairman was removing the brick lining from a denitrating tower and, although the tower had been washed, the acid fumes contained in the brick were sufficient to irritate his respiratory system. As the tower was open at both the top and bottom it acted as a flue and acid fumes drifted into the tower from a nearby operation. The combination of the two sources of acid fumes was sufficient to cause a very serious injury to the operator's health. Compensation and hospital expenses alone ran over \$225, and the man was fortunate to recover.

REMEDY: Use of air jets, exhausters, or electrical fans for this kind of work. A gas mask, with air-hose extending to uncontaminated air, should be used and, if over 20 feet away, an air pump employed for delivering air to the operator.

No. 6. The repairman was welding inside of a scale tank at a sulphuric acid plant. Tank was not thoroughly and properly cleaned out prior to making the repairs. The employee was caused an injury amounting to several days of lost time due to inhalation of fumes.

REMEDY: Acid tanks should be filled to overflowing with a strong solution of soda ash after washing them out with a stiff stream of water. The tank should contain the soda ash for several hours before it is drained and anyone permitted to go inside it. Gas masks and life-belts should be held in readiness and used when necessary.

No. 7. Again an injury similar to Nos. 5 and 6. An employee who was a nitric acid foreman inhaled nitric oxide gases which caused a diffused bronchitis. The acid tank, a mechanical mixer, had been filled and washed out four times. This employee entered the tank to see if it was safe for a machinist to enter in order to do some repairs; while he was in the tank he did not notice any fumes so he cleaned out two buckets of mud which were in the bottom of the tank. The mud contained

some acid and when disturbed, the fumes were set free. The foreman inhaled a sufficient quantity to cause him a very serious illness. He narrowly escaped with his life as a result of nitric oxide poisoning.

REMEDY: Tanks should be inspected with strong drop lights before men enter them. It should not be assumed that the wash is sufficient or complete, and if any mud at all is left within the tank it is clearly evident that there is danger to anyone entering the tank. Here again a gas mask should have been used.

No. 8. A rosin solution wash tank collapsed under partial vacuum, broke away from its supports and connecting pipe-lines and fell to the ground. The vacuum was caused by unintentionally drawing hot solution from the tank and the vent on the top of the tank was not large enough to take care of the sudden contraction. This was practically a barometric condition. The tank was a complete wreck and as it ruptured and fell to the ground the operators reported a loud whistling sound. The whole thing took place so quickly that the operator in charge had just time enough to jump clear of the falling tank.

REMEDY: Larger vents should be used and when calculating the size vent for tank, one should consider the kind of liquid used in the tank and the probability of partial vacuum caused by condensation of gaseous contents.

No. 9. A horizontal storage tank, with a capacity of 17,500 gallons, suddenly collapsed so that the two sides flattened and touched together. The tank had been cut out hot and not vented. It contained light petroleum solvent and, on the cooling and condensation of the vapors, a partial vacuum was caused, resulting in the collapse of the tank. The damage in this case amounted to \$2,000. This accident was considered so violent and surprising that tests were performed to determine how great a vacuum might be obtained in such a case. We quote from the bulletin which we later published:

"The tank was 9 feet in diameter by 36 feet long and of $\frac{3}{4}$ inch boiler plate and had a capacity of 17,500 gallons. The tank was filled to within one foot of the top with a solution having a temperature of approximately 250 degrees F. Following this the tank was immediately pumped out to a depth of 22 inches and then cut out of the system. During the pumping periods, vapor went to a jet condenser and thence to the atmosphere but this vent was closed after the tank was pumped out. Of course, it should have been left open.

"At the time of the accident the atmospheric temperature was about 75 degrees F. and the temperature within the tank about 85 degrees F. The cooling and condensing of the gases from 210 degrees F to 85 degrees F formed a vacuum of approximately 22 inches and possibly higher—determined by the following experiment:

"A 12 inch piece of pipe about 4 feet long was used. The ends were welded and pipe connections made for filling the tank with hot gases from the same source as those which caused the collapse of the large tank. This experimental tank was connected to a recording pressure gauge and a recording thermometer. The gases, similar to those which caused the collapse of the large tank, were passed through the experimental tank. When all of the air in the small tank was displaced and the temperature of this tank was approximately the same as the source of the gases, it was closed and allowed to cool, with the following results:

	Temp.	Mercury inches
(a) When first sealed full of hot gases	210 degrees F	0
(b) 1½ hours later	100 degrees F	22 (below atmosphere)

Tanks should have ample vents. In connection with this accident we were fortunate that a spark did not occur due to the rupturing of a seam or the friction of a rivet as the tank contained highly flammable gases. No one was injured.

No. 10. A circulating tank into which mixed acid was pumped became corroded and leaked. The contents of the tank were lost but no injuries occurred, although a spill of hot mixed acid containing a high percentage of nitric acid is a very serious

accident. The operating loss was around \$700, not including the contents of the tank, as the spilled acid did much damage to the plant.

REMEDY: Rigid inspection of tanks at regular intervals.

No. 11. A boiler maker entered an oleum tank to make repairs. The acid line, which was used for delivering acid to the tank was not disconnected nor was a danger sign hung on the valve of this line. While the boiler maker was making repairs there was a change of shifts and an operator, without knowledge of the presence of the boiler maker within the tank, pumped hot oleum into the tank. The boiler maker lived, but suffered terrible burns, especially on his legs and back. He was left permanently disabled.

REMEDY: It is quite obvious that all pipe-lines should be disconnected from tanks and blanked off before operators or repairmen are allowed to go within the tanks. In addition to this, the free use of danger signs should be adopted.

No. 12. Mixed acid arriving in a tank car was to be blown from the car into a storage tank. It was cold weather. There was no air receiver in the air-line. The valve controlling the air was inside a building near the track. When the air was turned into the car the tank ruptured and the mixed acid flooded the building which immediately took fire. The lives of two men were lost and the fire alone caused a damage of over \$100,000. It is thought that water in the air set up a sudden pressure in the mixed acid which caused the tank to rupture.

REMEDY: Air-lines should be equipped with large air receivers and should be bled before air is ever used for blowing mixed acid and any other chemicals where heat is generated as a result of the action of water in the chemical.

No. 13. An operator permitted spent acid settling tanks to overflow. He attempted to wash up the spill before his foreman got around and detected his error. He worked fast and in a partially enclosed building. Nitric oxide fumes poisoned him and he died within eight hours.

REMEDY: Such storage tanks should be equipped with overflow lines either leading to a sewer or a catch tank.

No. 14. A tank was used for circulating strong oleum over the absorption towers located in an acid pit, the floor of which was below high tide. The plant was located on the shore of a salt water bay. During high tide the salt water would rise sufficiently high to submerge the outlet nozzles on the bottom of the circulating tank and the bolts and flanges became severely corroded. In spite of a weekly inspection, the bolts corroded much faster than the acid mechanic realized and one of the blanks dropped off of one of the nozzles during operation. The sudden evolution of steam resulting from the action of water and oleum drove the operators from the building and, as the steam made the belts on the circulating pumps so slippery that they did not remain on their pulleys, it was impossible to pump out or to save the acid. The loss of the oleum was rather severe but no one was injured. Up to that time the plant for that year was holding first place in the prize competition for highest yield. Owing to this accident the prize was lost to another plant.

REMEDY: Outlet nozzles of tanks in such locations where corrosive liquids might destroy the bolts and flanges of the tanks can be protected by submerging them in lead saucers and filling these saucers with hot asphaltum. Such seals are readily removed if it is desired to empty or repair the tank at any time.

No. 15. A man had just gone into an empty tank, which contained a gasoline solution when in operation, adjusted his gas mask, and asked for an extension cord lamp to be handed him. Another employee handed him the lamp which was properly equipped with all gaskets and a vapor proof globe, but as he did so a spark ignited the solvent vapors. The man got out of the tank but received burns about his hands, forearms and legs. His burns were more or less serious and resulted in the loss of 98 working days.

REMEDY: The tank had not been thoroughly steamed out. This of course should have been done.

The extension cord lamp, while vapor proof, was not grounded. Upon examining this lamp it was found that the insulation on one of the wires had chafed through and the wire had grounded on the metallic part of the fixture. As the lamp frame approached or touched the tank, current must have jumped from the lamp to the steel tank, and it is presumed that this spark ignited the solvent vapors.

Had the extension cord lamp been grounded the circuit fuse would have blown immediately and it is probable that no accident would have occurred. We have since installed three-wire equipment which automatically grounds all portable extension cord lamps and electric tools when they are plugged in.

No. 16. A laboratory employee, working on an experimental digester had just finished a charge and was removing the cover when it popped off.

He failed to release pressure in the digester and was removing a nut on one of the two remaining bolts that were holding the cover in place. The bolts snapped off and the steam pressure blew off the cover.

The man was burned on the hands, arms and legs by escaping steam. As a result of this accident, the employee lost 18 days from the job.

REMEDY: The work of loosening bolts or fastenings on nozzles or manholes of pressure vessels should not be commenced until pressure within the vessel has been entirely relieved. This, of course, is very fundamental; however, supervisors, foremen and others in charge of work must see that the man on the job actually understands the purpose and meaning of such instruction, and they must also see that such instructions are carefully followed out.

No. 17. An employee was working near a tank containing a 2½ per cent caustic solution. The top of the tank was fitted with a steel cover plate welded in place and the tank was vented with a 2½ inch vertical vent pipe 15 feet high.

Apparently, the tank was entirely filled with solution, normally filled with 18 inches from the top, and liquor rose in the 2½ inch vent pipe. The static pressure and the agitation (solution was being heated) were sufficient to cause a rupture of the welded joint and hot caustic solution and steam sprayed out on the man. He was burned about the face, and back and was knocked down, dislocating his shoulder. This accident caused a time loss of 11 days.

REMEDY: The 2½ inch vent was not large enough to prevent pressure building up on the tank. This was due in part to crystals depositing in the vent pipe and probably completely plugging it. This particular vent was later replaced with a 10 inch one. The deposit of salts or crystals in small vent pipes frequently plugs them and it is important to provide a vent pipe of large enough cross section to prevent this occurring.

Pipe-Lines

We have had several instances where operators have walked under pipe-lines and equipment while dangerous chemicals were contained or being circulated in them.

No. 1. A bricklayer was severely burned while passing under nitric acid circulating lines. The acid was concentrated and hot, just coming from the stills. The repairman's scalp was burned off and he has suffered permanent injury for the past 25 years as a result of a painful condition set up by the burn. One ear was severely affected. We have had several experiences similar to this and we will not take time to cite them because the remedy is so obvious, namely, that guard rails or barriers should be set up to prevent workmen from passing under apparatus and equipment engaged in active operations where dangerous chemicals are being handled. Every case must be studied and solved as a separate problem.

No. 2. So many accidents occur through ignorance as well as a disregard of the consequences of carelessness. An operator hammered on a frozen spent acid line and the nitro-glycerin contained in the frozen spent acid exploded. The object in

hammering on the spent acid line was to determine whether the pipe was drained or still contained frozen acid. He lost three fingers and one eye and has been a cripple for over 20 years. The thawing out of chemical lines should be carried out after careful study and instruction. The procedure of the operator should be definite and standardized.

No. 3. In another case we had an explosion in a nitro-glycerin spent acid line where the line passed through a lead sleeve going through the roof of a car barn. A steam hose was used for thawing the line but the operator had a narrow escape, and the building was set afire. Mixed acid and dangerous chemicals should not pass through buildings where it is not necessary to have them. Frozen chemical lines should be thawed from extreme open ends, working the steam hose from an open end backward. The ends, of course, should drain. The usual way is to open the lower end of the line and start from that end thawing upward. It is obvious that if thawing is attempted at an intermediate point the frozen chemical, on becoming a liquid, expands and with additional heat will rupture the line, often with serious consequences.

No. 4. An operator was starting to pack a discharge valve on an acid circulating pump, and upon removing the stuffing box gland the valve opened and the acid came through the stuffing box, striking him and burning him about the face, arms and legs.

REMEDY: First be sure that the lines are drained as much as possible before opening them, and use an acid mask for doing such work.

No. 5. There have been several instances where employees have received acid burns in their eyes while scraping flanges preparatory to making new connections or repairing old ones in the pipe-lines. There is absolutely no doubt that fresh water should be at hand in clean buckets before repairmen are allowed to do work of this kind and goggles should be used. We make goggles compulsory wherever the need is indicated.

No. 6. An employee was picking up a piece of duriron when he stepped back against a chemical-ware spigot in a scale jar which contained nitric acid. The spigot was opened and escaping acid severely burned the employee on the legs below the knees.

REMEDY: Prior to making repairs, if possible, such containers should be drained. If this is not practicable a foreman or responsible person should stand by to guard and watch the repairman while he is working around chemical apparatus while it is in operation. This illustration will serve to cover hundreds of instances of such accidents.

No. 7. An employee was burned with hot nitrate of ammonia solution which was blown on his arms, neck, and shoulders and back while he was blowing out a nitrate of ammonia solution line with live steam. The salt had become crystallized in the pipe, and the operator opened the outlet cock of the line while the line was under pressure.

If crystallin salts plug a line, the line should be broken at an elbow or "T" and an open drum or container be placed under the break in the line. The operator may then introduce steam into the line in the open end, permitting the dissolved or melted salt solution to drain into the drum. Operators should wear goggles and, if necessary, acid masks when doing this work. If, on the other hand, the contact of steam with crystallin salt is undesirable, the same method may be followed but, instead of using steam, external heat may be applied to the pipe.

No. 8. Here we have an illustration of the improper selection of materials. Cast iron elbows and fittings were used on hot circulating lines containing boiling gasoline. The strain on the castings was too great; as the result of expansion and contraction a 6 inch cast iron elbow snapped and a piece of 6 inch pipe, 12 inches long, blew out of the line. Boiling gasoline was released into the building and it was most fortunate

that nothing caused a spark or a fire. 5,500 gallons of solvent gasoline were lost. Engineers should study such conditions and prescribe proper metals to withstand the strain and the action of the chemicals involved.

No. 9. Through negligence on the part of a repairman, the pipe-line leading to a storage tank had been opened for repairs and left open at the end of the shift without his reporting it. The succeeding shift operator, not knowing of the opening in the line, proceeded to pump liquid through the line. 72,800 gallons of paint thinner were lost before the situation was discovered. The fire risk was enormous. Fortunately, there was no fire. The remedy for such a case as this is plain. It starts at the plant manager's desk.

No. 10. An operator and repairman had been changing a nitric acid circulating tank submerged pump. All connections but one were completed—a flanged nipple which was missing and which connected the discharge side of the pump with the cooler. The repairman, in his haste to try out the pump shaft bearing, attempted to throw the belt on the idling motor pulley after shutting off the current of the motor. He stated afterward that he did not think one or two revolutions of the pump would cause the acid to rise to the discharge outlet at the top of the tank. The trouble was, he really did not think and the result was that his fellow-worker, the operator, received a shower of strong mixed acid over his face and body. He lost one eye and was terribly disfigured. The mechanic also was burned with acid and received quite a severe injury. This unfortunate accident was the result of poor foremanship and lack of proper supervision.

No. 11. An employee was making necessary repairs to equipment when he broke a glass connection in a nitric acid recovery. He received severe burns on one of his hands, arm, and left leg.

REMEDY: Glass and chemical-ware lines should be guarded against breakage.

No. 12. The acid pump had failed to deliver acid into the sulphuric absorption house. It was considered that the pump needed priming and the operator proceeded to open the cap on the priming chamber. The chamber was under pressure and acid splashed into the operator's face. The pressure was caused by a faulty valve at the end of the long discharge line in which the gate of the valve had fallen off of the valve stem, leaving the valve closed.

REMEDY: Positive instructions to operators never to go near apparatus without first preparing for such occurrences as this. A system of inspection and maintenance control will prevent untold numbers of accidents of this nature.

Had the operator been taught that he should allow at least five minutes for any pressure in the line to equalize, and then when opening the pump that he should take the same precautions which are taken when breaking any flanged joint, he should not have been injured. Again the use of an acid mask is indicated.

No. 13. An engineer engaged on experimental work put lard oil into a pressure gage "U" tube or gooseneck which was in turn connected with the mixed acid pumping line. The idea was to protect the gage against the corrosive action of mixed acid and, of course, he did not know that mixed acid as well as many chemicals will react with animal or vegetable oils. When the mixed acid was started and came into contact with the lard oil there was a violent explosion and the engineer can still remember how the gage whistled as it passed near his head. He also understands that vegetable or animal oils should never be used around mixed acid. It should also be mentioned that some kind of mineral oils are also nitratable and react with many chemicals. Therefore the careful checking up of the lubricants used around circulating pumps and chemical machinery should be made, for the use of improper lubricants has caused many injuries, fires and even explosions.

No. 14. Again, as in the illustration above, we have a case where a vegetable oil or a nitratable mineral oil was used as a lubricant for packing stuffing boxes on

a mixed acid pump. When the pump was put into operation a violent explosion blew the top of the pump away and showered the surrounding area with mixed acid. The operator was fortunate to be behind the wall in the adjoining motor room and escaped burns.

No. 15. Here is another kind of accident which can occur in spite of good management in the training of men. One midnight a hurry call was sent to the pipe shop from the nitric acid plant to send the pipe fitters over to change a circulating pump. At the time that the stills are priming it is a very anxious moment with the nitric acid crew. If the circulating pump fails, the nitric acid then will flow by gravity into the circulating tank and not sufficiently mix with the sulphuric acid contained therein, owing to the specific gravity differences of the two acids; i.e., pump agitation is necessary to obtain the mixing. Without agitation the nitric acid will float on the sulphuric acid and immediately attack the steel tank. Hence the hurry call on the pipe shop. It so happened that the pipe fitters were elsewhere in the plant and all busy that night. A millwright in the adjoining shop, on hearing the call, volunteered to go to the assistance of the nitric department. Here is where the unfortunate combination of circumstances arose. The millwright was not a chemical plant pipe fitter and therefore had not had the training which he should have had to undertake such a job as changing a nitric acid pump. He was a handy mechanic and, of course, understood the use of pipe wrenches, etc., but he did not know what he was dealing with. Error No. 2: Mr. Foreman was not on the job in order to warn the millwright of the danger. Error No. 3: The circulating line operator did not check his lines to see that they were drained before permitting the millwright to remove the flange bolts connecting the pipe-line to the pump. On parting the flanges, the acid spurted into the millwright's face, completely destroying the sight of both eyes, besides which he was very badly burned and in the hospital for over six months. The millwright didn't have goggles. He didn't even know that they should be used on that kind of a job. There is no use to moralize further, but this is certainly an illustration to which we should give a great deal of thought. Some injuries are worse than fatalities.

No. 16. Here is a message to the salvage crew. A blacksmith was forging a piece of pipe, attempting to draw it to a point. The pipe had come from a scrap pile and contained some TNT. When the end of the pipe was heated in the forge nothing happened, but when the hot end was laid on the anvil and the pipe tilted from the opposite end, molten TNT ran down into the hot end as the blacksmith struck it with his hammer. The blacksmith was painfully and severely injured for a large portion of the muscles and flesh was torn from one of his thighs.

Mr. Salvage Man, watch your materials and scrap piles, and see that apparatus which contains dangerous or explosive chemicals is first thoroughly cleansed by steaming or boiling or by burning on a burning ground, before such materials are allowed to find their way into the hands of innocent and unsuspecting workers such as the blacksmith.

No. 17. Here is another one. Scrap lead was being melted and poured into pig. Nitro-cellulose was in some of the lead pipe. Nitro-cellulose is usually a high explosive when in the dry state, while in the wet state it is classified as a flammable. There was an explosion in the melting pot and hot lead was spread over a radius of 20 feet. No one was injured as the men had just stepped away from the pot to get more scrap lead.

No. 18. In this case an accident occurred to an outside wrecking and salvage crew, who were cleaning up a war plant in our neighborhood. They were loading steel pipe on a motor truck and this steel pipe had been used in the manufacture of nitro-cellulose. Some of this flammable material was in one of the pipes and evidently had dried out. When this pipe was dropped on some other pipes in the truck there was a violent explosion, resulting in one death and severe injuries to two others.

Often men take chances in an emergency. They should be thoroughly prompted in their training so that they will not take unnecessary chances. Spilled acid and destroyed apparatus can be replaced or repaired, but life—never. It seems that in their excitement men will do things that on second thought they realize they would not do. You and I have seen this among fire fighters as well as the ordinary workman. The following accident could have been avoided if the men were properly trained and prepared.

No. 19. During a heavy prime in one of the nitric acid retorts the bleacher receiving the hot distillate cracked and it was necessary to brace it by barring it back into place and holding it with a supporting wedge in order to continue running the rest of the retorts which were approaching the "prime." While making this emergency repair the fumes encountered by the operator were inhaled with injurious results.

REMEDY: The fires should have been cooled and fire doors opened under the retorts so that the distillation would have subsided and the repairmen, equipped with gas masks, could have done the work at leisure without danger to themselves. The delay to the operation would not have been more than 20 minutes.

No. 20. A bucket elevator was used to raise molten nitre cake. The elevator had been shut down for repairs and when it started up it was presumed that the housing had shifted. This made an unusual noise which attracted the attention of the operator and he went to investigate. When the second bucket came up it caught on the housing and when it let loose there was a jerk which splashed nitre cake on to the man, burning him about the face and caused a time loss of twelve days.

REMEDY: While this is not a pipe line accident it is somewhat similar to opening a line containing corrosive liquid or chemicals without properly draining the lines. This injury could have been avoided if the elevator had been turned over by hand and without molten nitre cake in the buckets.

No. 21. A pipe fitter was potting a 2 x 4 brace under an elevated hot water line and an old 4 x 4 brace four feet long was hanging to the line which became dislodged and fell 15 feet and struck the fitter on the head and resulted in a fractured skull.

REMEDY: Loose materials, equipment, and tools should never be left lying overhead on any job. A comparatively small object falling from even a moderate height can cause a very serious injury. Some men are particularly careless in this respect. They will park bolts, nuts, tools, flanges, etc. on most any convenient surface. This practice can be broken up by supervision and constant inspection and education.

No. 22. An operator was attempting to open a quick opening valve of the straight lift type. It was stuck and he had to jerk at it a number of times to get it started. This jerking caused the man to strain his left side and this resulted in a hernia.

REMEDY: We have since changed the type of valve, substituting a slow motion valve which avoids any straining action on the part of the operator.

The quick opening valves had been installed only a short while. Had the men responsible for the selection of the valves been familiar with the difficulties of operation, this type would not have been selected.

No. 23. The tail pipe of a sterling type boiler had burst and the steam and water had wet the ashes in the bottom of the ash pit up to the door level and to a higher level around the tail pipe. The wet area around the tail pipe acted as a dam to hold back a pool of hot ashes.

The man was sent into the pit to clean out the ashes but he did not realize the condition in the pit and when he broke the dam the hot ashes caused burns to his ankles, knees, hand, and forearm and resulted in a time loss of 71 days.

REMEDY: The man could have avoided the injury had he investigated the conditions before commencing work, however, the responsibility for this injury rests

on the foreman. He should have personally investigated before sending the man into the ash pit to start the work. Had this been done the injury in all probability would not have occurred.

No. 24. A chemist carrying out some work in a plant building was burned by nitric acid on the face, hands, and legs when he removed a plug from a section of pipe. The section of pipe on which he was working was shut down, however, back pressure from two adjacent sections caused acid to spill from the hole when the plug was removed.

REMEDY: The entire unit should have been shut down before work was commenced and should have been relieved of pressure; however, the seriousness of this particular injury was increased by the sketchy working platform around the equipment. There was not sufficient room for the man to jump out of the spray of the acid and while he attempted to escape he slipped and fell and the acid sprayed on him. A permanent platform was to be installed around this equipment but "due to the press of other work" the installations had not been made. This lack of a well constructed platform with ample working space, no doubt, contributed to the severity of the injury.

No. 25. An employee was disconnecting an acid line which stood about six feet from the floor and when he attempted to unscrew the union, the pipe line broke and remaining acid in the line ran out and dropped into the employee's eye and on the left side of his face. This injury occurred over two years ago and during that time the employee has been receiving medical attention, the vision of one of his eyes being affected.

REMEDY: There was a sag in this particular line which did not permit all the acid to drain out; however, the injury could have been avoided had the man exercised greater care. He should have worn goggles or a mask. In addition he should have worked from above the line and not from below.

CHAIRMAN ROACH: I think we owe a debt of gratitude to the Hercules Powder Company, Mr. John Shaw and Mr. Charles Jones for what I consider an epochal contribution to safety in chemical plants.

I feel if this paper were placed in the hands of all the people in the chemical industry that have to do with tanks, pipes, and equipment of that kind, and they would study it carefully, many of the accidents we do record now resulting from inattention, lack of proper knowledge, carelessness perhaps, and improper supervision might be avoided and workmen saved from a great deal of human suffering, and industry saved from considerable financial loss.

IRA V. KERNER (Pennsylvania Salt Mfg. Co., Philadelphia, Pa.): I was asked if it would be possible to get a copy of Mr. Jones' paper.

Mr. JONES: We would be very glad to supply anyone who wishes a copy some time in the future. I haven't enough copies with me. If you will write me, I will be delighted to send them.

W. S. BRIMJOHN (Hercules Powder Co., Wilmington, Del.): I think I ought to say a few words about Mr. Jones' paper in justice to the Chemical Section. We are here to get all the information we can. The accident he speaks of, where the man turned the current on the motor and started to pump, and connections had not been completed, that happened to be the master mechanic of that plant and his accident record previous to that time had been exceptionally good. It also has been good ever since. In fact, I think it is true that he has a very favorable accident record. He certainly got punishment enough in that accident to last him a lifetime.

We wonder perhaps why that was, and that is why I am telling you about this. The man had just been made master mechanic. There had been some difficulties and some high-handed work there in the plant. I happened to be superintendent of the plant at the time, so I am quite familiar with the whole thing.

This man had been a specialist and, in fact, in the district where he was he had been a disgruntled worker for a number of years, especially during the war. I guess

he was a Bolshevik. Nobody would hire him. I happened to need a specialist and hired this man, but I gave him to understand that he was hired for his work, and not for his agitating ability. When this agitation came up, I discharged some men and called him in and asked him what he was going to do, whether he was going away with them, or not. He said, "I suppose I am going to walk the plank, too."

I said, "No, you haven't begun any agitation. You are going to stay here as master mechanic."

The discharged men felt he had double-crossed them. As a matter of fact, he had not. He was worried about it. He was in a hurry to get his job done because he wanted to make good. It was simply a psychological proposition entirely that caused that. The man had good judgment, and has had since, but it was just one of those cases where his mind happened at that moment to be on something else. After the accident he assumed all responsibility and said his mind was wandering to his family troubles and troubles with the other employees.

I thought probably you would like to know about that, because that was a definite case where the mental attitude of the man contributed to his accident, and probably was 100 per cent responsible for it.

K. E. YANDELL (Standard Oil Company of New Jersey, Elizabeth, N. J.): Mr. Jones has referred to the lead lining of acid drums; the petroleum industry finds it necessary to utilize lead lined or concrete lined acid containers.

I am just wondering what has been the experience of those present in the chemical industry as to the best means of coping with the problem of gas between the lining and the shell. We have had some difficulty in that. We have had any number of minor explosions. How are you going to gas-free the area between the shell and the lead lining?

CHAIRMAN ROACH: Mr. Brimjohn, would you care to answer that, or Mr. Jones?

Mr. JONES: Of course, during all these years a great deal of the acid of the strength you are having trouble with has been handled, transported and stored, but the number of accidents that have occurred, according to the data I have been able to collect, are relatively few. According to some determinations we have made recently, the hazard is there all right. In one case, I think, we found that we had about up to 70 per cent hydrogen concentration in the tank. The explosive range of hydrogen is from 4 to, I guess, 75 per cent, and of course you have a very real hazard.

We haven't yet reached a definite conclusion as to what shall be done, but opinion seems to be that we should use nothing but lead storage tanks; for transportation, that probably means. At least the ideal condition would be lead lined tank cars. There may be other means of eliminating that hazard.

I think that is a very worth while subject for discussion, and perhaps some of the other men have had experience on it and can tell us what their experience has been and what corrective measures they have put in force to take care of the condition. I don't know whether my comments have added anything.

Mr. YANDELL: We have replaced our lead lined tanks with the concrete lined. I was wondering what the experience of those present has been on that. The indications are such that we will continue to change a number more from the lead lining to the concrete lining.

A. L. ARMSTRONG (Eastman Kodak Company, Rochester, N. Y.): The only safe method of doing that, I believe, is to remove the lead lining. I know it is a pretty expensive proposition, but is it more expensive than an explosion?

Mr. YANDELL: From the manager's point of view, I think you are quite right. The maintenance on that would be great, of course. A few times removing and replacing would, within a short while, render the lead lining rather useless.

F. C. ROGERS (Grasselli Chemical Company, Cleveland, Ohio): I was glad when Mr. Jones mentioned the question of the sagging of a line. Just how far do standard instructions go? Most of us have standard instructions for draining the lines before they are repaired.

If you hand that to a workman he is apt to take you literally and go out and drain

the line, but any line is apt to have a sag at times. That is where the supervision comes in. You shouldn't leave that work solely to a workman. You can't give him all the instructions in detail. He might follow your general instructions religiously, and still that may not be enough. It is not unusual to find a sagging line. It causes a lot of trouble.

I believe every line that is connected with a bottom outlet storage tank should not only have a valve at the bottom of the storage tank but it ought to have a bottom outlet plug in the tank. You open a line and rely on the one valve, and that valve is apt to leak. With a plug in there, you avoid the danger of that heavy head of acid coming out on you. You ought to have double protection. We always equip our bottom outlet storage tanks with plugs and rods, and we see that the plug is down before the valve at the bottom of the tank is opened. We then raise the plug after the valve has been manipulated.

Mention was made with regard to the use of valves, iron, and lead. Of course, with any weak acid, iron should not be used. Anything below 60 or 55 ought to have lead absolutely, because a weak acid goes after iron very quickly.

In these days, we sometimes wonder why we have lines, especially lines used for filling tank cars and shipping containers. In other words, many of those lines are now standing idle. There is a considerable difference of thought as to whether those lines should remain empty while not being used, or whether they should be filled with acid. There is argument both ways, and I would like to hear what other people think about that. Of course, when the line is empty you are apt to get rapid deterioration of the line, and when you come to use it you are going to have trouble. Sometimes in warm weather I have known lines to blow up. On a short line coming immediately from a storage tank to a filling rack to load tank cars, it isn't such an important matter, but on a long line it might be a serious matter. I am just wondering what others do with a long filling line coming out of the bottom of the tank which is either filled with acid or is empty, especially when the line is laid up and is not in use for a long time.

MR. ARMSTRONG: I think there has been enough experience with that sort of thing to prove that there is just one thing to do with those lines, and that is to take them down. I don't think any acid line that is left for any length of time unused, whether it is full of acid or not, is a safe proposition.

CHAIRMAN ROACH: Would that be a week or a month?

MR. ARMSTRONG: I would say a line that is going to be laid up for two or three months.

WILLIAM BAXTER (Newport Division, E. I. duPont de Nemours & Co., Carrollville, Wis.): While we don't have any large quantities of acid, probably 400 to 1000 gallons at the most, for measuring tanks we do drain the lines after the acid is blown. We open the valve and drain them. That is the only thing we do.

MR. JONES: This hasn't anything to do with taking down lines, but I want to mention the experience we have had with a type of pipe hangers. I think it has something to do with the size of your lines.

I don't know who makes grabbler iron, but most of us are familiar with it. We have found that when grabbler iron is used around an acid pipe, corrosion takes place. Perhaps there aren't enough threads to hold the grabbler iron to the point of attachment on the pipe line and sooner or later the stove bolt goes and a sag occurs in the line. Then something more serious takes place.

A couple of years ago a line had just been put up a couple of months before and a lot of men were working. They were pumping mixed acid along this line. Either corrosion or insufficient purchase of the nut on the stove bolt let that line go down. The joints opened up and acid squirted all around those men. We could have had twenty or perhaps more men burned with mixed acid, so that in general we are opposed to the use of grabbler iron. A forging of solid bar attached with half-inch or better bolts is the safest thing, and it probably is the most economical thing because grabbler iron is light. The bolts are light and it leads to constant maintenance, and

I imagine over a period of time your maintenance cost with grabbler iron exceeds the cost with the more sturdy and stable construction and, incidentally, you will get away from some of the siding and pecketing in acid lines and other chemical lines.

MR. ROGERS: Mr. Armstrong, when you take your line down what do you do with it? Do you treat it? It corrodes just as much in your scrap pile or in storage as it does any place, unless you treat it.

MR. ARMSTRONG: It goes into the junk pile. We are probably situated a little different than most people because our plants are not shut down. Mr. Jones spoke of what to do if you shut down an entire unit for a year. We don't have that experience.

I would like to have somebody tell me what is done in regard to venting mixed acid tanks. We run spent acid back into a balloon tank, and it carries back with it considerable nitrite compound, sufficient to start decomposition. The vent out of the tank was plugged from corrosion. The decomposition started in the tank and all the tank crew men ran out. The general foreman ran up the stairs and opened a vent on the top of the tank. That balloon tank stretched about three inches all the way around. Instead of being round, it straightened right out.

To prevent a recurrence of that, we have put in each tank a piece of one-eighth inch aluminum about two feet in diameter and that is scored very nearly through so it will blow out with very little pressure.

CHAIRMAN ROACH: The next order of business is the report of the Nominating Committee and the election of officers. Mr. Whiting.

Report of the Nominating Committee

STEPHEN E. WHITING (Liberty Mutual Insurance Co., Boston, Mass.): Gentlemen, we have just finished our slate. Your committee is Mr. Ira Kepner, Dr. Leonard Greenburg, and myself.

We present herewith for your approval the following list of officers and executive committee:

General Chairman—JOHN S. SHAW, Hercules Powder Co., Wilmington, Del.

Vice-Chairman in Charge of Program—JOHN ROACH, Deputy Commissioner of Labor, Trenton, N. J.

Vice-Chairman in Charge of Membership—A. L. ARMSTRONG, Eastman Kodak Co., Rochester, N. Y.

Secretary and News-Letter Editor—RALPH O. KEEFER, Aluminum Company of America, Massena, N. Y.

Poster Committee Chairman—S. H. MCKENTY, The Atlantic Refining Co., Philadelphia, Pa.

Statistics Committee Chairman—IRA V. KEPNER, Pennsylvania Salt Manufacturing Co., Philadelphia, Pa.

Engineering Committee Chairman—G. H. MILLER, E. I. duPont de Nemours & Co., Wilmington, Del.

Industrial Poisons Committee Chairman—DR. LEONARD GREENBURG, Yale Medical School, New Haven, Conn.

Members at Large—

WILLIAM A. BAXTER, The Newport Co., Milwaukee, Wis.

F. E. CLANCY, JR., Mathieson Alkali Works, Inc., Niagara Falls, N. Y.

W. A. COOK, Connecticut State Board of Health, Hartford, Conn.

L. A. DEBLOIS, Consulting Engineer, New York, N. Y.

DR. H. E. HOWE, American Chemical Society, Washington, D. C.

S. D. KIRKPATRICK, Chemical and Metallurgical Engineering Co., New York, N. Y.

H. L. MINER, E. I. duPont de Nemours & Co., Wilmington, Del.

C. E. RICE, The Dow Chemical Co., Midland, Mich.

E. C. ROGERS, The Grasselli Chemical Co., Cleveland, Ohio.

E. J. SMITH, Underwriters' Laboratories, Chicago, Ill.
 R. C. STRATTON, The Travelers Insurance Co., Hartford, Conn.
 STANLEY WARZALA, The Calco Chemical Co., Bound Brook, N. J.
 S. E. WHITING, Liberty Mutual Insurance Co., Boston, Mass.

CHAIRMAN ROACH: Gentlemen, you have heard the report of the Nominating Committee. The Chair will receive a motion on the report to either accept it or reject it.

Mr. ARMSTRONG: I make a motion that we accept the report.
 (The motion was regularly seconded, was put to a vote and carried.)

CHAIRMAN ROACH: Will the members of the Committee or the General Officers meet after this session is over?

The next number on the program will be a paper by Mr. Stanley Warzala.

Accidents in the Chemical Industry and Their Prevention

By STANLEY WARZALA

The Calco Chemical Company, Bound Brook, N. J.

Any attempt to classify the accidents which occur in the chemical industry may, at first sight, seem as baffling as an effort to define that industry, and, by the same token, the prevention of such accidents may appear to present a problem equally as defying; and yet both tasks readily yield to the solvent of the same principles which are applicable in these matters to any other industry.

It is quite true that we have no common definition of the chemical industry, and perhaps some fixed determination, if such were possible, would be very helpful in a number of ways. At present everyone has his own interpretation of that term, and, undoubtedly, this latitude of meaning, to paraphrase a common saw, even more than politics, has made some strange bed fellows.

In our own state, New Jersey, for purposes of the Statewide Safety Contest, which is conducted annually under the direction of the State Department of Labor, with increasingly successful results, there are grouped in two classes, of light and heavy chemicals, as comprising the chemical industry, the following manufactures:

"Distillation of light and heavy chemicals, explosives and fire-works, alkalis, soda ash, dyes, fertilizers, petroleum products, artificial leather, manufacture of all heavy chemicals, Baclelite compounds, pyroxylin compounds, drugs and medicines, soaps, paints and varnishes, extracts and perfumes, glue and paste, inks, polishes, baking powders and sodas (except soda ash) all light chemical manufacturing, pyroxylin fabricated goods (combs, brushes, etc.)."

It is the best classification that could be devised, and yet, as you see, we have in it ink, soap, dye, paint, varnish, and polish makers, together with glue, explosives, fertilizer, artificial leather, and other manufacturers. However, notwithstanding this heterogeneity, there are many problems, due to the similarity of operations employed or materials handled, which are more or less common to the more closely allied among them. Accident prevention may be mentioned as one of the more important ones, but I maintain that, in this respect, the chemical industry is on the same plane with any other industry. Intelligent direction, supervision, education and training and carefulness in this, as in any other industry, will solve the problem of accident prevention.

The chemical industry, giving it as broad or as narrow a definition as we desire, is, in its present state of development, practically a new field of business in this country. Prior to the World War it was almost non-existent except for very few manufacturers of explosives, and still fewer producers of acids, dyes, and kindred commodities. Today, after surviving some of the vicissitudes of the post war period, and notwithstanding the problems which every year presents for it, it ranks seventh in point of value of its products among the industries of the country. In point of safety, as represented by the frequency and severity rates, it ranks tenth and fourteenth, respectively, in a group of 28 major industries reported in "Industrial Accident Sta-

tistics", of 1931. This record of accident prevention, which places it so near the top of the list of older industries which have attained a very favorable accident experience, is a tribute to the men and women engaged in the chemical industry, and to the interest and ability of those directing its destiny.

When a new business like the chemical industry, which, despite its struggle for existence and the throes of the development of its own technique, is able, in a little more than a decade, to surpass the record of accident prevention of the food, metal products, ceramic, paper and pulp, petroleum, the public utility, woodworking and lumbering, railway car and equipment, refrigeration, construction and mining industries, there can be only one conclusion, and that is that either the industry is not as hazardous as it is generally presumed to be, or that it has committed itself to safety in a manner calculated to produce successful results.

Born in the stress of the war, when production was the only consideration, the chemical industry, under these circumstances, naturally fell into ill repute with the working population on account of hazardous and disagreeable working conditions, and it made bad friends in the localities in which the factories were established because it paid no attention to the feelings of its neighbors. Chemical plants became eye and nose abominations. Even if perfume were discharged into the air as constantly and voluminously as were the noxious or disagreeable fumes, in very many cases, objection would be justified.

However, a steady and gratifying improvement has taken place in the industry in this respect, and particularly in regard to accident prevention; and it is this latter feature which has given it the favorable position, among the older industries. The vision and ability which have established, and later developed it during the difficult period since the war, and which are sustaining it today, have been responsible for this progress. In 1930, for instance, its frequency rate of 15.50 and severity rate of 1.94 compare very favorably with 18.47 lost-time injuries for each million hours worked in the industry as a whole, and with 1.97 days lost for every thousand hours worked. It has reduced the frequency of lost-time injuries 20 per cent, and their severity 6 per cent, from 1928 to 1930, and even though this is somewhat less than the reduction attained by all industries, it is nevertheless a remarkable performance which permits the statement that this industry ere long will become one of the leaders in accident prevention, and, consequently, one of the safest industries in which to work.

I make this confident prediction because evidence abounds of individual earnest effort on the part of the different companies to eliminate accidents in their plants. In a recent issue of one of the publications of the National Safety Council, recognition is given this effort in one case in these words:

"For the third month within the past seven months all Hercules Powder Company operations were conducted without a lost-time injury. Eleven explosives plants, a nitro-cellulose plant, a cotton purification plant, two naval stores plants, four woods camps, and two experiment stations worked throughout the month of May without an accident, repeating the performance of February, 1931 and November, 1930. Dynamite plant at Kenil, N. J. completes two years without a lost-time accident."

I know of different plants of the great DuPont interests which have operated months on end without a lost-time accident, and there are companies with equally excellent records. My own company, which is cited only to indicate the trend, despite 39 lost-time accidents, aggregating 1,000 days lost, has shown in 1930 an improvement of 47 per cent in the number of lost-time accidents, and 32 per cent in the number of days lost, over 1929.

H. T. Gannon, assistant works manager of the Monsanto Chemical Works, recently delivered an inspiration and a challenge to the industry by a reference to the experience of his company, in the following words:

"If a chemical factory can operate 3,500,000 man hours without a lost time, acid burn, accident, you too can."

Accidents in the chemical industry appear to be produced by the same causes that are responsible for them in any other industry. In a purely machine accident we will find, regardless of the nature of the industry, the same failure of the machine, or the guard, or the absence of the guard, responsible for it; and, similarly, in the non-mechanical accident, identically the same failure of the human element will appear to be answerable. Obviously, therefore, there seems to be no difference between the causes of accidents in the chemical industry and those which produce them in other industries.

Can the same assertion be made with reference to the nature of the injuries? In this respect it may seem that there are some injuries which may be said to be typical of the chemical industry, but the similarity with respect to the other industries extends even to this phase of accident experience. It is true, of course, that we have our skin affections, poisoning by inhalation and absorption, burns by acids and alkali, scalds by hot liquids, and, finally, explosions; but these, singly or otherwise, can also be identified in a large number of other industries. It seems that only their natural predominance in the chemical industry has led to the belief that they are peculiar to it. I will not attempt to point out to you the industries with hazards similar to those found in the chemical industry because the list, which would probably include almost every field of production, would prove more cumbersome than interesting. Those with hazards involving the use of acids and alkali alone would form a goodly number.

Let me therefore, recite to you a few cases of accidents which occurred in strictly chemical manufacturing plants, to support the claim which I have made that accidents as well as their prevention, whether in the chemical or other industries, have very much in common.

(1) Five chemists were working in a laboratory room, 30 feet wide and 50 feet long. It was of modern construction, very well lighted, and ventilated. In the center of the room a double laboratory table, of soapstone and steel, was installed, designed for five chemists to work at it at one time. It was equipped with the usual gas jets, water pipes, sinks, etc. As it happened to be a rather warm spring day, all doors, and windows were open.

At about 11 a. m. one of the chemists decided to secure a sample of petroleum ether, for testing, from a new 5-gallon container before it was placed in a fire proof storage building outside the laboratory. As soon as he loosened the cap of the container he noticed that considerable pressure had generated there due to hot weather which forced the gas out of the container in a spray, carrying with it considerable liquid. The chemist immediately sensed the danger of this condition and tried to replace the cap on the container but before he was able to do this some of the vapor reached an open flame from a Bunsen burner on the table and a violent explosion instantly took place. Another chemist who was working at the table, a short distance from the container, was directly in the air current from it. The flame of the explosion developed and burned him so severely about the back, neck and head, that, despite immediate and best medical attention obtainable, he died three days later.

Can it be maintained that the accident was peculiar to the chemical industry and consequently different in any respect because it occurred in a laboratory of a chemical plant? Responsibility for it must rest, primarily, upon supervision, because, having provided a safe, fire proof storage for such liquids, it failed to promulgate and enforce a rule that quantities of highly flammable materials, as large as that involved in this accident, should neither be kept nor handled in the laboratories. Safe working conditions, surrounded by definite rules of safety, duly enforced, must be considered to be the duty of supervision as much as are efficient operating methods. Of course the chemist who poured the sample and provoked the accident, acted thoughtlessly, but conditions in this laboratory, which are the province of supervision, permitted this lapse of discretion.

(2) A master mechanic selected a crew of men, mostly riggers, including pipe fitters and an electrician, to remove a centrifugal pump from the sulphuric acid storage building. It was the electrician's job to disconnect the wires leading to the motor operating the pump before the other men could proceed with their work. He removed the fuses from the starting box, and commenced disconnecting the wires leading to the motor. While thus absorbed in his work upon the wires, the pipe fitters disconnected the discharge line of the pump, and the riggers were installing tackle overhead. The concentration of men and activity on and about the pump was sufficient to prevent clear observation by any one craft of the action or accomplishment of the other.

After the electrician completed his share of the job, he stood looking at the motor, and the thought came to him that he had failed to mark the direction in which the motor rotated before the pump was removed to the shop. He had not tried the motor when he started the job and did not know in what direction it turned. This, however, was a detail of no importance and could have been determined while the motor was repaired in the shop.

Without any intimation to the others of his intention, he attached the wires he had just disconnected, walked over to the starting box and replaced the fuses. One of the mechanics, observing this, asked what he was doing, but instead of an explanation received the usual answer from a strong headed person, "I know what I am doing." With this bluster he started the motor, expecting the motor to turn very slowly at first and to be able to check the direction in which it turned. However, since the pump happened to be of high speed type, it started off with a roar as soon as contact was made. The open end of the discharge line which previously had been disconnected, was not far from the starting box, and pointed in the general direction of it. The result was that the electrician was splashed and sprayed with acid about the face and body. He became panic stricken at this, fought off the efforts of two of the mechanics who attempted to get him under one of the emergency showers, three of which were in the building, within less than 25 feet square, and dashed outside and into another building before he could be seized, controlled and given attention.

After several weeks in the hospital it became necessary to remove one of the eyes. The vision of the other was also impaired, not to mention the burns on other parts of his body. Obviously supervision was responsible in this case, because it failed to provide, first, the superintendence which was quite essential, from the standpoints of safety and efficiency, and, second, mechanical safeguards in the form of locks, for the starting box, and of proper flanges with which to blank off the acid line after it had been broken. These have since been added to the measures of accident prevention. Such lack of safeguards and proper control of men invariably will be found to be fraught with hazards for the workmen in any industry.

(3) An employee wearing rubber boots, gloves, and a mask was engaged upon special work in an aniline product vessel. Noting that his clothing had become soiled with the residue, and that accident, through poisoning, was imminent, he suggested to the foreman that he be relieved and permitted to bathe and change the clothes. The latter, who had permitted his personal feelings to influence his official attitude toward the workman, replied, "You can't get away for a smoke that easy. I'll tell you when you ought to change your clothes." By the time he was relieved the workman had become cyanosed, and another lost-time accident, due entirely to the failure of supervision, was charged against the chemical industry.

(4) An employee was instructed to empty into a sink a nondescript assortment of bottles containing unknown samples of chemicals. One of them happened to be phosphorus oxychloride which, with the water running into the sink, produced a very natural reaction which burned his face severely, goggles saving his eyes. Such lack of judgment (supervision again) not to say ignorance, will probably also be found in other than chemical plants with equally disastrous results.

(5) As a new idea, it was decided to weld, instead of rivet, a tank for the storage of 93 per cent sulphuric acid. The tank was provided with a safety valve set at 30 lbs. which was tested weekly. There was no pressure in the tank at the moment of the accident.

Three workmen had just passed the tank, when the whole end of it blew out, causing a loss of more than 130,000 lbs. of acid. Of course the electrolytic action of the acid set up by the difference in metals between the weld and the steel of the tank caused the end to part from the tank, but failure of supervision to obtain proper advice in the matter cannot be doubted. The workmen escaped injury or death only by mere good fortune.

(6) Report reached an operator that a certain valve on an acid line of which he had charge developed a drip. The valve was from 7 to 8 feet above the ground. The leak was so small that there was hardly any evidence of it on the ground, which was covered with cinders. In his effort to ascertain whether the report of the leak was correct or not, the operator took a position directly under the valve, and, as the valve was some distance above his head, he was compelled to gaze upward. As he did so a drop of acid fell from the valve straight into his eye.

Of course he had goggles on his person, but did not wear them because the supervisor established certain free zones in the department where goggles need not be worn. This had the effect of weakening throughout the department the rules regulating the use of goggles. Fortunately it was possible to save the eye by prompt and appropriate measures, but the accident involved considerable loss of time. Had the position of the valve been on the level with the eyes of the operator, condition which has since been corrected by a suitable stairway and a platform, the accident would have been avoided even with the disregard of goggles.

(7) Six inch bulls-eye sight glasses were equipped with gridiron safeguards on all tanks of a battery of six, except one. The superintendent knew of this condition for some time but neglected to order the sight glass protected. The line immediately below the unprotected glass became clogged one day, and to thaw it out, i. e. clear it, the department mechanic applied steam pressure which was stronger than the sight glass. The obstruction failed to yield, with the result that the glass burst in a veritable shower of glass shrapnel. A piece of it deeply imbedded itself in the thigh of the mechanic, disabling him.

The several accidents which I have just described have not been selected with a view to illustrating the failure of any special phase of plant operation. They were taken entirely at random, but even so, they indicate, very definitely, that to a very large extent, we must look to supervision and more thorough training for any material improvement in our accident experience. The share of the responsibility of supervision in almost every accident occurring is strikingly clear and direct. Systematic education and training of employees in safe methods of work, and the stimulation and development of their interest in accident prevention are very useful and helpful, and, indeed, indispensable, but upon supervision must rest the responsibility for eliminating hazards and maintaining working conditions which will enable individual plants to eliminate accidents now needlessly occurring in many cases, and as a whole to make further progress in accident prevention.

CHAIRMAN ROACH: I think Mr. Warzala has done a good job this morning. I never thought the chemical industry was much more hazardous than any other if properly conducted. I think the records of the large plants that have carried on successful safety work all go to prove that rates, either in human suffering or in dollars and cents, should be no greater in the chemical industry than in any other allied industry where work of a similar kind is carried on.

We can't get away from the fact that in this industry we handle very poisonous and corrosive substances, but their nature or natures are well known. Methods of handling in a safe way are becoming common knowledge, and with the diffusion of

this information that is collected in this great clearinghouse, the Chemical Section, there is no reason—I say it most earnestly—why the compensation rating boards should attach higher rates to the chemical industry than they do to any other.

I would like to hear some discussion from the experts who are present.

IRA V. KEPNER (Pennsylvania Salt Mfg. Co., Philadelphia, Pa.): I would like to say one word with reference to supervision. It is not always supervision that prevents accidents.

Just to give you an illustration: Our plant at Philadelphia had a record of 436 days without a time-loss accident, an excellent record. We put in a new acid pump that had never been used, had it all connected up myself, and the superintendent was there just a few minutes before the accident happened. We hardly got out of the building. The foreman of the department was there, the electrician, and the electrician's helper when this pump gave way, which was due to a defect in the pump. It was a brand new pump, and it looked perfectly all right. The first time it was turned over with the acid in the accident happened. The fellows had goggles on which prevented them from getting any eye injuries, but they were all burned, and we broke the best record we ever had.

MR. WARZALA: May I make a slight explanation, that when I said "supervision" I also intended to include management's technical ability to make certain that working conditions are safe.

Mr. Kepner speaks about a pump giving way. We also had a pump give way, but if we had given thought to it we could have foreseen the circumstances under which it would give way, and under which it did give way. Structural defects and things of that sort are one thing, but when different equipment is put into use in the plant, conditions for which perhaps the equipment isn't altogether suitable may make a great deal of difference. Therefore, in that question of supervision the technical ability of the management is also involved.

MR. KEPNER: May I say this was a brand new pump and showed every sign of being absolutely correct? It was a defect in the pump that couldn't be found or seen. It was on the inside, evidently, but the pump appeared all right and the specifications were right, and under other circumstances the pump would have been all right.

STEPHEN WHITING (Liberty Mutual Insurance Co., Boston, Mass.): What broke the pump?

MR. KEPNER: The box.

MR. ARMSTRONG: The speaker talks about proper education. I wonder if he would tell us exactly what he means by proper education and how far we should go, and what methods are best for educating the employee.

MR. WARZALA: Proper education would embrace acquainting the individual entirely with the hazards of his own job, so that he knows exactly what he is about, just what he has to face, just what he may do to protect himself against those hazards.

MR. ARMSTRONG: How would you go about doing that?

MR. WARZALA: Explain the job to the individual exactly. That is what we attempt to do when we take on a new workman.

MR. ARMSTRONG: Do you think it is possible to take an average individual into a chemical plant for the type of labor you have, tell that individual the hazards connected with his work and get him to believe them?

MR. WARZALA: Unless you do that I don't see how you are going to have an informed worker on the job. How could you explain to him the chemical processes which are more complicated and more intricate than the protection against hazards?

MR. ARMSTRONG: He learns those by working with people who know those things.

MR. WARZALA: That is quite true, but it takes too long a time. By the time he has gained that knowledge from the other workmen, he may be injured. So the thing to do is to get at him right from the start and say, "This is so-and-so, and this is so-and-so." You have to tell him, "Protect yourself in this way, and this way, and this way." It is quite a job, but it can be done. We are doing it. We are making a serious attempt to do it.

Mr. ARMSTRONG: I am absolutely in accord with you. I don't think there is any organization that is doing any more educational work than we are. We do our work by demonstration. We don't tell the individual what will happen. We show him what will happen. You can take the accidents in Mr. Jones' paper, if you like, and rig up some very fine demonstrations. You can show failures of equipment, you can show explosion tests, and you can show what takes place when different chemicals are mixed together and water gets in, and you can show different types of reactions. You can show the seriousness of not taking care of acid burns by using good strength sulphuric acid, putting it on your hands and washing it off immediately, and things of that kind.

I am not endeavoring to tear down your thought, or anything like that. The thing I am trying to get is more knowledge in regard to educating the employee. I am of the opinion that it can't be done successfully by taking the employee out and telling him that certain definite hazards exist, and in some cases you can't do it by showing him. If we could, we wouldn't have any automobile accidents.

Mr. KERNER: I think the mental attitude has a great deal to do with it. We have employees who have been with us twenty-five, thirty and thirty-five years and yet they do have accidents that they know will happen, because they probably didn't think. They might have been woolgathering.

We endeavor to educate them. As Mr. Armstrong says, they get the education through the plant and the people they work with. We have our safety meetings and talk to them, and have personal educational work that we carry on. As a rule, it isn't always the new man who comes in who has accidents. You can't always anticipate an accident.

You make an investigation or an inspection of a certain department, pipe lines, or whatever it may be, and it looks perfectly all right, but two hours after you may find an acid line has sprung a leak, and somebody may have been sprayed. The only thing is to let them know what to do in case of an accident.

CHAIRMAN ROACH: If it is something that hasn't been foreseen, you have nothing to reproach yourself with, but if you put an ignorant man on a dangerous process it is like putting a high-powered gun in the hands of a simple child.

Mr. KERNER: I don't think anyone does that, not in these days.

CHAIRMAN ROACH: I am not so sure about that. I do know that distressing accidents occur in well run plants. One man said, "I have leaned backwards trying to run this place safely," and he was almost discouraged because of those unforeseen things that we can't anticipate by any knowledge we possess now did occur. I told him, "I wouldn't let my conscience bother me about that particular catastrophe. It was something you couldn't foresee. But reproach yourself with your shortcomings where you haven't done all that an ordinarily intelligent, reasonable, thoughtful man who knows his business would do. If you do that, then you have done your part."

But these accidents that we have heard about today, and have had analyzed for us, were in the main accidents that might have been prevented by remedies that were indicated in the paper.

I do not think it fair to compare automobile accidents with those that occur in the chemical industry. It is estimated we have about 25 million automobiles in our country, many probably operated by people who have no mechanical instinct, possess poor judgment, and who in industry would not be trusted with machine responsibilities that involve human safety. Although motor vehicle departments test drivers for efficiency and issue certificates to those who pass the tests, it must be remembered that these tests are of a most elementary nature, not at all conclusive as a measure of the judgment, discretion and thoughtfulness possessed by the driver. The consequence is that many people are on the road operating high powered machines who are a menace to themselves and other motorists. Automobile insurance is therefore high, which indicates the character of the risk involved.

If that were true in industry, then I think I would do what our friend said might be done, cancel all policies in the chemical industry. But that isn't true even in the worst run plants. Men are given some instruction about the quality of the work

they are to do, and the nature of the materials they are to handle. It may be that after a time they grow careless and calloused, and want to take a short-cut, and that is the thing Mr. Warzala's program is trying to anticipate. If that were not done successfully, then some of the large groups that run millions of man hours without an injury wouldn't be able to quote those records.

Mr. ARMSTRONG: I would like to say in defense of what you said in regard to the automobile, it was not my intention to make a comparison of the two. The thought I had was this: Is it possible to take an individual into the chemical industry, put him on a job, and tell him that certain definite hazards exist, and tell him if he does certain things certain things will happen and he will get hurt? Is it possible to make that man believe it?

CHAIRMAN ROACH: What do you think about it, Mr. Brimijoin? You have had a lot of experience in handling high explosives where a man could send himself away in a second.

W. S. BRIMIJOIN (Hercules Powder Co., Wilmington, Del.): I don't think it is possible to impress hazards upon a man 100 per cent. You may be able to do it partially. I think it takes years of training. In the high explosives, we are always very careful not to place a man in the danger zone until he has had more or less training and has become familiar with the conditions. Personally, I think it is impossible to take a raw recruit and tell him all the conditions. I agree with Mr. Armstrong. You can probably tell him some of them, but I don't think it is humanly possible for any man in the chemical industry to see all the conditions and combinations that may arise.

C. W. GREENFIELD (DuPont Viscoloid Co., Arlington, N. J.): We come to meetings and talk about education and say how it should be done, but do we go back to our plants and absolutely put it into operation? Do we attempt to tell each and every employee under our jurisdiction the hazards to find out whether he does absorb that information?

That is the point that seems to bother me a whole lot. We realize the hazards many times. We might tell a man once. Do we assure ourselves that we have positively educated that man, and then put him to a test? I am firmly convinced, with the author of the paper, that the lack of education is the cause of a great many of our accidents, but we are not following out the policies that we firmly believe in. We do it occasionally but don't keep it up continuously.

C. G. SMITH (Lever Brothers Company): There are three points in the education of a man on a job, as I see it. You might take him into the office and tell him about the job, but if you tell a man about a job he is only one-third educated. He goes into the plant and sees a man operate on the job, stands by him and watches him work, and after he sees that workman complete the operation he is two-thirds educated on the job. Then he must use his own hands and complete the job to the satisfaction of his superior, whoever he may be, and then he is educated on the job. So it seems to me that a man's experience is his education.

We have our safety meetings and we pick out the men who have helpers, and we try to instill into the minds of these men that they must tell their helpers the correct operation of every job they do. It seems to me that is the best point about the contact. The man who understands the job should pass on the information he has already acquired, and give the fellow working with him a chance to learn. Of course, oftentimes you find a case where the man who is working on the job is given a helper whom he doesn't like and he isn't interested in him at all. If that condition exists, it should be corrected, but I think it is a man's experience that gives him his education on any job.

Mr. ARMSTRONG: I would like to tell you what we do as long as there has been so much discussion in regard to this.

A new employee comes into our plant and of course gets general instructions from the employment office. Two weeks after he goes to work he comes to the safety department and is given a quiz to determine exactly how much he knows. If he

doesn't know the thing he should know, it is not the safety department's fault; it is his foreman's fault. We take minutes of those meetings, but we do not take the men's names. The foreman, superintendent, and general manager gets a copy. Once each year those employees come back for that same quizz, and we do not try to tell them what will happen. We show them by actual demonstration. I can't go into that now because it would take too long.

If it is possible to educate a man, without going to all that expense, in some other way I would certainly like to know how it can be done. Personally, I have the feeling that is the only possible way to let the employee realize you are absolutely in earnest. Those fellows come back once a year and spend a couple of hours, or two hours and a half with the safety department, and we get very valuable information in regard to conditions which exist in the plant of which we have had no knowledge, and a great many times of which the foreman has had no knowledge.

ADJOURNMENT

Thursday Morning Session
October 15, 1931

JOHN ROACH, Chairman

Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.

The last session of the Chemical Section convened with Vice-Chairman John Roach presiding.

CHAIRMAN ROACH: The first order of business will be a report on the trend of accidents in our industry, by Mr. Kepner.

Accident Experience in the Chemical Industry in 1930

By IRA V. KEPNER

Chairman, Chemical Section, Statistics Committee

While it is very difficult to find something new about accident statistics, it is a topic of vital importance and never-ending interest to those of us who believe complete, permanent and reliable records and statistics are a necessity in the conduct of present day successful accident prevention work—which, more and more, is leading us into fields of science, experiment and research—all of which is eminently worth while, for it is by just such development and progress that many organizations in the Chemical Industry have not only made new accident records, but reduced accidents to almost the vanishing point.

Your Statistics Committee and sectional officers were very much pleased by the excellent response of members to requests for 1930 accident records. Through your cooperation the 1930 accident experience is based upon the largest number of plants ever to report, and gives, therefore, a more reliable picture of the accident situation in the Chemical Industry than has been indicated by reporting companies in any previous year.

During 1930 your Statistics Committee received reports from the following establishments:

- 15 plants manufacturing carbon products
- 26 plants manufacturing explosives
- 11 plants manufacturing industrial gases
- 15 plants manufacturing acids
- 13 plants manufacturing chlorine and alkali products
- 9 plants manufacturing dyes
- 16 plants manufacturing paints and varnishes
- 15 plants manufacturing pharmaceutical and fine chemicals
- 16 plants manufacturing soap
- 9 plants manufacturing and distilling coal tar, and
- 66 other plants not classified.

This makes a total of 211 establishments reporting, in comparison to 172 for 1929; hours of exposure, however, were slightly less in 1930, as was the case in most of the other industries, the figures showing a decline of about 17 per cent from 1929 to 1930. The increase in the number of reporting plants, I believe, is ample evidence of the interest which many members have in their accident records, and in the efforts of our section to develop reliable statistics.

According to the man-hours worked, operations in chemical plants during 1930 did not decrease as much as in some other industries. But in spite of the recent depression, and a drop below a full schedule, the chemical industry had a good year. Our lost-time injuries averaged 15.50 per million hours worked in comparison to 18.47 for all industries. This rate gave us a rank of tenth in a list of 28 major

American industries. However, we cannot overlook the better records of the cement, steel, and machinery manufacturing industries, whose operations involve many hazards as great as our own.

Our showing from the standpoint of severity of lost-time injuries was not quite as good as for frequency. Lost-time averaged 1.94 days per thousand hours worked; our severity rate, consequently, was slightly lower than the rate of 1.97 for all industries and our standing among the 28 industries was fourteenth. Even this rate, however, was considerably less than for steel, cement, and machinery manufacturing.

Injury rates in different branches of our section vary widely. Plants manufacturing carbon products had the lowest frequency rate, 5.05, whereas coal tar distillers had the highest, 44.72. Paint and varnish manufacturing establishments, pharmaceutical and fine chemical manufacturing plants, and soap factories were other branches of the Section to have higher than average frequency rates. Serious injuries, however, occur more frequently in other divisions. Dye manufacturing and acid plants, with better than average frequency rates, have permanent partial disability rates exceeded only by soap manufacturing. Explosives plants, also with very low frequency rates, have the highest severity rate, due, of course, to the unusual hazards of their operations.

The experience of our own as well as other industries shows that small plants usually have higher frequency and severity rates than larger ones. In general, as plants increase in size, their injury rates decrease. The average frequency rate of 78 chemical plants employing less than 100 people was 26.94, in comparison to 13.04 for 17 plants with over 1000 employees. The difference in their severity rates was equally striking; these rates being 3.72 and 1.63 respectively.

Some good records have been made, however, by small plants in all branches of the industry. A tar refining plant with 36 employees went through 1930 without a lost-time injury; this plant had a frequency rate of 33.65 and a severity rate of 0.58 for 1929. A record of two-years without a lost-time injury was made by a plant producing carbon products and employing 64 people. Also, our smaller establishments have made, in many instances, much better records than larger ones in their divisions. For example, a small plant employing 39 people led the explosives division with a no-accident record during 1930. These are only a few of the illustrations that can be cited to prove that safety can be achieved in small plants.

In discussing our injury experience during 1930, I have indicated where we should look for improvement in the future. Many of us are particularly interested in comparing our 1930 records with those of previous years because of the business depression. We have 106 plants in our industry with an exposure of approximately 145,000,000 man-hours that have reported in each of the last three years; the records of these identical establishments most accurately measure our improvement during this period. The 1930 frequency rate of this group was 20 per cent below their rate for 1928—a reduction which was, however, somewhat less than the decrease of 28 per cent for over 1500 identical establishments in all industries. This reduction in frequency included a decrease of 34 per cent in our fatality rate during 1929 and 1930 in comparison with 1928, but, unfortunately, the frequency of permanent partial disabilities has risen steadily in the past two years. The decrease in our general frequency rate is largely due to the decline in the frequency of temporary disabilities. While the decline in the fatality rate of our identical plants is much larger in many other industries, our experience with other types of injuries is much the same.

The rise in the frequency of permanent partial disabilities during 1929 and 1930 was largely responsible for holding down our decrease in severity to only 6 per cent. The reduction in this rate was less than the 8 per cent decrease made by all industries. The permanent partial disability rate doubled during 1930 in comparison with 1928 and 1929. The large drop in the frequency of temporary disabilities, on the other hand, resulted in a decrease of 25 per cent in the severity of these injuries.

Several explanations have been advanced in the Council's Annual publication on "Industrial Accidents" to account for the large difference in the reductions of temporary disabilities and the more serious injuries. It is thought that an undue proportion of effort may have been devoted to minor hazards with the result that the more serious ones may have been neglected. Also, the increasing use of machinery may have eliminated some minor accidents but introduced new hazards with more serious consequences.

It is also possible that more accurate reporting tended to increase rates, particularly for permanent partial disabilities with their arbitrary scale of time charges. More liberal compensation awards in recent years may have had the effect of increasing time charges for a permanent partial disability; and furthermore, an injury which may have been a temporary disability several years ago might now be considered a permanent partial.

We need, therefore, to give special thought to the reduction of our serious injuries. The importance of knowing the frequency and severity of accidents which are happening in our industry each year is apparent to anyone seriously interested in safety. The fact that we have never been able to ascertain these figures from all the members of our Section is regrettable. We have yet to get the most out of the use of statistics in the work of preventing accidents. The more they are understood and studied the better are we able to apply protective and corrective treatment. Statistics to a safety man are just as indispensable as the compass is to the mariner. They give him the range and scope of the hazard. They eliminate the guess work and a great amount of time ascertaining for himself that which statistics can give him at a glance.

Several industries follow the practice of exchanging full details on fatalities and other serious injuries. Many such cases result from accidents whose causes are unusual and difficult to control. With this plan, however, there is no good reason for a similar accident occurring from the same cause in other plants.

In conclusion, I desire to emphasize the value of reporting your annual accident records to headquarters. In spite of the steady growth of plants reporting from year to year, and our particularly good showing this year, we are getting accident reports from only slightly over one-half of our members. Every member should take advantage of this opportunity to check up on his accident experience from year to year and then compare it with other plants in his industry. A good record is always gratifying and stimulating to the officials and employees of a plant. An organization whose record makes a poor comparison with others in its division should certainly learn the reason for it and take necessary steps for improvement.

Furthermore, every safety man should feel it his personal responsibility to contribute his accident experience for the benefit of the Section. Our non-reporting members are certainly not supporting the efforts of our Sectional Officers to advance the development of full information on the problems and progress of our Section in accident prevention work. Our Section is exactly what we make it, and we get out of it in proportion to what we give, and the growth of the Chemical Section statistics depends on the support from its members.

In closing I wish to take this opportunity to thank the National Safety Council Staff, the Sectional officers, members of the Chemical Section Statistics Committee, and all members reporting, for the help they have given me in making this report possible.

CHAIRMAN ROACH: That was a very excellent report, and I certainly hope that during the next year the other half of our membership that has not contributed accident experience will do so. I know of nothing more stimulating to the interest of the safety committee and men interested in accident prevention than a correct listing of accident experiences. I know of nothing that causes more enthusiasm on the part of all of us who are interested in this human conservation work than to learn

of splendid plant records, covering hundreds of thousands of man-hours without injury to anybody.

P. W. GUMAER (Consulting Engineer, New York City): I would like to ask the author if there have been any statistics compiled concerning industrial poisoning cases, particularly chronic poisoning? I contend that there is scarcely any chronic poisoning in the chemical industry; that in firms manufacturing chemicals, cases of acute poisoning occur occasionally. Those statistics would be of extreme value to the chemical industry of the country, and I was wondering if they have not been compiled if there was any possibility of securing them in the future.

MR. KEPNER: None have been compiled, to my knowledge. We are very fortunate to get the number of accidents, even if we do not get the details of the accident. The name of the company in all cases is kept absolutely in confidence, and we have no way of knowing what causes the accidents or what the accidents were. I do not know of any way we could do that. It could be arranged between ourselves in the Chemical Section, if the firms would sanction it; but I doubt very much if the firms would care to do so. I know the National Safety Council has no records at all as to the cause of the accidents.

MR. GUMAER: There is no thought of getting the names of the firms; just the total number of the accidents in industry during the year.

MR. KEPNER: They do not report what the accident was at all. It would be nice if they would do it, as a matter of statistics, but they are not available that I know of.

CHAIRMAN ROACH: I wonder if the chairman of the committee had ever called upon the Industrial Health Bureaus of the several states for that kind of information?

MR. KEPNER: Not to my knowledge. The best information you get is that some have died by poisoning. That does not have statistical value.

CHAIRMAN ROACH: I think in most of the states they differentiate between cases of that kind. It may be their statistics might not be very accurate. I am inclined to think the chemical industry has nothing to be ashamed of, so far as health conditions go, in comparison with other sectional groups. Probably if we really knew the truth of the matter, there is very much less poisoning in the chemical industry than was the opinion some years ago. When we do have poisoning cases of course they attract attention. It may be the thing is over-emphasized, but if you are to compare the toll paid by workers from industrial poisoning and that paid by industrial accidents in the chemical industry, I think all of us would be more or less surprised.

C. L. JONES (Hercules Powder Co., Wilmington, Del.): The thought you expressed a while ago opens up a possible avenue for discussion. Take your own state, for instance; are the files of the Accident Commission open to the general public or the persons interested in compiling statistics, such as Mr. Gumaer thinks of?

CHAIRMAN ROACH: I think they are. We would be very glad to give any information that is there. As a matter of fact, at the end of each fiscal year there is a report printed of compensable occupational disease cases. That probably only covers a part of the cases that might be reported, because many of them would not be compensable; but it gives you some idea of the sickness in the chemical industry.

MR. JONES: In other words, a review could be made of all such cases that occurred and with sufficient detail?

CHAIRMAN ROACH: I think we could get our statistician to throw out the cases that might be charged against the chemical industry, once we could determine the limitations or the extent of the industry. Just what industries are to be included as chemical would be one of the difficulties.

MR. KEPNER: See what Pennsylvania does. Mr. Ainsworth was here a moment ago. I wondered if they had any special statistics.

DR. ELIZABETH B. BRICKER (Pennsylvania Department of Labor and Industry, Harrisburg): Pennsylvania's workmen's compensation law does not cover occupational diseases. There are a few cases reported in conjunction with the accident reports that come in, but they would not give a fair idea of what is occurring. I am sure, and I do not think they ought to be used.

A. L. ARMSTRONG (Eastman Kodak Company, Rochester, N. Y.): I think the difference in the compensation law makes that almost impossible. When you take the states where compensation covers occupational disease and compare that with states that do not, it is unfair, and you get reports that are not at all consistent in statistics. I think perhaps that is why some of our Pennsylvania concerns make such good records.

CHAIRMAN ROACH: Mr. Armstrong, you are a brave man to make that statement here.

The next on the program will be a paper by Dr. Elizabeth B. Bricker, of the Pennsylvania Department of Labor and Industry, Harrisburg, Pennsylvania.

Volatile Solvents—Their Health Hazards

By DR. ELIZABETH B. BRICKER

* (Chief, Hygiene and Sanitation Section, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.)

The past ten years have witnessed a new interest in a certain group of solvents. I refer particularly to those solvents having rapid volatilization as one of their properties. A number of causes have contributed to arouse this interest. But if one factor were to be singled out as being the most significant, it would undoubtedly be the introduction and the adoption, in many processes, of nitrocellulose lacquers. The accompanying economic necessity for the development of better, cheaper, and more universal solvents and diluents in the manufacture of these lacquers led naturally either to the introduction or to the widened application of these same volatile solvents for other purposes. In addition to their use in lacquers, enormous quantities of solvents are employed in the manufacture of artificial silk, in the production of artificial leather, in the dry-cleaning industry, and in many other branches of business where, though possibly not used in large quantities, they play an essential part in the process of manufacture.

Unfortunate experiences involving explosions and disastrous fires first directed public attention to the necessity for careful handling of these products. Before methods for control of the fire hazard had been universally agreed upon, illness in some of the persons exposed to these compounds was being discovered. The far-sightedness of the Chemical Section of the National Safety Council in sponsoring the study of the health hazards in the use of benzol was an early and an outstanding demonstration of the fact that industry is interested in more than its product and its property; and that the health of the men and women who produce the output of a factory should receive the same careful consideration as does their safety.

Knowledge of the effects of volatile solvents on health may be acquired in two ways: by laboratory investigation, involving controlled experiments on animals and on man; and by the study of workers who have become ill while using these compounds.

In the past much of this work has not come to the notice of industry, as the reports have, for the most part, appeared in medical journals and other scientific publications closely allied to medicine. A departure from this procedure has appeared, however, within the past few years. Many companies are now appropriating funds for the study of the physiological effects of their products, and in a number of instances have published the results of their investigations. This information may reach the industrialist through popular presentations in the newspapers or in non-technical periodicals, or in the form of reprints from scientific journals distributed by the manufacturers of the compounds studied.

The actual case reports of illness produced by exposure to volatile solvents, and of many other health-hazardous compounds in common use in industry, continue to appear almost exclusively in medical journals. It is the compilation of some of these reports that I have been asked to present to you.

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 Harrisburg, Pa.

Accounts of the effects of the newly developed and the more widely advertised solvents are undoubtedly the ones which have the greatest interest for the manufacturer. Thus far, practically no cases of ill health due to these substances have been reported in the literature. Whether this is due to the harmlessness of these compounds, or to the greater care exercised in their use, is not known. Whatever the cause, this apparent immunity should not lead to relaxed vigilance.

In discussing petroleum distillates in one of the German medical journals, Floret reported two unusual cases. One was that of a girl who suffered from epileptiform convulsions for a year after an acute poisoning from benzine fumes. The other case was that of a man who, while filling cans with benzine, lost consciousness. He developed high fever and became acutely ill. Later, sores appeared on his body and in his mouth and throat which, Floret believes, were caused by the excretion of the benzine through the skin and the mucous membranes. The man died five weeks after the accident.

Another author, Stiefler, described the case of a man twenty-one years of age who fell unconscious after emptying a can of benzine. He was treated in a hospital and was discharged as recovered after ten days. Later he also developed convulsions which recurred every four or five months and were epileptic in character.

It would seem that the great amount of publicity given to benzol and its physiological effects should insure adequate protection in its use. However, cases of illness continue to be reported. Among those from Germany was that of a workman who entered an empty vessel which had contained benzol. The vessel had previously been washed out with water six times. Nevertheless, the man lost consciousness shortly after entering it and all efforts to revive him failed. As several plumbers had worked in the same vessel it was thought that benzol could not be the cause of death, but at autopsy considerable amounts of benzol were found in the brain and other organs, so this case must be regarded as one of unusual susceptibility.

A report from Vienna gives details regarding a group of cases of benzene poisoning occurring in Central Europe. Fifty cases appeared among the women workers in a rubber-goods factory within a few weeks after beginning employment. Seven of these cases resulted in death. It would be of great interest to learn the exact composition of the compound used by these women. Unfortunately that was not published in the report, benzene, evidently one of the ingredients, being regarded as the toxic agent.

Carbon disulphide has been held responsible by certain French observers for a case of neuritis in which the muscles of the legs and the arms were affected. This man had been employed for five months in the making of mustard plasters by spreading on paper a mixture composed of rubber, benzine, and carbon disulphide.

Injurious effects arising from the use of the chlor compounds continue to be reported. The German factory inspectors' report for 1927 carried accounts of several cases of poisoning from trichlorethylene, most of them being merely loss of consciousness with no lasting effects, although two important cases were included, one of very serious eye injury and one of death.

A report from Paris describes two cases of poisoning from carbon tetrachloride. The first case was that of a man who, on showing slight symptoms, stopped work and recovered in a few days. The second case was of greater severity. This man had been using carbon tetrachloride in a small, poorly ventilated room in a cleaning establishment. At the end of his second day's work he became acutely ill, developing vomiting, headache, dizziness, abdominal pain, and a temperature slightly above 102 degrees F. He became unconscious and was removed to a hospital for treatment. His symptoms indicated involvement of the liver, spleen, and kidneys but he was discharged from the hospital after two months, very much improved in health. A physical examination one year later showed him to be completely recovered.

The recent controversy on the permissible uses of methanol apparently quieted down following the publication of the agreement between the manufacturers of methanol and the United States Public Health Service, which agreement went into

effect July first of this year. While a large number of deaths and some cases of blindness have been reported as being caused by the drinking of methanol, no recent fatalities have been reported from its industrial use. At the present time several investigations are being carried on in well-known laboratories for the purpose of increasing our knowledge as to the toxicity of this compound both by inhalation and by skin absorption. With additional data on these two points methanol should assume its proper place in industry. Certainly with what is known of its physiological action at the present time, it should not be used as a solvent for general purposes.

In the preparation of this paper assistance was solicited from a number of companies manufacturing or using volatile solvents in large quantities. The questions asked referred exclusively to the kind of protection used by these companies for conserving the health of their workers.

The replies brought out little that is new. The points emphasized were those which have many times been presented at meetings similar to this one: the handling of volatile solvents in closed systems; the use of positive pressure helmets or hose masks, with an adequate supply of fresh air, by persons cleaning tanks or repairing leaks in valves or pipe lines, (this type of work never to be done by one man alone); and, in the case of a tank, only after it has been thoroughly steamed or washed out; adequate ventilation of workrooms; alternation of jobs for workers exposed to volatile solvents with jobs in which there is no such exposure; periodic physical examination of workmen; and substitution of nontoxic, or at least less toxic materials, for toxic compounds.

As exhaust ventilation at the point of evaporation of a solvent is the procedure usually recommended, it was a surprise to learn that three large companies, when using benzol as a solvent, are depending upon general room ventilation alone. Two of these companies specified that this ventilation was by means of blowers at the floor level of the room.

One company stores most of the volatile materials which are kept within the plant, in underground tanks, or, in the case of especially volatile materials, in refrigerators. The latter procedure seems to be an admirable method for conserving material and also for eliminating a health and a fire hazard.

Another company, which has as a special hazard carbon disulphide, conducts its process almost entirely under water seals. In cases where escape of this vapor is inevitable it is ignited and burned to sulphur dioxide.

Education of the workers concerning the potential health hazards of the materials they are handling is most important. Such education gives them a definite reason as to why certain rules have been formulated and why they must be obeyed. One company emphasizes the importance of constant and close supervision by technically trained men. This is regarded as particularly necessary in the case of operators who use piping, pumps, etc. and are inclined to apply personal ideas which might prove dangerous.

At intervals during the past two years "The Rubber Age" has published a series of most interesting and instructive articles by Dr. P. A. Davis, Assistant Medical Director of the Goodyear Tire and Rubber Company, dealing with toxic substances in the rubber industry. Many of these articles carry a section which should be of great help to the plant physician and the personnel department in the selection and placement of workers. In discussing the subject of physical examinations Dr. Davis specifies in detail the kind of person who should not be employed when such employment involves exposure to the particular substances under consideration. The volatile solvents on which these details are given are carbon tetrachloride, carbon disulphide, amyl acetate and other amyl compounds, and acetone.

In conclusion, I should like to make a plea for the reporting of cases of ill health caused, or suspected of being caused, by volatile solvents. I am sure that the files of the medical departments of many companies contain records that should have

wide publicity in scientific journals. A large company, with its corps of chemists, physicians, and safety engineers, can make any plant safe. These men are familiar with the hazardous substances with which they are dealing, know how to recognize their toxic effects on the human being, and how to provide for the safe use of these compounds. But what of the physician in general practice who, for example, may be treating a cobbler, ill because he has been using a cement containing benzol? His knowledge of industrial processes and materials is limited. Without aid from industry itself, he cannot be expected to keep accurately informed as to the physiological action of the many volatile solvents which are being developed and utilized in rapid succession. But he does read his medical journals, which carry occasional items on the subject of these important industrial hazards. The average physician has some knowledge of the effects of the more commonly used solvents. It is ill effects from the group of newer solvents therefore that should be brought to his attention by frequent and detailed reports. The sooner we have general knowledge of the toxic action of these substances, the better prepared we shall all be to combat it.

The American Public Health Association is attempting to compile records on just such cases. The committee having this work in charge depends largely on published records. It would welcome informal personal communications, carrying reports of cases, to embody in its report. With such cooperation from industry itself these reports would soon be built up into a useful source of information for reference. For the more we know about the health hazards encountered in the handling of volatile solvents the better able we shall be to employ these compounds with safety, and thus retain for use valuable materials which would otherwise be outlawed.

CHAIRMAN ROACH: The floor is open for discussion.

I would like to hear from Dr. Greenburg on that paper.

DR. LEONARD GREENBURG (United States Public Health Service, Washington, D. C.): I have nothing to add to Dr. Bricker's excellent presentation of the subject. I think this is a field which is continually enlarging, and Dr. Bricker's review is certainly an excellent summary of the present status of the problem of some of the industrial poisons.

Mr. Gumaer made an interesting suggestion last night, namely, that some organization should continue to compile the literature on each of these substances that comes out, and keep a running file of the literature, particularly the toxic doses of these newer chemicals and solvents. He suggested that the National Safety Council do that. I do not know of any mechanism by which the Council could, but I think it was an interesting suggestion and perhaps some of the members may know how.

CHARLES GREENFIELD (DuPont Viscoloid Company, Arlington, New Jersey): I would like to ask Dr. Bricker if, when carbon tetrachloride comes in contact with fire, the fumes are more dangerous than when it is simply inhaled or there is contact with fumes from an open tank.

DR. BRICKER: I think Dr. Hamilton, in her book on Industrial Poisons in the United States, has gone into that. It is not so much the carbon tetrachloride itself, which is dangerous when used on fire, but the products of its decomposition. She considers phosgene is the compound which is so dangerous under those circumstances.

DR. EDWARD G. MEYER (Assistant Chemist, U. S. Bureau of Mines, Pittsburgh): The Bureau of Mines is making tests of the use of carbon tetrachloride on fires, and when it is used on fires, phosgene, chlorine and hydrochloric acid are the poison substances. If you write in to the Bureau of Mines, they will send you the information.

CHAIRMAN ROACH: I wonder if we have any records of fatalities or injuries, at fires, caused by carbon tetrachloride?

DR. MEYER: The reason for this investigation by the Bureau of Mines was the fatality of two navy men who were working in a compartment where a fire started, and they were using carbon tetrachloride and were killed. Then this investigation was made.

MR. GREENFIELD: The investigation also covered the gases that came in the New York City subway, when that cable came out. Somebody squirted a Pyrene extinguisher on it and the Bureau of Mines found phosgene was one of the decomposition products at that time.

DR. W. J. McCONNELL (Metropolitan): Just a few weeks ago there was reported a death of a janitor, who was using a wax containing tetrachloride. The wax was rather hard, and he put it on the stove to melt the wax and the tetrachloride was liberated and he died after ten minutes exposure.

DR. ALBERT S. GRAY (Director, Bureau of Occupational Diseases, Connecticut State Department of Health, Hartford): I was very much interested in Dr. Bricker's discussion of carbon tetrachloride. They are using it now in household cleaning machines, and I consider that extremely dangerous, because the literature sent out with these machines does not dwell sufficiently upon the toxicity of the material.

I know of three cases rendered quite ill by the use of this material. They are using it and sending it out for use in small hand cleaners, and they also have a very nice electrical cleaning device, in which the individual is furnished with about five gallons of this material, largely carbon tetrachloride, and instructions for using and cleaning the carbon tetrachloride after it becomes dirty. They furnish them with a canvas bag and Fuller's earth, with instructions to pour the material into the canvas bag with the cleaner and put the Fuller's earth in and pour it out into the original can two or three times, until it becomes clean. You see the possibilities of danger to the woman working with that material, using it in a poorly ventilated room. They do tell you it should be used in a room preferably where there is cross ventilation, with a door opening outside. They read those directions and they do not do it.

I know of two cases where it was used in a basement and one case in which it was used in a kitchen, with very unfortunate results. We know the vapor is about five times as heavy as air. I think there are going to be some tragedies there.

It is suggested that children and animals be not permitted on the floor during its use, but we are bound to have children crawling on the floor while this work is going on. I think if the companies selling that do not make more definite statements we are going to have unfortunate accidents.

DR. BRICKER: I have asked the Pennsylvania Dry Cleaners' Association to keep us informed of any cases of poisoning from carbon tetrachloride that come to their notice, but evidently none have appeared as yet. I shall be glad to learn of any occurring outside of the state.

CHAIRMAN ROACH: Would you care to say something about the absorbent properties of the fluid?

DR. BRICKER: I took that matter up some time ago, and as far as the literature would indicate there is no toxic effect from skin absorption, although you have that skin irritation which you always have when a substance is used which removes the fat from the skin. Since carbon tetrachloride is used to remove the fats from clothes or other substances, it may produce dermatitis.

P. W. GUMAER (Consulting Engineer, New York City): In one case you mentioned where a man was overcome with acute poisoning in a tank, after it was supposedly cleaned and after other men had worked in there—I would like to explain about that.

You take a ten thousand gallon tank car and supposedly clean it out; it does not take very much liquid solvent to get a concentration which will cause acute poisoning. Now there are certain gums that are slowly deposited on the inside of tank cars, that have carried solvents for a long time. They are on the inside of the car, and if you could steam the car out, some of them would come out, yet not the full amount. Suppose the car stands for a considerable time after it is steamed out, and then the men go in; there has been time then for the solvent to escape from the gum into the atmosphere of the car. On a ten thousand gallon car you get a concentration of two thousand parts of a million, which might cause acute poisoning; it only takes one

cupful, and it is very conceivable that that amount of material might be distributed over the whole surface of the car, inside the car film, although it might be very very thin.

I make this explanation in order to emphasize the fact that no one should ever go into a closed tank for any purpose, without gas mask and attendant, even though it has been supposedly cleaned beforehand.

CHAIRMAN ROACH: I think that point has been well emphasized and I hope it will be more strongly emphasized. In the last seven years we have had many tragedies in New York sufficient to warn us, in backing up the experiences by Mr. Gumaer, about some of these tanks supposedly clean and free from vapors.

I would like to hear from Dr. Winslow.

DR. C.-E. A. WINSLOW (Professor of Public Health, Yale Medical School, New Haven, Connecticut): I was very much interested about the publication of our current comments on industrial solvents. Dr. Sappington and I have discussed it a great deal; certainly if the Industrial Health Division did that work of publication of our current comments on industrial solvents, there would be such a protest from manufacturers of some of the products as to reasonable standards, and such a protest and such fear on the part of industry that these figures would be quoted on compensation cases, that the Industrial Health Division would probably be wiped out. We have to recognize quite frankly that there are certain things the National Safety Council can do quite well. No other organization has the ability to get the things into the actual daily works of the industry; on the other hand there are certain things we can not do in our organization, and I think that is one of them.

When there is a tremendously big issue like benzol, we have to face it and take our medicine; but if we were to start out and give a general list of solvents and their dangerous concentrations, I can assure you the reaction would overbalance the benefit. There are other organizations that can do that. The American Public Health Association can do that kind of thing. They are not responsible to industry; they can do it and we can use it, but I am afraid it would be a very dangerous thing for us to do the thing we ought to do, unless it was big enough to make you believe you had to stand for it and have a big fight.

I was very much interested in another point, particularly the small plant. I listened the other day in the Governmental Officials' Section to an illuminating address by Colonel Reninger. He faced well the fact that where we are following an entirely practical ideal, if we expect to solve the small plant problem it must be through the small plant. He said the only way to solve it was through action by governmental officials and insurance companies. He suggested, I think very wisely, that it would be very well if our officials in accident prevention—I would say the same with those concerned with industrial disease—should devote a very much larger part of their attention to the small plant. The big plants can take care of themselves, as he put it, in the accident field. What is the use of an inspector visiting at regular intervals a big plant that has not had a lost time accident in three years, and ignoring three or four smaller plants in the neighborhood that are having them rather constantly?

I think the most useful thing to do would be to persuade the governmental bodies to devote a much larger share of their attention to the small plant than they do.

DR. C. O. SAPPINGTON (Director Industrial Health Division, National Safety Council, Chicago): May I make a few remarks supplemental to what Dr. Winslow said?

The basis upon which information is given out by the Council, particularly in regard to industrial poisoning, is largely through correspondence. We write probably 3,000 technical letters during a year, endeavoring to answer some of these questions. It seems to me significant that 60 per cent of those inquiries are on chemical health hazards. As you are a chemical section, you certainly must be interested in that trend. In other words, there are about 1,800 inquiries on chemical health hazards that we receive.

Now, in addition to that, you might also be interested to know that approximately 90 per cent of these inquiries do not come from physicians or nurses. They come from safety engineers or safety supervisors, which of course is what you would expect in an organization built up primarily of safety people. We have been recently asked for the safety precautions necessary in storing fifteen one-ton drums of chlorine in a large city.

IRA V. KEPNER (Pennsylvania Salt Company, Philadelphia): We were probably a dozen times that much at the plant, keeping it in a cool place where there is ventilation.

DR. SAPPINGTON: It would be all right in a large city?

MR. KEPNER: Yes. I do not know of any place where they would have restrictions. That is only one tank car or two.

MR. GUMAER: In reference to Dr. Winslow's remarks regarding compiling information on toxicity, I think it would be a great benefit to industry, state departments of health and labor, and also engineers, to have this information available. Before I can do any work on ventilation, I have to know how toxic a material is, how many particles of material a workman can breathe without endangering his health. A firm endeavoring to use a new solvent wants to know how safe it is to use.

The ideal thing would be to carry on research and determine the toxicity of all these materials; but that is obviously impracticable and would require a long, long time for that work. However, there is information on many materials, and on a great many materials there is no information at all. Some of the information is in obscure foreign journals that the average person would not have access to. My thought that I discussed previously with Dr. Greenburg was that we could compile the information that is available—not publish it, but possibly have it on file for Dr. Sappington to give to any one asking for information on toxicity. It would be a great saving for everybody in that work, if he would give the references, establish a good bibliography on the subject.

The American Chemical Society, Paint and Varnish Section, is preparing a monograph on lacquer raw materials, and they are giving the properties on the very many solvents and materials used in lacquer. It seems as if industry would benefit from such knowledge.

DR. WINSLOW: That is a practical suggestion, and I think Dr. Sappington will confirm me when I say he is quite ready to do that. One of his principal values to the Council members is his readiness to give any such information in correspondence.

DR. SAPPINGTON: I think, if I may be allowed to say another word, there is a distinction which Dr. Winslow has made between documentary evidence, which is broadcast over the entire country, and the other method which we use through correspondence when we discuss specific problems; there is a distinct difference between the interpretation of information given in those two types of media. Now there is much more chance for misinterpretation in printed documentary evidence of the kind that we put out in our pamphlets, than there is when a member writes in for information on a specific problem, and gives you exactly the problem he would like to know about. I think that should be emphasized, and probably that is exactly what is in Dr. Winslow's mind.

DR. J. P. LEAKE (United States Public Health Service): This is all very interesting, and I think very profitable.

In regard to carbon tetrachloride, to make the record complete, probably several of you know of instances that were cited in Kansas City, with affidavits, and so on, with fatal results, supposedly, from the use of one of these cleaning machines, using carbon tetrachloride. From what I saw of the data, it did not look conclusive that that was the cause of death or probably some toxic effect.

CHAIRMAN ROACH: Mr. Timm, do you care to join in the discussion?

E. A. TIMM (Standard Oil Company of New Jersey, Bayonne, New Jersey): I just wanted to state we had an electrician who was cleaning a motor with carbon tetrachloride, spraying it in there, and the man was using a gas mask at the time;

but he took off the gas mask and he was slightly overcome. Of course we took him to the first aid and gave him the necessary treatment and he came around all right. I wonder, in spraying that carbon tetrachloride, if phosgene is generated there without the application of heat?

MR. GUMAER: If your commutator is sparking very badly you have intense heat at the sparking point.

MR. TIMM: The motor was shut down.

CHAIRMAN ROACH: I was very much interested in that part of Dr. Bricker's paper that dealt with the possibility of toxic poisoning from benzene, that is the petroleum distillate. I wonder if we have any American cases on that. We certainly make enough of it to have had some experience with it.

DR. LEAKE: I know of one fatal case of gasoline poisoning.

K. E. YANDELL (Standard Oil Company of New Jersey, Elizabethtown, New Jersey): The last speaker commented that he knew of an occasion of death due to gasoline vapor. Just what manner or nature was that?

DR. LEAKE: Of course it is not the same thing as petroleum benzene, but quite similar. This was a boy cleaning a car off with gasoline, spraying it all over the car in a tightly closed small garage. We know that it is toxic and that apparently was the only possible cause of death, at the autopsy.

We know of a lot of cases, particularly in our southern refineries, where tramps go in a long string of tank cars in a train, a rain comes up, they find an empty one and go in and the tramp is always found dead when the tank car reaches the refinery.

CHAIRMAN ROACH: Gentlemen, the floor is still open for discussion. I doubt whether the subject has been exhausted. I was very much interested in what Dr. Winslow said about frequent plant inspection of small plants. I think that practice is carried out in most states, to give very much more attention to small plants than to very large ones where they have such engineering services that the police inspection made by the departments of labor is not very helpful. After all, you must remember that our authority is based upon police power. When we go in, we do not go in by asking permission of anybody. The state commands a certain thing be done, and while we try to "soft pedal" that particular aspect of plant inspection we would rather go in there, if we have the ability, to give consulting advice on matters. Primarily the authority of a state inspector is a police authority, and we do very much better with that kind of service in medium and large sized plants than probably we do in plants only employing a few people.

It is much more difficult to convince a man employing ten or fifteen people, that the plant requires a great deal of safety attention, than it is to convince a very large plant employing a large number of people that the safety program is an important part of their operating program. It is possible to go into the small plants and see that plant premises are reasonably safe, structures, buildings, equipment are safeguarded, and if those were the major causes of accident, there would not be any problem about it at all, because we would not ask the help of anybody to make plant premises safe so far as buildings and equipment are concerned.

However, if you look over your records you will find that unguarded machinery or dangerous structures are not the major causes of accidents in industry, but that the unseen things that are not altogether visible at the moment when an inspector is there, are the ones that we have to guard against, and that is where this safety educational feature comes in. If we were to inspect small plants once a month (which *NO* state does, no state, I am sure of that, they would not have an inspection force large enough, and I do not believe they ought to have it large enough to do that) I doubt even then if it would make the plant very much safer, unless we can sell the thought to the man that operates the plant, that is on the premises all the time, so that he becomes safety conscious. Down in our state we are trying to do that through annual state-wide inter-plant safety contests, that will permit an employer having ten or more people to enter the contest.

I have in mind an accident in a tank that cost three lives in a small plant. No

kind of factory inspection could prevent that type of accident. One man entered the tank that was sour, was overcome, and another entered, and he was overcome; a third went in, the superintendent of the plant was the third man, and he was overcome by the vapors, and then a fourth man went in and brought out the other three. The three of them died. The superintendent of that plant certainly was not safety conscious, because our rules are printed, published and posted, that *NO* person shall enter a tank without a life line, and a fellow workman on the outside at the end of that line. But these rules were disobeyed, and probably had never been followed out, for the reason that in that small plant the man who was responsible for the operation of the plant was not safety conscious.

We can do a little to sell safety in a plant. The insurance carrier can do a great deal, and most of them do a great deal, in selling safety in the small plants; but I am not a bit sure that we are going to solve the problem of the small plant until we can educate the man employing ten or twelve people, that he has just as grave responsibility resting upon him for the safety of those men, as has the man who employs five hundred or a thousand people.

MR. GUMAER: I spent about five years in studying a particular industrial poisoning and giving free service to plants where that particular chemical is used, in endeavoring to get them to use proper precautionary measures, and it is my opinion that in industrial poisoning, the problem of the small plant is even greater than in the case of accidents in the large plant. I infer that the only solution to that, as Dr. Winslow mentioned, is better state supervision.

Now the larger plant is being penalized by the poisoning of the small plant. The small plant does not take the interest that the larger plant does. In most cases I have never encountered any difficulty at all in getting the larger plant to make changes in their ventilation for precautionary measures. They are willing and anxious to do it. It is very seldom that the small plant follows recommendations willingly. I have even had to get the firm I represented to state that they would refuse to sell them the material if they did not make changes. That shows you the impartial attitude or the attitude of large producers to protect the health of individuals even at the expense of their own sales.

In Mr. Roach's state about a year and a half ago, I happened into a plant, and a man was using the solvent in cleaning off tires, just before they were wrapped. He was down in the basement, in a corner of the room, where there was absolutely no ventilation. The man looked anemic. I warned them at that time, that it was a very dangerous condition, and that they should put in exhaust ventilation. They had been in financial difficulties and did not do it. A month from that time the man was dead.

The problem is the small plant. I think there is room for improvement in the state inspection. The inspection of these solvent toxic materials is left to routine factory inspectors. Very few of them know about proper use of these solvents and the ventilation. If each state would have at least one man especially trained in this particular line, and they had gradually acquired—like Dr. Gray has in Connecticut—a list of all the plants in the state that are using chemicals, and this particular man made inspection of that plant, and of the amount of the air necessary, it would go a long way toward solving the problem.

A. V. BERQUIST (Youngstown Sheet & Tube Company, East Chicago, Indiana): I am interested in a steel plant but we also are associated in chemicals in a way. It strikes me that nothing was said about the use of self-contained apparatus in the rescue of men who had been overcome from poisonous fumes of some kind, ammonia gases or fumes from oils, and the like. I would like to hear an expression from some of the members as to what they do in the training of men as to the use of self-contained apparatus for rescue work.

CHAIRMAN ROACH: Is there anybody here that can answer the question?

MR. YANDELL: I might answer that. We are in the petroleum manufacturing industry and we realize it is hazardous. You are more or less constantly in contact

with gases. Not as an answer, but as a preventive, I might recommend the very close scrutiny of the possible dangers and warn the men against entering into gaseous areas without the necessary equipment. We also try to emphasize that to employees particularly in our process operations, by giving them at least once a year instruction in the pressure prone method. You can always get a capable instructor. We emphasize the pressure prone method of resuscitation.

We usually catch the men after their shifts and reimburse them for coming there so there is a considerable number of the men entering into that training, and after they have that it makes them more conscious of that danger. In case of necessity, although there are plenty of them I have seen get out of there, I would hate to have my life depend on their ability, but it does make them safety conscious and in a number of cases it is advantageous.

Mr. BEAQUIST: We may have a break in the line in the ammonia building; the men in there possibly may be overcome. How do you get them out?

Mr. TIMM: As far as the self-contained apparatus is concerned we find we can add the fresh air hose line to the gas mask; that is, if the man is overcome. If the man is overcome in the first place, we can get to him with a twenty-five or fifty foot length of fresh air hose. We have not discovered any case yet where we have to use a self-contained breathing apparatus, either a Gibbs or McKay. We use the ammonia canister type of gas mask, with a fifteen hundred or two thousand c. c. canister to it.

Mr. BEAQUIST: I think any plant, of any size, ought to have a man drilled in McKay or Gibbs apparatus. We recently had a Bureau of Mines man, Mr. Grimes of Vincennes, Indiana, come up and train some of our men. It seemed we could do with green men; in the use of McKay apparatus, you can train them in a short period of time. We trained them in a month. They can go through the process, take the machine apart; we held competitive drills with those men after one month training, three teams; we put them through a smoke room for three minutes, changing the apparatus, sterilizing, shutting off the bottle, sterilizing, putting on the goggles, made a complete change of four men in twelve minutes.

Mr. TIMM: If you have use of that type of self rescue, it is a fine thing to train a man. We did back in 1920 train a man in the use of the McKay machine. We found it was a two hour machine at that time; a man trying to get into the tank car would have an awful job on his hands.

Mr. BEAQUIST: In a tank car it is impossible to do that.

We also use a power blower. We have a little different situation than you probably do in a chemical plant, because with the gases and carbon monoxide being present you may have them spread around. With the power blower, if you do not set them down in an atmosphere that is absolutely pure, you are liable to blow gases or draw gases into the blower and blow them to the men.

Dr. EDWARD G. MEYER (United States Bureau of Mines, Pittsburgh, Pennsylvania): There is a representative here with the Bureau of Mines, with a gas mask exhibit. I invite you people to write in and tell your experiences and ask what suggestions we can give to solve your difficulties. There are a great many of these difficulties we never hear about and naturally we can not improve the equipment.

FRANK SCOTT (Hamlin and Company, New York): I am representing the Consolidated Gas Company in New York. In connection with this question regarding rescue work, they have cars equipped for emergency service. They have on them the two hour apparatus and also the half hour oxygen breathing equipment; we recently have installed one hour apparatus on our larger holdings. I do not think it is generally known that they have the one hour oxygen breathing apparatus. The

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Construction Section

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Tuesday Morning Session
October 13, 1931

GEORGE WIDUA, Chairman
Woods Brothers Construction Company, Lincoln, Neb.

The first session of the Construction Section convened with General Chairman George Widua presiding.

CHAIRMAN WIDUA: It is a great pleasure to see this large assembly and I bid you welcome.

I want to say that I think the chairman of our Program Committee, Mr. Tubesing, has arranged a fine program, one of the finest that I can remember in the Section, and I think we will all learn considerable from the speakers who are to deliver the papers.

I am sorry to announce that our secretary, Mr. Charles Black, is unable to attend the Congress this year, but he is sending in his report which will be read later.

We will call on our good friend, John Russell, for his report. He has done a very fine work for the Section the past few years.

What We Learn From Reporters

By JOHN RUSSELL, JR.
Chairman, Statistics Committee

Insurance rates for any industry are based on the actual accident experience of that industry. Individual companies obtain better than manual rates by improving their accident experience. Just as lower rates may be secured under mass buying, so favorable mass statistics exert a force toward lower insurance rates.

Your statistical committee bends every effort to encourage construction companies to report annually to the National Safety Council, using standard methods which are satisfactory to all insurance carriers and to the majority of industries.

We are indebted to the 392 reporting firms who made possible the comprehensive survey of accident experience for the year 1930 upon which I wish to comment briefly.

Construction Industry Statistics Briefed from Injury Records of Individual Establishments, 1930, Arranged According to Frequency

No. of Firms Reporting	Average Employees	Man Hrs.	Deaths & Per-Add 000 Disab.	Lost Time Injur.	Days Lost	Frequency	Severity
ENTIRE INDUSTRY							
392	42,797	93,783	89	4,836	514,500	51.57	5.49
HEATING & PIPING CONTRACTORS							
17	1,522	3,149	0	41	504	13.02	.16
PAINTING & DECORATING CONTRACTORS							
24	641	1,305	0	18	1,633	13.79	1.25
MARBLE CONTRACTORS							
24	1,147	2,344	2	39	13,124	16.64	5.60
CARPENTER CONTRACTORS							
14	315	652	0	15	174	23.01	.27
TILE CONTRACTORS							
8	219	466	0	11	260	23.61	.56
WINDOW GLASS CONTRACTORS							
11	131	268	0	7	155	26.12	.58
ROOFING & SHEET METAL CONTRACTORS							
19	538	1,069	1	48	6,865	44.90	6.42
BUILDING TRADES NOT OTHERWISE CLASSIFIED							
58	4,708	10,099	20	473	52,625	46.84	5.21
PLASTER CONTRACTORS							
17	526	1,060	1	52	6,722	49.06	6.34
GENERAL BUILDING CONTRACTORS							
99	19,399	41,534	20	2,228	46,858	53.64	4.84
ERECTION DEPARTMENTS OF ALLIED BUILDING METAL IND.							
30	1,560	3,446	1	191	14,359	55.43	4.17
CONSTRUCTION WORK OTHER THAN BUILDINGS							
32	10,295	24,763	26	1,436	200,292	57.99	8.09

PLUMBING & PIPING CONTRACTORS							
21	1,144	2,405	0	146	3,058	60.71	1.27
COMPOSITION ROOFERS							
9	259	469	0	44	775	93.82	1.65
CEMENT WORK CONTRACTORS							
9	393	754	2	87	13,090	115.38	17.36

Table I.

Increase in the number of firms reporting accident figures to the Construction Section of the National Safety Council during the last five years.

1926	1927	1928	1929	1930
51	65	250	397	392

Table II.

Trend of severity and frequency rates in the construction industry during the last five years.

	1926	1927	1928	1929	1930
Frequency rate	57.70	65.07	59.37	50.41	51.57
Severity rate	5.44	7.13	5.79	4.62	5.49

Table III.

Accident frequencies of construction, mining and quarrying during the last five years.

	1926	1927	1928	1929	1930
Construction	57.70	65.07	59.37	50.41	51.57
Mining	82.91	87.60	67.78	74.43	49.34
Quarrying	57.01	53.72	39.57	26.71	23.46

Table IV.

Accident severities of construction, mining and quarrying during the last five years.

	1926	1927	1928	1929	1930
Construction	5.44	7.13	5.79	4.62	5.49
Mining	8.65	11.27	10.67	9.99	8.94
Quarrying	7.04	5.21	4.76	6.11	3.30

The first table shows the increasing interest in reporting annual experience. That this growth should continue is of importance since we know there are still several contractors who operate with lower frequency rates than that shown in this year's report. If they would report I feel sure the frequency rate for the entire industry would be lower than 51.57.

The second table needs a word of explanation as it is considered.

1st—It is not weighted to compensate for the varying number of firms reporting from year to year.

2nd—It is not weighted for the varying number of man hours worked from year to year.

3rd—It is the result that would ordinarily be graphed by a layman and does show a rapidly dropping frequency and a severity which has mounted to a point higher than in 1926.

While the drop in the frequency rate of our construction organizations is only



Charting Tables 1 and 2

about one-half of the decrease for identical establishments in all industries during this period, there has been a marked decline in severity over a five-year period. This improvement is due to reductions of 18 percent for fatalities and 5 percent in the frequency of permanent partial disabilities in a two year period.

Through individual efforts, together with the organized accident prevention activities of our trade associations and the work of this section of the Council, many construction organizations are showing marked improvement in their accident experience from year to year.

But as an industry we have the doubtful honor of heading the injury rate list of 28 major industries. This rate is the highest shown in the "Industrial Accident Statistics", a Council publication.

In this publication, lost-time injuries at the rate of 51.57 are charted for each million man-hours worked and there were 5.49 days of lost time per thousand hours worked. This indicates that insurance rates for construction coverage will be considerably higher than those for the cement industry, for instance, that has a frequency of 6.30 and a severity of 2.43.

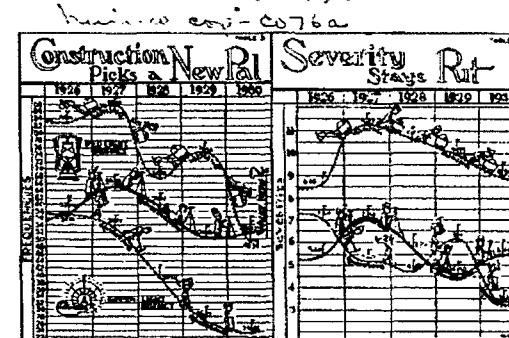
Construction work has much in common with quarrying and mining, or at least much more in common than with laundering or petroleum. For several years quarrying, mining and construction were bracketed as a triumvirate—the three most hazardous industries. But what has happened? Remembering that construction must be done with due regard to factors of safety, both of building materials and considerations of the human beings who accomplish the building, we turn to Table 3.

Here we have charted the frequency curves of the three industries, mining, quarrying and construction.

Mining and quarrying are making very decided progress. Quarrying has left us in disgust and gone to the green light district. Construction and mining continue to wallow in the danger zone, but it is my firm conviction that unless the construction industry gets going in an organized way, we are liable to have the honest finger of public derision pointed at us, with the attendant rush to attempted improvement by force rather than by natural healthy growth of safety consciousness. Gentlemen, the situation is serious.

Table 4, showing severity figures, is not more encouraging if we compare ourselves with quarrying.

There is one factor that must be taken into consideration in the study of Tables



Charting Tables 3 and 4

3 and 4. The figures are not entirely comparable from year to year because of the variation in reporting companies and hours. Consistently reporting companies give a much better and fairer picture than the intermittent type.

Of particular interest are the trends of 146 construction companies that have reported consistently for a three year period as compared with those of the mining industry who have consistently reported for the same period. The construction group shows annual reductions in both frequency and severity of lost time injuries since 1928. The total decrease for each rate amounts to 14 percent.

Suppose we try to visualize the accident experience in different phases of the construction industry. Table 6 lists them from the lowest frequency to the highest and in sequence. It clearly indicates that some of the trades are more hazardous than others, which prompts me to ask whether our problem of reduction lies with a concentrated drive on the cement work contractors or greater effort all along the line.

I incline toward a belief in the merits of the latter course, and the first step—the most obvious step—is a system whereby we can follow the safe worker from place to place and make use of him whenever he applies for a job. This is being done now on a small scale with mutually beneficial results. Certain companies certify their safe foremen by different means. When it comes to pass that such a foreman needs to make another connection he carries his credentials with him. Construction work is dependant upon roving labor. The reason for high frequency rates is explained in great measure by this fact. If we must use roving labor we can at least grade the supply so that we have certain knowledge of the assets that an employee will bring to our jobs.

Hazards in the construction industry are not limited to the construction of buildings as shown by the frequency rate of 57.99 and the severity rate of 8.09 for other types of work than building. Unfortunately, we do not have sufficient figures for different kinds of jobs, like dam construction, for example, to even approximate the average experience of companies engaged in doing such work. In this connection, I urge all companies that are engaged in doing many types of work to make a separate report for each when sending their annual experience to headquarters, if possible to do so. This procedure would add much to our knowledge of the hazards and the results that are achieved on different classes of work.

Identical Companies
Reporting 1928-1929-1930

CONSTRUCTION
SPECIFIC AND SEVERITY RATES
OF 100 ESTABLISHMENTS

CLASSIFICATION	1928	1929	1930
1. Erection Departments of Allied Building Metal Industries	18	60	30
2. Carpenter Contractors	11	78	14
3. Cement Work Contractors	3	33	9
4. Composition Roofers Contractors	5	56	9
5. General Contractors	45	49	99
6. Heating and Piping Contractors	16	94	17
7. Marble Workers Contractors	20	83	24
8. Painting and Decorating Contractors	23	96	24
9. Plaster Contractors	10	59	17
10. Plumbing and Piping Contractors	11	50	21
11. Roofing and Sheet Metal Contractors	12	63	19
12. Tile Contractors	5	62	8

Charting Tables 5 and 6

In Table 6 two groups have been underlined. In each there were an insufficient number of firms engaged in the construction of any one class of work to make separate classifications of practical value.

It would be of interest and value to us to know, for example, the safety records made by firms engaged in the erection of electric transmission and distribution systems, bridge and dam foundations involving caisson work, pipe line construction, highway construction, bridge erection, and similar jobs, because average records of companies in such types of work are standards which we can expect our gangs to attain. Two companies, for example, engaged in the construction of electric transmission lines had frequency rates of about 20 and 80 respectively. Although conditions under which their work was done may have varied widely, it would be worth while to each to know the best records obtained in such work for the year and to know the experience of other companies similarly engaged. Several of our larger members have adopted a plan for reporting their experience in different classes of work and your sectional officers urge others to do so when reporting their 1931 records.

Reports are sometimes written to gloss over undesirable facts. We have not compiled this in any such vein. Consider these facts! In every classification shown, (Table 6) many individual firms operated with a frequency below forty; i.e.—

Frequency Below Total

	No.	40 % Reporters
Erection Departments of Allied Building Metal Industries	18	60
Carpenter Contractors	11	78
Cement Work Contractors	3	33
Composition Roofers Contractors	5	56
General Contractors	45	49
Heating and Piping Contractors	16	94
Marble Workers Contractors	20	83
Painting and Decorating Contractors	23	96
Plaster Contractors	10	59
Plumbing and Piping Contractors	11	50
Roofing and Sheet Metal Contractors	12	63
Tile Contractors	5	62

Window Glass Work Contractors	9	81	11
Building Trades Not Otherwise Classified	41	70	58
Construction Work Other than Buildings	12	37	32

From an address made by Mr. W. R. Richards, safety director of the A. G. C. in Newark, N. J., we draw the following figures:

"Twenty-one competitors in the 1930 Accident Prevention Contest of the Associated General Contractors had no lost time accidents during the entire year.... Among them were—

Firm	Lost Time Accidents	Hours
James E. Cashman	0	211,926
Kaiser Paving Co.	0	118,651
Armstrong & Latta	0	89,085
Oakwood Construction Co.	0	75,788
Johnson Pepper Const. Co.	0	41,476
Boehm Bros.	0	149,858
Frank N. Cooper Co.	0	21,584
W. W. DeLange Co.	0	26,974
Lenane Co.	0	40,695
J. F. Russell Co.	0	77,339
Struck Const. Co.	0	33,433
T. J. Pardy Constr. Co.	0	272,972
F. J. Romer Constr. Co.	0	96,602
J. C. Nelson & Son	0	15,965
August Cederstrand Co.	0	15,680
L. W. Baumeister & Sons	0	52,609
Meiert Constr. Co.	0	26,692
Earl E. Garber & Co.	0	41,292
Webb-Clarke Company	0	16,780
Wortham Constr. Co.	0	15,440
Frank H. Davis Co.	0	17,814

Total hours without a lost time accident 1,458,655

From "Facts on Industrial Accidents, 1931 Edition", published by the committee on Accident Prevention, Building Trades Employers Association of the City of New York, we find in Table C the following:—

Trade Group	Hours	Frequency	Severity
Allied Building Metal Ind.	3,059,961	38.56	2.00
Carpenters Contractors Asso.	887,470	41.69	1.28
Cut Stone Contractors Asso.	1,076,080	18.58	.22
General Contractors	12,083,555	42.53	3.62
Glass Association			
Stained and Leaded	86,720	00.00	0.00
Glass Dealers Asso.			
Window and Plate	181,310	38.60	.85
Heating and Piping Contractors	3,171,939	12.92	.15
Marble Industry	2,342,802	16.64	5.60
Painters and Decorators	1,324,991	14.33	1.26
and others amounting in all to 310 firms working 39,456,552 man hours with a frequency of 42.50 and a severity rate of 3.82.			

What can be done by a consistent persevering accident prevention program is clearly shown in the ten year chart of a Boston contracting organization. In 1921 Stone & Webster Eng. Corp. started their program with an 85 frequency.

The chart shows marvelously sound advancement to a frequency of 37 for the year 1930.

The year 1931 has been brought up to September. This is one of the finest examples of accident prevention progress I have ever seen.

Gentlemen, if we strive sincerely enough, we can operate as an industry with a frequency below 40 for 1932. You are members of this Construction Section. Every one of your officers is ready to go to almost any length to give assistance, if he is permitted to do so.

Too many millions of dollars have already gone to waste. This is bad from economic, mental, and moral points of view. It is time for the industry to awaken and to energetically conduct a campaign that shall place us in a position in accident prevention work, comparable to that held by the construction industry in other respects throughout the nation.

It means profits, fewer delays, better public relations, better industrial relations and will attract higher grade workers who in turn will make still greater profits possible. Construction need not be the ignoble waster of money and lives that it has been!

CHAIRMAN WIDUA: Thank you, Mr. Russell. Would anyone like to ask any questions?

C. W. WAGNER (Safety Engineer, United States Fidelity and Guaranty Company, Chicago): I wonder if Mr. Russell has any data on nail punctures in major construction jobs, such as reinforced concrete where the forms are being used, and if so, what is the percentage.

MR. RUSSELL: In the reports going to the National Safety Council each year such a classification has not been set up because not enough people have sent in reports of that nature, but it is possible to obtain it if we invite the construction companies to report their figures on such accidents at the end of the year.

CHAIRMAN WIDUA: I think this is a good suggestion.

We will now call on Mr. Hendra to deliver his paper.

The Insurance Organization's Attitude Toward Accident Prevention in Industry

By T. J. HENDRA

Manager, Detroit Branch Office, Central West Casualty Company,
Detroit, Michigan

This is a subject which suggests a question, the answer to which comes readily to my mind as a casualty insurance representative; and the answer as I have it is about as follows:

The insurance organization's attitude toward accident prevention must be favorable, as it has been very definitely proven that the experience on any given line of industrial operation may be controlled by application of accident prevention means.

Those of you who have had experience with the rates paid by your firms for Workmen's Compensation and Public Liability insurance have your own answer when you make comparisons of the rates charged on some two periods, one with successful accident prevention, and the other without accident prevention; and the reduction in rates for the period of successful accident prevention will indicate in a most material way the insurance organization's attitude toward accident prevention.

This being true, it is, I believe, very definitely shown that the insurance organization's success in the handling of insurance covering operations which are susceptible to accident prevention treatment depends very largely upon its ability to promote and maintain interest on the part of its clients in accident prevention. Many rules and regulations have been adopted for use in manufacturing plants, these consisting

of certain types of guards built according to specifications; and in your construction industry you of course have somewhat of a mobile operation and guards used are usually for the guarding of a temporary hazard which, within a short time, will be entirely removed by the progress of the job, and as the hazard is eliminated by permanent construction, the guard becomes scrap, unless (as is the exceptional case) other more recently developed conditions might make possible the use of this particular guard at other points as the work progresses. These guards can be made just as effective in the prevention of accidents as the most highly developed permanent type of machine guard, and this is accomplished through means of safety education which is that means by which we are quick to note a dangerous condition, and are alert to the extent that a remedy in the form of a practical guard for the elimination of the hazard will immediately come to our mind.

I mention safety education as the most effective means of accomplishing the objective of accident prevention, and this scheme of education must be carried to those who design and plan the work, those who contract for its completion, those who superintend its many operations, and in addition to this, all journeymen and their helpers; and it may be truthfully said that accident prevention will not be accomplished in any appreciable degree unless safety education is effectively implanted in the minds of all persons having any part in the operations, even though their part in it may be but a minor one in the undertaking.

This thought seems most reasonable, as man's most natural and sacred duties are his own self-preservation and the welfare of his fellowman. Safety education is at times very difficult to get started, but it has been very definitely shown that it can be accomplished, and where it has been effectively carried on the favorable results obtained amply pay those responsible for its development in the knowledge that the result of their effort is the fulfillment of a duty in the interest of humanity.

Many of us recall construction operations in connection with which the injuries to workmen and members of the public were appalling, and we get a great deal of satisfaction from comparison of these operations with similar ones which were completed with a surprisingly small number of accidents. While some may be unreasonable enough to claim that this improvement was the result of just luck, I would say that it would be safe to assume that somewhere in the organization carrying on the latter job was an influence which made itself evident in accident prevention by means of safety education; this may not have been as much in evidence as are our present day methods, but nevertheless the objective of the ones exerting this influence for good was accomplished.

Many of you remember the old accepted remark of not so many years ago—a fatal accident for each story as the construction of a new building progressed. While this ratio held true on many projects of construction, it is good to note that it did not hold true on all; and I would say that those persons who were responsible for the defeat of this more or less accepted thought have had their reward in the satisfaction which comes to those who have done something worth-while. We must give a great deal of credit for the improvement in accident history to the various legislative bodies which have enacted laws creating departments of Labor and Industry and Public Safety bodies, some states and cities having drafted very specific safety requirements, and we must give much merited credit to the various contractors' and manufacturers' organizations for their effective safety development; and I believe that the attitude of the insurance organization toward accident prevention has been very definitely shown by their whole-hearted cooperation in the promotion of safety education. I believe that their attitude may be summed up in the words of a departed authority on safety and welfare whose memory we, of the insurance profession, will always respect. He stated that an accident compensated is an apology, but one prevented is a benefaction; and the attitude of at least a majority of the insurance companies indicates clearly their belief in this thought.

CHAIRMAN WIDUA: On behalf of the Construction Section I want to thank you, Mr. Hendra. Is there any discussion?

W. W. WILLIAMS (Safety Engineer, Employers Reinsurance Corp., Kansas City, Mo.): Why are insurance companies interested in accident prevention? It is because accidents cost money. I was asked by an employer why insurance companies are so keen to keep down the accident costs. "Doesn't it reflect in your rate, and isn't our insurance rate much better if we have a better experience? Doesn't it operate to bring to you an insurance premium?" It certainly does. We handle less money with a reduced premium, but more of it stays with us. What advantage is there in collecting a large premium on a job and spending it all and possibly more? We handle less money, but if we can keep a little of it we are better satisfied.

EDGAR N. GOLDSTEIN (Safety Engineer, Barrett & Hilp Co., San Francisco, Cal.): I am interested in accident prevention, and feel that one of the things that will bring the facts of accidents to the minds of superintendents is to list very carefully those that occur on each job, with the names of the men, the nature of the accidents, and the costs, when they occur. Insurance companies can do a great deal more than they have done so far in getting the necessary statistics to construction organizations so they can pass them on to their superintendents.

CHAIRMAN WIDUA: I might state that in our company we have twelve or fifteen jobs going at one time and we get that report every month, showing the name of the man who has the injury, the foreman, amount of time lost, nature of the injury, and the costs. I think it is very valuable.

H. W. HEINRICH (Assistant Superintendent, Travelers Insurance Co., Hartford, Conn.): This discussion has dealt with cooperation between insurance companies and construction men. I would like to tell you what our company does to cooperate. Each employer is furnished, either weekly or monthly, (depending upon the activity, turnover and size of the job) a sheet whereon is reported each individual unsafe practice that has been observed by the engineers and inspectors either as the result of accidents or as the result of observation without accident. It is reported in a specific manner. The type of accident is given and the unsafe practice is worded in a manner that is very definite. For example, standing under suspended loads, riding on material hoist where it is improper to do so and not wanted by the employer. Whatever the particular practice is, it is worded in such a fashion that it indicates that the man was doing something he was paid not to do. In addition to the type of the accident and the unsafe practice, the reason that the man persists in violating a practice is also given. Those two points, then, constitute a pretty complete picture.

At the end of the month the employer has that set-up. Every unsafe practice is listed on that sheet. From that point on, the job is one of issuing and enforcing instructions as to the elimination of those practices.

CHAIRMAN WIDUA: Gentlemen, the next speaker hardly needs any introduction as he is one of the fathers of safety in our Construction Section. Mr. Greensfelder is president of the Fruin-Colnon Construction Company of St. Louis, and also president of the Associated General Contractors of America, Inc. It gives me great pleasure to introduce him to you.

Construction Safety Insures Dividends.

By A. P. GREENSFELDER

President, The Associated General Contractors of America, St. Louis, Mo.

Dividend is an arithmetical term designating an act of division. In finance it applies to a division of profits; in life, to a participation by two or more in the results of joint activities.

Before there can be a dividend there must first be a concrete accomplishment or result. Fortunately, all results need not be tangible. Intangibles frequently outweigh the tangibles.

When one saves a life, be it spontaneous or the act of a life guard, the motive is never financial. There is rather an evidence of inner sanctity which responds to the emergency call for help. Finance does not enter into that equation. The spiritual influence is overwhelming.

Life in reality is merely more or less a collection of events, perhaps more hapless than made to happen, if we would face the truth. Business life is just that portion of our total existence which we purposely or unconsciously devote to commercial pursuits. Our ostensible objective is to earn a livelihood for ourselves and family.

Construction Industry

Food, clothing and shelter being the three essential needs of mankind, the greatest number of business people devote their lives to supplying the demands for these necessities of all people. The ever expanding needs of civilization continually broaden the variations into functions beyond these three primary requisites. Life has become more than just mere existence. Through physical discoveries and mechanical inventions, man's conception of life and its values has widened tremendously.

Agriculture today is more than just the tilling of soil. It involves social and economic problems and personal independence of far deeper consequences. Farming is more than insurance against famine. It is the means to an end. Mining, manufacturing and transportation are more than just large or small problems of production and distribution, creating and supplying ever expanding desires of mankind. They increase the opportunities for leisure, education and travel.

Construction, too, the second largest industry in the country, does more than provide shelter from the elements. It is the forerunner of the world's development—the pioneer of progress. It is preeminent in its position and unlimited in its possibilities.

It is the function of constructive minds in any field of endeavor to guide that industrial group. Construction is no exception to this. The leaders, whether they be voluntary or selective, brilliant or mediocre, must assume obligations within the limits of their powers. They must conserve the resources, minimize the wastes, expand the program of construction forces and lead onward to greater speed and effort than ever before.

Construction Safety

It is our specific allotment today to consider the safety element in construction. We are assigned the problem of analyzing and developing safe practices through collective groups.

The National Safety Council, as its name implies, acts as a national assembly to increasingly guard mankind in peaceful pursuits. It appeals to the unselfish and the selfish alike with its sole objective of minimizing the toll of accidental deaths and preserving the human family unharmed and healthful.

Council implies group action. Individuals can be careful of themselves and others, but through cooperation they can so tremendously multiply the fruits of their endeavors that collective planning is now granted as essential. Life has become very interdependent and is becoming more so very rapidly. It therefore behooves all of us to combine our intelligence to preserve our business and personal families. It is just self preservation modernly applied.

Man's Safety

In considering the most essential safety—that to mankind—one must think not only of one's employees, but of the public as well. This difference is recognized by

insurance companies in their public and employers' policies. The more safety, the less insurance premiums.

Constructors, as individuals, have seldom been publicity minded. The public is always greatly attracted to construction work, due to motion, noise and color as well as to each human being's ancestral trait of building inherited from the cave builder. Why not capitalize this public interest and erect safe platforms where visitors can watch construction work in progress?

Safety to employees would certainly seem desirable not only from the viewpoint of interest in our fellow-men whom we select as our business partners, but in self defense as well. Wherever one works safely, he will work with a great deal more joy and speed. Likewise, when the individual workman knows that his immediate superiors are safety minded, he rapidly becomes so himself if he stays around long enough.

Safety Engineering

One of the great hardships which confronts field construction forces is the fact that an employee is likely to work for many employers. Men follow the work rather than the employer. In every large community there are pools of construction labor from which are drawn particular craftsmen by various employers as work of their specific craft is reached on a structure. If one of these employers tries to educate the men on safety and the next one does not, it makes for confusion in the employee's mind.

A suggested cure for this situation is the employment of a common safety engineer by construction employers in a community cooperating with the various insurers. Either through misunderstanding of the need, or from jealousy, insurers have yet to cooperate in providing a joint safety engineer, who can go from job to job in a city and check up the safe practices of the workmen. When better cooperation displaces this stupid jealousy or whatever you may call it, safety work will progress more speedily than ever.

There are many instances, recently published, of jobs where excellent records have been made on safety work. Great credit is due these employers and their staff for such intelligent leadership as well as to the employees for their excellent cooperation. Through the courtesy and generosity of a number of prominent constructors in our own association, prizes have been offered for safety performance by A. G. C. members.

Eight years ago active cooperation was brought about between the National Safety Council and our own national organization. Ever since that time our association has been rapidly selling its membership on safety work in cooperation with the National Safety Council.

As chairman of the first safety committee of The Associated General Contractors of America at that time, I made a study of the safety programs as practiced in the various states. As a result I suggested Ten Commitments which are appended hereto, as they seem just as pertinent today as they did then.

In recent years the A. G. C. has had a Safety Director and has followed a definite safety program. Through the efficiency and faithful services of our Safety Director, W. R. Richards, we have been gradually expanding our program of safety work. Our Safety Manual has been issued by the hundreds and its increasing demand is very encouraging.

Physical Examination

In order that men may not be unduly overtaxed, perhaps more frequent physical examinations might become the rule. Men who are not in the prime of condition should not be assigned to certain work. Certainly the near-sighted should not be permitted to walk steel beams in mid-air. An employee who is ruptured should not be placed at heavy lifting. Men with deformities should not be entrusted with the operation of machinery, if others are depending upon it. Men who are not quick-

witted should not operate hoists, nor should men be forced to undertake work beyond their strength or endurance. Apprenticeship tests should perhaps be not only applied to apprentices who are just beginning to learn, but to the older employees who are novices at certain work.

The improvement of safety equipment is progressing very fast. Monoxide detectors, safety alarms on hoists, amplifiers with loud speakers at operators' elbows are just a few of the more recent contrivances which tend to more safety. Safety signs, painted guards and other devices are rapidly becoming standard practice, which employees are taking to as readily as the employers.

Machinery Safety

Unless machinery is operated safely, great losses can occur through careless operation. The derailment of a locomotive on a passenger train can create a great public catastrophe. At the same time the loss of the locomotive and cars may add up into a large sum.

The same applies to dirt trains, operating locomotive cranes and steam shovels. The wreckage of machinery totals into large sums each year. It is imperative to impress upon operators the great importance of care and the necessity of safety at all time. Safety permits the payments of dividends which would otherwise be impossible. Contempt for human lives is one of the hall marks of barbarism. While we should be merciful of men, we should be mindful of machinery.

Accident to machinery means delay to the work, needless unemployment while awaiting repairs and is one of the waste elimination factors which always must be kept in mind. Mr. George Widua, Manager of the Welfare and Insurance Department and more frequently in the future by construction men. It is well worthwhile. ment of Woods Brothers Construction Company of Lincoln, Nebraska, and General Chairman of the Construction Section of your Council, has recently prepared an excellent article on how "Care Cuts Lost Time on Construction Jobs for Woods Bros." I first heard safety spoken of by a railroad man. I hope to hear it spoken of

Safety for Materials

Safety in operations includes safety for materials. Loss of materials from fire is enormous. The Committee on Construction Operations of the National Fire Protection Association has recently published its first formal report entitled "Recommended Good Practice Requirements for Construction Operations." This report covers the fire hazards of buildings in course of construction and methods of fire prevention and control. These recommended Good Practice Requirements were tentatively adopted at the Annual meeting of the National Fire Protection Association last year, and should be studied with care. When men like W. J. Barney, president of Barney-Ahlers Construction Corporation, Charles S. Hill of *Engineering News-Record* and others who are members of this committee, can take the time to point out the necessity for fireproofed scaffolding, not-readily-over-turned salamanders, proper fusion welding and cutting process, etc., we should all take heed.

The use of salamanders and the heating of concrete materials deserve special attention. The increased use of fire proofed scaffolding, particularly when same remains in place for weeks at a time is rapidly justifying itself.

John W. Cowper, past-president of our association, has long been a leader in accident prevention. In his address before you two years ago, he accentuated the need of safety work, not only by the contractor, but also by the sub-contractor. When a hammer is dropped, it makes little difference whether it is dropped by a fellow employee of the contractor or by a careless worker of the sub-contractor. The chances for damage are just as great.

Safety Codes

Safety codes are of two kinds. That which is prepared by various elements of the construction industry who know and understand the problems from safety experience, and the dogmatic safety code as a part of the law. One is flexible; the other inflexible. One is usually intelligently prepared and interpreted; the other becomes a letter as well as the law.

Our association has suggested that the General Conditions of the Fifth Edition of The American Institute of Architects' form of Contract include a safety clause so that all bidders will know that safety requirements will be equally enforced regardless of the bidder. This places everyone on the same plane, and does not permit individual bidders deciding for themselves whether the expense for safety is warranted on a particular job or on a yearly basis.

When codes are made legal instruments there is no good place to stop in describing details. Frequently, therefore, inspectors, experienced or otherwise, through animosity or for other various reasons, can make for unpleasantness.

Public Safety

It is not enough for employers of labor to confine their interest to job safety or only to the men while on the job which is less than one-third of their total time. I know of a very large job in the middle West which lasted for two years. During that time more accidents and lives were lost by employees on public highways going to and from their work than on the work itself. This may seem irrational, but it is true nevertheless and the injured included several of the high construction officials.

The ever increasing motor vehicle registration, including 23 million passenger vehicles and nearly 3½ million motor trucks, makes one realize the highway hazards.

The public taxes itself to provide traffic signals to increase the safety of transportation, doctors urge practices to safeguard individual and public health; industry spends enormous amounts to safeguard its factories against fire and builds its buildings safely in order to protect the occupants. All this is as nothing if the public is not safety minded and thinks and acts safely.

Home Safety

There is a great need of safety in the home and in recreation. Parents owe it to their children to insist upon safety in the home and play as well as when crossing streets. It is likewise due the children that parents should take no chances around the home with fire, broken stairs or railing. When a member of an employee's family suffers injury, the whole morale of that family is disturbed and the man himself is upset and distraught. As a result, very often he is made careless by his anxiety, is apt to have an accident himself and is not rendering service due his employer.

Structural Safety

It is impossible to carry sufficient premiums and an adequate amount of insurance against all hazards. Therefore, it should behoove all parties at interest in construction to safeguard the job.

The Associated General Contractors of America are having surveys made by various insurance groups in an endeavor to have a new policy written to be known as "Structure" insurance. Just as years ago some one initiated fire and tornado insurance, so today it is believed essential to originate another type of insurance which will cover all modern needs. It is hoped that it will protect those constructing a structure during its erection from damages "however caused". This "all risks" policy would include fire and tornado risk as well as explosion, earthquake, bomb, riot, civil commotion, damage from airplane or collapse. Thus, the writing of such a policy may insure dividends from structural loss.

Insuring Dividends

Prevention of accidents insures the dividends of "life, liberty and the pursuit of happiness" to every employee and the employers themselves. When a job is not safe for an employee, it is not any more safe for the employer who makes the rounds of his own work, or who hazards the life or limb of his supervising executive.

Safety also insures the payment of dividends through the preservation of a company's surplus. I can distinctly recall a company which was put out of business several years ago, after a serious accident had occurred on one of its jobs. It took the Courts several years to decide upon the liability, but when they did, the result was the complete extinction of that company in the midst of a lucrative job. Construction safety, therefore, does actually insure dividends in more ways than one.

The excellent safety calendars issued by your Council are fine samples of your educational work exemplifying the manifold safety problems and stressing the need for eternal safety for each day of every year.

No insurance other than eternal care can insure personal and company dividends. We can all concur, therefore, and co-operate in joint and individual programs for construction safety. Let us strive, to make this a record breaking year in safety dividends!

Ten Safety Commitments

- One*—To view a liberal safety policy as vital as a limited insurance policy.
- Two*—To meet the public demands for elimination of accident waste for social and economic reasons.
- Three*—To avoid slowing up production due to first attention of all persons in vicinity of accidents.
- Four*—To urge that the "duty first" of every employer is a "safety first" consideration of every employee and his family.
- Five*—To make it as safe for others as we would have them do for us.
- Six*—To realize that a man who feels safe works satisfactorily and that a survivor of an accident is likely to fear another.
- Seven*—To remember that a crippled workman is likely to be a handicapped employee, and that one dollar of accident prevention is worth more than one hundred of cure.
- Eight*—To note that replacement of an injured employee costs from twenty to one hundred dollars.
- Nine*—To adopt safe appliances as sure assets and safe practices for safe profits.
- Ten*—To provide safety supervisors jointly with insurance agencies and safety councils.

It may interest you to know that at a conference this summer at Schenectady, in the House of Magic, as Floyd Gibbons calls the research laboratories of General Electric Company, we discussed the problems of safety with particular application of electricity to the construction industry. We asked them why a wiring system could not be attached to reinforcing steel to keep the concrete warm while setting in the winter. It created a smile, but maybe we will all live to see that all we have to do is attach a power wire to our reinforced concrete work and we will not need salamanders.

With reference to scaffolding, you would be interested in a solution that came to our attention while we were abroad last year at the International Congress of Building and Public Works in London. This vertical steel scaffolding is an invention of an Englishman. Wood for scaffolding has become very expensive and scarce. Any man who ever put a nail into their wood scaffolding was figuratively hung to that nail. This steel scaffolding, which has been a product of the English group, has been adopted and licensed in America. At the same time they have adopted over there the hanging steel scaffolding which has

been manufactured in America. We have learned to cooperate internationally with our construction friends and they have learned to cooperate with us. We had thirty-four English builders at the banquet of the governing board of the A. G. C. last week in Washington, and they gave us many things to think about.

We know in these depressive times men are taking desperate chances, that instead of providing ladders, fences, and so forth, they are taking chances. We do not believe it is sound practice to take a chance. They may think they get by with it, but you and I pay the increased cost of accidents that result therefrom. We want to prevent that, and we ask the architects to put into their specifications certain general conditions relative to safety. Only last week we asked Robert D. Kohn, President of the American Institute of Architects if he would not guide his committee men along that direction and he has promised his cooperation.

We are beginning to realize that building codes should be merely an interpretation of the safety requirements of the structure and not specifications. Our safety codes probably should be cut two-thirds. Mr. Rudolph Miller, the Consulting Engineer of New York, authority on building codes, is absolutely correct in his stand in that direction. I know of nothing that is today retarding construction work, the building of homes for moderate costs, than these antiquated building codes which are not being revised because it is a legislative matter. Do not let us go backwards by putting into law so-called detailed safety codes. We want government out of business, not into business.

We do not presume to tell the underwriters what insurance premiums should be. We know they are different in different localities. We know the earthquake risk in Chicago, for instance, is very nominal. We know the windstorm risk in Kansas, for instance, is quite great. We know that explosion risk varies with the structure. So we are not presuming to say to the underwriters in determining the rates that those rates should be uniform for America. It is not true in other lines and we don't presume it to be true in this.

CHAIRMAN WIDUA: Mr. Greensfelder, on behalf of the Construction Section I want to thank you for your wonderful paper.

We will go on with the next subject and have the discussion later. Mr. John E. Ericsson, Commissioner of the Department of Buildings of Chicago, tells me that he has a very bad cold, and we will have Mr. W. G. Wheeler, vice-chairman of the Building Trades & Employers Assn., read Mr. Ericsson's speech.

Trench Construction Bracing

By JOHN E. ERICSSON

Commissioner, Department of Buildings, City of Chicago.

To offset the natural tendency of earth to slide or cave into a trench when the lateral support is removed by excavation, has ever been a problem; not always an unsurmountable problem, to be sure, but often taxing all the skill and ingenuity of the engineer or contractor.

The problem becomes more acute when a load of any description, for instance a building, is superimposed on the ground and its weight must be carried directly or carried by the support given to the sides of the excavation.

Trenching and excavations of any kind are not done aimlessly. There is always some purpose in mind, something definite to be accomplished. It may vary from draining a patch of land by a shallow ditch to putting in a foundation for an immense skyscraper in the midst of a number of large buildings that will have to be supported during the progress of construction work.

In addition to the proper accomplishment of the ultimate object of the work of

excavation, there are other very important matters to be considered relative to the excavation itself. These concern principally the prevention of accidents and the consequent possible personal injuries or loss of life, and the damage or destruction of property.

I would like to draw your attention to a distinction between unforeseen accidents and that class of happenings which are the result of lack of reasonable care, of inexperience, of ignorance, or of the use of improper material or method for bracing or otherwise securing the banks of an excavation.

Confining this discussion to such excavations as are incidental to the erection of a building or structure, we may conveniently make three classifications to include them all:

In the first group are included trenches that require no shoring or bracing.

In the second group are included trenches that do require sheeting, shoring, or bracing.

In the third group we will include excavations adjoining buildings or structures that must be securely and safely supported during construction work and left in safe condition when work is completed.

In considering the first group, the most important thing to be determined is whether or not the excavation really needs bracing. Ordinary trenches or excavations, four or five feet deep in firm ground, seldom require support. Excavations more than eight feet deep should have their sides sloped and have their banks kept free of any loading for some distance back from the edge.

If the excavation is a narrow trench, say three or four feet wide and seven feet deep, it is advisable for safety to take the additional precaution of bracing, as men working in the trench might otherwise be caught by a cave-in that they could not run away from as they could were they working in an open basement excavation.

When the sides of the excavation have to be supported, if the earth is firm, it usually is done by bracing. This consists of using two short planks—one on each side of the trench—and a cross-piece or brace, wedged in between them. Extension or screw braces are now commonly used for this cross-piece. The bracing is placed at intervals from five to eight feet apart.

When the soil is loose or otherwise treacherous, tight sheeting should be used. The lower end of this sheeting is generally "stuck" or driven below the bottom of the trench and the upper part driven between "wales" or "breast timbers." These run horizontally along both sides of the trench, and cross-braces or screw-braces are placed between them across the trench at intervals. When the sheeting is being prepared for driving, the bottom end, in addition to being sharpened, is cut bevel, so that in driving it will be forced close to the last sheeting in place.

There are several designs of interlocking metal sheet piling used in the relatively deep excavations, and there is also one well known wedge type called "Wakefield" sheeting. These are generally driven by a pile driver, sometimes in advance of the excavation being made. If properly used they will hold out running sand and are practically water tight.

Slight water leaks in a sheeted trench are permissible. In trenching wet ground, drainage should always be provided for. An outlet for the water should be made to a sewer, if possible, or a sump should be constructed and a pump installed to raise the water out of the excavation. This water should be drained by some means, to a place where it will not return to the excavation. The main thing to guard against is sand leaks. If the sand is carried by running water through leaks in the sheeting, a hollow space will be formed behind it, causing the bracing to loosen and drop out, which will be followed, usually, by the trench caving in.

Bracing or sheeting should be put in place without delay. An earth bank of firm material, if properly and tightly braced, will retain the cohesion between its particles for a considerable period. This explains why a trench, braced in a practical and perfectly safe condition, takes less material to do the work than would be used

if customary engineering practice had been followed in making an estimate of the same.

When excavations are made adjoining an existing building that must be kept safe and unharmed while the excavations are made, shoring, needling or underpinning are resorted to.

Shoring consists of using heavy inclined posts or timbers, to carry a portion of the load. The lower end usually rests on a timber platform, while the upper end is fitted into a hole or slot, cut in the wall to be supported. The lower end of the "shore" is generally fitted with a jackscrew to tighten the shore and take-up settlement.

Needling consists in cutting holes through the wall, inserting a heavy timber or I-beam, and supporting it on cribbing on both sides of the wall.

It often happens that only one side of the wall is available for use. In this event it is customary to support the wall by some form of what is called the "figure four" method. This consists of using the needle as a cantilever by supporting the wall on one end of it. The needle itself, is supported by cribbing, and the opposite end when the upward reaction takes place, is held down by placing upon it a drum with a jackscrew at the lower edge of it. The upper end of the drum is let into a notch in the wall.

When the excavation does not extend much below the adjoining building, the wall is often supported by short drums. A horizontal section of the wall is taken out a short section at a time, and short drums with jackscrews are placed immediately. When the entire wall is thus supported the jackscrews take up any settlement in the old foundation; after completion of building and all settlement stopping, the jackscrews are removed a few at a time and masonry is rebuilt into the walls.

The term "underpinning" in a strict sense of interpretation, means extending . . . walls of existing buildings, to a lower level by new walls or foundations under them. This work and the bracing incidental to it has been developed as an engineering art, being done principally in New York, Chicago and Boston. In our city many large and heavy buildings have been successfully supported during adjoining operations.

In the matter of adjoining buildings of different ownership and on different premises, complications often arise. The law in the state of Illinois requires an owner in such a situation to protect and take care of his building. This has been the rule and it is always followed. However, where the property adjoining an excavation is unimproved it must be kept secure and protected by the party making excavation, the legal theory being that you are entitled to support for virgin soil, but not to support of any load you may impose on the soil. Loading your ground with, for instance, a building that must not be disturbed would place a limit on the use of the adjoining property, whereas the law provides that the adjoining owner is entitled to the full and unrestricted use of his property. This permits him to go deeper with his foundation than you have gone with yours.

Notice is generally given by the contractor to the owner of the building adjoining, to protect his building. It is advisable to have the same contractor support and underpin the adjoining building to avoid friction between owners and contractors. But where another contractor is engaged to do the work and he cannot get permission to go onto the premises in possession of the first contractor, he is often required to do all the work under the most adverse conditions. In fact, often it is found impossible to do this. Then the situation resolves itself somewhat like this. The owner of the existing building refuses to do anything and the contractor on the new building proceeds with the excavation until the existing building is endangered of caving in. The Building Department then steps in and in the interest of public safety "stops further work" to protect the workmen in the excavation, as well as the occupants of the existing building.

If an agreement is not reached at this stage, law suits or an endurance contest between the owners generally ensues. Cases are on record where the long delay pre-

ceding the resumption of work has brought about conditions making it necessary to take down existing buildings, causing great loss of property and valuable time, all of which could have been avoided by the exercise of a little tolerance and judgment by the parties at issue.

Many involved problems arise even when there is complete cooperation of all interests, such as in the excavation of an entire tract 150 feet, or more, square, for a basement and sub-basements. Here the street with both its surface and sub-surface improvements, as well as its traffic, must be supported.

Adjoining buildings must also be underpinned, and the bracing of the excavation must be so arranged and of sufficient strength, to permit the use of a steam shovel, or to support a "clam shell" digger. Often pile drivers must be supported and operated on the bracing arrangement, as well as concrete equipment and materials used during the work of building retaining walls to grade level.

I have had a number of such personal experiences as a building contractor. On the Marshall Field building in Evanston, Ill., erected in 1930, which we had the contract to build, we made a radical departure from the customary methods. The excavation was 216 x 80 feet x 16 feet deep, on a corner lot. Streets had to be supported on the east and on the south sides, and on the north side a moving picture theater was underpinned, permitting it to be kept in operation throughout the progress of the work.

The excavation had to be sheeted tight. Instead of driving water-tight sheeting before excavating, the bracing system was placed on the ground at the bottom of the excavation, and a system of shoring used for the midway support. This allowed the use of a steam shovel and a pile driver with little or no interference. The procedure was as follows:

The steam shovel was put into the lot and it excavated for the full depth, starting at the rear end of the lot, leaving a sloping bank of earth on the street side. As soon as there was room the first cross timber was laid down. A little later the second set was laid down and so continued until the lot was covered. Then a section of the sloping earth bank was dug away, and a whale or breast timber was put into position against the earth bank and held there with drum shores, the lower end of the shore being secured against the cross timber and the upper end against the breast timber. Sheeting was placed behind these timbers to hold up the earth banks and driven down as the excavating of this bank proceeded, a second waling timber was placed at the bottom level. At the opposite side of the excavation the breast timber and lower wale timber were placed against the wall of the theater building, the appearance of the bracing being somewhat like an inverted truss. The method was devised for the purpose of getting away from an excavation full of cross timber bracing and giving the maximum of space for building operation, and with the exception of a few minor changes it worked out perfectly. The theater wall was underpinned as a separate proposition, and the work on this fitted in perfectly with the general scheme.

There are several well grounded principles that have been deduced that have equal application in nearly all cases and tend to prevent accidents in this class of work. A few of them may be stated here:

A railing should be placed around excavation or placed in such manner that passers-by or idle and curious persons, cannot come in the way of being harmed. The material used . . . lumber especially, should be of the best quality. Old scrap, discarded, or poor quality lumber or other material, should positively not be used.

The problem should be studied and a plan formulated for going through with the work.

The men employed should be the most skillful that can be procured. This is obvious when we realize that most of the work is carried on in close or cramped places where only one or two men can work.

Tools and other loose equipment, should not be left lying on braces or scaffolding as they may be knocked off and injure someone working below.

While most of the workmen who follow this class of work are experienced and careful, an occasional talk on "Accident Prevention" will always be beneficial.

Finally—one must not expect a cheap unreliable contractor, who has put in a very low bid for the work, to put any of his money into it in order to complete it. As in everything else . . . in this work . . . we get about what we pay for. And where a single failure will mean so much in loss in life and property, it is the greatest economy to entrust the work to a reliable, experienced, and skillful contractor.

CHAIRMAN WIDUA: I want to thank you, Mr. Ericsson, for the wonderful paper you prepared for the Construction Section.

ADJOURNMENT

Wednesday Morning Session

October 14, 1931

GEORGE WIDUA, Chairman

Woods Brothers Construction Company, Lincoln, Neb.

The second session of the Construction Section convened with General Chairman George Widua presiding.

CHAIRMAN WIDUA: The first item on the program this morning is the election of officers for the coming year.

The Nominating Committee consists of Mr. C. H. Black, Mr. W. F. Austin and Mr. J. Cowper. We will call upon Mr. W. F. Austin to read the report of the nominating committee.

Report of the Nominating Committee

W. F. AUSTIN (W. E. Wood Co., Detroit): The following are nominated for the Executive Committee of the Construction Section, National Safety Council:

GENERAL CHAIRMAN—JOHN RUSSELL, JR., United Engineers & Constructors, Inc., Newark, N. J.

VICE CHAIRMAN—W. G. WHEELER, Building Trades Employers' Assn., New York, N. Y.

SECRETARY—CHARLES H. BLACK, Stone & Webster Eng. Corp., Boston, Mass.

CHAIRMAN POSTER COMMITTEE—E. N. GOLDSTINE, Barrett & Hilp, San Francisco, Calif.

CHAIRMAN PROGRAM COMMITTEE—W. F. TUBESING, W. F. Tubesing Company, Milwaukee, Wisconsin.

CHAIRMAN MEMBERSHIP COMMITTEE—F. A. DAVIDSON, Long Island City, N. Y.

CHAIRMAN PUBLICITY COMMITTEE—ROBERT D. MACMILLEN, Merritt-Chapman and Scott Corp., New York, N. Y.

NEWS LETTER EDITOR—ROBERT MCKINLEY, General Accident Fire & Life Assurance Corp. Ltd., Detroit, Mich.

CHAIRMAN STATISTICS COMMITTEE—J. C. FORESTER, L. E. Myers Company, Chicago, Illinois.

CHAIRMAN ENGINEERING COMMITTEE—J. W. FOLLIN, Philadelphia Federation of the Construction Industry, Philadelphia, Pa.

EXECUTIVE COMMITTEE OFFICERS AND

W. F. AUSTIN, W. E. Wood Company, Detroit, Mich.

GEORGE WIDUA, Woods Brothers Construction Co., Lincoln, Nebraska.

W. R. RICHARDS, SAFETY DIRECTOR, The Associated General Contractors of America, Inc., 1329 E Street, N. W., Washington, D. C.

CHAIRMAN WIDUA: Gentlemen, you have heard the report of the chairman of the Nominating Committee endorsing Mr. John Russell, Jr., United Engineers & Constructors, Inc., Newark, N. J., for Chairman of this Section. What is your pleasure?

(It was moved that the nominations be closed and that the secretary cast one ballot for the election of Mr. Russell.)

WILLIAM H. MILLER (Wm. Miller & Son, Inc., Cincinnati): I move the secretary cast one ballot for the balance of the slate for the coming year.

(The motion was seconded and carried.)

(Mr. Russell assumed the chair.)

Acceptance Speech

By JOHN RUSSELL, JR.

United Engineers and Construction Co., Newark, N. J.

It is the wish of every man charged with the accident prevention work of a construction company to see the interest in and success of the safety work carried on by his supervisory force recognized in no uncertain manner.

Such recognition is a very great inspiration for continuance in the efforts that have made low frequency and severity rates a possibility.

That such recognition should come to our company in my appointment as the successor to George Widua, the retiring chairman, of the Construction Section, I did not anticipate.

If you could appreciate the accomplishments under the leadership of Mr. Widua during the past two years, guided by the ardent desire for the finest section in the National Safety Council, and visualize, as we of the Executive Committee have been able to do, the plans for such an end, you would realize the task he has passed on to me in continuing his policies and building upon the concrete foundations he has set.

If you will study the back numbers of the news letters during his term of service and read between the lines you will find much food for thought. Therein are written the policies for our guidance and if we are to continue on the ascendant we must pledge ourselves to active and vigorous support of them.

- 1—Unrelenting education on the job of every man, until the habit of safety has been inculcated.
- 2—Improvement in technique of many of the mechanical manual processes by proper studies.
- 3—Immediate instructions to every new man coming upon a construction job that can be hazardous (because of ignorance) to his fellow workers, and must therefore be shown what he is to do, how he is to do it, and why he is to do it as instructed.
- 4—Foremen whose accident prevention records are outstanding must be rewarded in some tangible form that may be utilized by them in securing more steady year-in year-out employment—whether this be by certificate, button or personal letter is not material.
- 5—Accident experience statistics must be collected at one central point so that they may be properly tabulated and interpreted to guide the construction industry toward safer methods of work.
- 6—Publicity—by word of mouth, the printed page, by poster and by radio—must increase in volume and quality so that the general public may come to a clearer understanding that the construction industry has sincerely undertaken accident prevention work on everyone of its projects.
- 7—The whole-hearted cooperation of every member is necessary to increase our numbers to the point where a paid secretary can be employed to apply his entire time to the needs of the section.
- 8—The members of this section must be brought to a realization of the many possibilities of their affiliation with National Safety Council.
- 9—The construction industry must increase the scope of its accident prevention work, rather than make it necessary for a bureaucratic force to step in and complicate matters. If the latter comes to pass, or if a National Safety Code is the solution, organizations who see and understand our problems are most desirable that the code shall not in itself be made into law, but that it shall be referred to in a law, leaving the code flexible and changeable by proper authorities as advances and changes in construction methods may make it necessary.

10—Extraordinary precautions to prevent accidents to the public will increase the sympathetic interest of the public in the work in which we are engaged.

We have not let Mr. Widua retire from active service. We of the Executive Committee realize his worth too well. We have kept him near us, so that we may turn to his larger experience in time of need.

This year the men on the Executive Committee whom you have elected are active to a man.

May I urge that you help us speed up the millennium of the Construction Section by reading the monthly News Letter, our only means of direct communication, and let us know your reactions? We want to make this section grow in the way you would have it grow. We are but your mouth pieces and hands. We the Executive Committee want guidance.

Part II

Each year sees new members joining our Section. Each year at its annual meeting the Section should make clear to those attending its meetings the basic reason for the formation and continuation of such a body as we are.

The Construction Section of the National Safety Council was organized to promote unified effort of individual units of the construction industry in accident prevention.

It was founded on a broad concept which recognized that individual effort could do little toward solving an international industrial problem.

It provided a central agency or clearing house through which mutual problems arising among the membership of any one geographical area might be presented to representative companies of all branches of the industry for solution and remedy.

Today it is generally appreciated that business success in the construction field is dependent not alone on individual effort but to a large measure upon what others do. Organization of trade associations among competitors in the same branch of the industry, first merely to promote acquaintance and then gradually through these organizations to develop codes of ethics, is evidence enough of recognition of this element of inter-dependence.

So this section of the National Safety Council serves its purpose not only through enabling a national study of accident prevention work, but also because of the acquaintances formed, a study of construction methods and conditions throughout the world naturally follows.

It aims to protect and promote generally the best interests of individual member firms and corporations in the construction field in lowering construction costs through the prevention of accidents.

It provides a clearing house of information in connection with many phases of construction.

An important and significant part of its activities is the operation of a research or engineering committee to provide an authoritative source of information concerned with basic formulation of safe engineering practices.

Specialized and expert advice concerning the economics of accident prevention education and plans for successfully eliminating hazards is similarly a part of its functions.

National Safety Council has developed and maintains a bureau of information, international in scope. The data collected are always at the disposal of members of the section.

Such a source makes easily accessible in one place definite information concerning all types of mechanical and human failure and the equipment, material or method used to combat such failures.

No industry can forget the public it serves. In the present age one of the greatest problems confronting any major business activity is the education of the public to an understanding of its function in the community, the conditioning factors which make for good or bad results and the resources of accomplishment which those engaged in this activity place at the community's disposal.

Through the judicious dissemination of accurate information concerning construction and the safety thereof, we are in a position to cultivate an intelligent building mind. In doing this it will aid materially in developing a constructive public attitude toward the industry. To this end we have an active publicity committee.

The policies and program of the section are formulated by an executive committee, working in conjunction with National Safety Council elected annually at the Congress.

Three educational committees function to broadcast to the membership those things which experience has shown are successful in the work. The poster committee handles the mass educational advertising. The News Letter, a monthly publication, disseminates the best in accident prevention work in the industry. The Statistics Committee gives every member the results accomplished for each year.

In addition to providing an agency through which accident prevention problems may be presented to the industry as a whole individual companies are in a position to gain, because membership in the section requires cooperation on the part of every individual member, thus placing it in touch with every other member throughout the entire industry.

Much waste motion and uneconomic expenditure of time, effort and money of the individual member can be eliminated by the coordinated concentrated work of the section which in addition to general service to the entire industry is in a position to provide specialized service to individual members.

It is not to be assumed that affiliation with the Section will cure all the ills affecting the construction industry in eliminating accidents. Rather it must be recognized as a forward looking movement initiated and perpetuated by representatives of the industry who have recognized that intelligent self-regulation and control through cooperative effort is essential and this cooperative effort must be translated by every individual member into contributions of company experience and advanced methods for effective accident prevention work.

CHAIRMAN RUSSELL: The program shows that we have this morning a motion picture by Mr. S. M. Siesel of the S. M. Siesel Company, Milwaukee. Mr. Siesel was unable to be here but he has sent Mr. William F. Kachel.

I take great pleasure in introducing Mr. Kachel.

Constructing an Eight Million Dollar Court House Safely

By WILLIAM F. KACHEL

S. M. Siesel Company, Milwaukee, Wis.

This picture that we are showing was prepared primarily for our own pleasure and we did not have any particular idea in mind of emphasizing any safety features. However, I think it will bring out certain features which I want to emphasize and I have asked the operator to stop the film at certain points so that I can make a few remarks.

We are especially proud of this job in that it was conducted without any major casualties. No one was killed, no one was permanently injured and no one was laid up because of injury for a greater period of time than two or three weeks at the most. We did have a great many fellows who stepped on nails, and minor accidents of that kind. In fact we had a poster displayed right at the office and right at the exit where every man who was going into the building could see it very plainly, a man stepping on a nail and captioned, "We have four of these every day," and considering at the time the crew consisted of one thousand men we thought that all in all that was very creditable.

Another feature about our job which was very unusual, was that while the building itself cost in excess of eight million dollars it was divided among eighteen dif-

ferent contractors. Our contract on this job was for the excavation, concrete piles, concrete work, the masonry work, and the setting of the cut stone.

The film is very largely devoted to the setting of the cut stone as that was the easiest to photograph and perhaps the most interesting problem from an engineering standpoint. In addition to the fact that there were eighteen separate and individual contractors working on the job, all with equal authority, we were all very conscious of the fact that we had the condition of a mixed union and a non-union job. In other words, the contractor who was successful with union operators employed union men and the others employed non-union operators.

We did many things that a general contractor in charge would just naturally do and would assume it to be good business to do on any job. In spite of all this the interesting fact is that we did not have any major accidents, and it can be attributed, I think, to the fact that we were able in a bad situation to get a certain amount of selling on the part of everybody concerned.

The excavator on the job was a capable, competent man who listened readily to our instructions (and by the way I might say that everything we did is in the manual that the Detroit people have so ably gotten up). The important point is that we followed the directions. We not only knew about it but we actually did it and we got a lot of cooperation as we went along.

The excavation was very simple, the driving of the concrete pile was fairly simple and it was only when we got into the erection of the steel that our possibilities of actual trouble started. Fortunately the steel company was broad-minded about safety regulations and we were able to get together with them and suggest that we get all the men together, including the plumbers and electricians and so forth, and hold meetings.

These meetings were held about every two weeks. We took fifteen minutes and we brought in some experienced fellows from the insurance company and from the various industrial plants around Milwaukee who knew what they were talking about, and I do think that those meetings did a great deal toward putting the proper point of view before the men.

Another thing, and I am certain it produced results, was the pinning to all of our checks a simple statement done in an imitation of handwriting, in which we simply called the attention of the men to the fact that a pay check was always larger than a compensation check. I, myself, have heard the wives of some of these men remarking on that point so I am satisfied that it reached into the home and had its effect.

As we got into the fire-proofing of the structural steel we had a system of form work that did away entirely with the shoring. We hung all our forms from our steel beams and girders and this unquestionably did a great deal towards lessening the hazard of some thousands of men working around in a building of this type.

The story heights of the building are unusual, that is they are greater than occur in an office building, and the danger of falls was particularly great in that situation. In fact, I would say that the only injury we had that ran as high as three weeks' disability occurred when one of the men stripping forms fell from his scaffold and dropped to the floor, a matter of six or seven feet.

The foremen were especially careful in seeing that their runways were solid, substantial and properly placed, and owing to the size of the job these operations became more of a factory operation than the usual construction job. It was when we got into the stone setting that we realized that if we were going to have any great amount of trouble from an accident point of view we were going to have it there.

The film shows the range of stones and the arrangement of the plant, and both Mr. Siesel and the field superintendent made themselves particularly insistent in calling to the attention of the men at every turn that we weren't going to take loads in excess of the rated capacity of our hoist and that we were going to work the proper way. Time and again I have seen with my own eyes Mr. Siesel and the

field superintendent require men who had put their slings on to stones and had them half way up into the air to lower those stones and get the proper loads.

We of course watched this very carefully, and as I said, the main reason for the success in this effort was that we knew what to do and we did it.

As you view these films you will note that in one instance you will see a man on one of the trucks who is directly under one of the stones, a section of the column being directly over him. I might say for your information that this man was immediately seized upon and that was the last time and the only time that he did it, but on work of that character you can't be too careful and it takes somebody with a will and purpose to actually see that these things are done.

(The film was then shown on the screen.)

CHAIRMAN RUSSELL: We are very much indebted to Mr. Kachel for his movie. I know there are a lot of questions you will want to ask. The movie suggested to my mind the good possibilities there are in using a small motion picture camera for taking views of safe and unsafe ways of working, and almost anyone can do this.

E. N. GOLDSTINE (Barrett & Hilp, San Francisco): I think that one of the things that needs to be done is to get some good moving picture films of conditions that need to be removed to prevent accidents. Last February I tried to get some moving picture films of that sort and I was unable to find any such films. There may be some but I can't find any. May I suggest that if anything can be done it would be a good idea to give this suggestion to the National Safety Council. Slides may also be of help.

CHAIRMAN RUSSELL: We have changed the program by one speaker, placing Mr. Richards' talk last because Mr. Rosenthal is here in Chicago and is tied up with a number of things that are especially important. His subject is "Safety Work a Man's Job," and I know he must appreciate real men because around his office are pictures of Lincoln, Walt Whitman, Tolstoy, Emerson and Marshall Field. Now if he can appreciate those men, he knows what a man is. He knows safety too. He is the founder of the Construction Investment Trust which places public funds in construction and places around them such safeguards as would be sure to return proper interest with safety. That almost parallels what we are doing in the National Safety Council, in a way, because we are throwing safeguards around human beings and he has thrown safeguards around the funds for construction purposes.

Safety Work Is a Man's Job

By O. W. ROSENTHAL

President, O. W. Rosenthal-Cornell Company, Chicago

Carelessness is a disease. Safety must be analyzed, it must be diagnosed, and in order to diagnose safety you must first know the elements.

It is really absurd to tell a fellow he should look out. That is the funniest thing I can think of and yet we know that there are certain human elements that enter into the thing that we must be familiar with. We must diagnose the case. We must know where those elements are most likely to evidence themselves, where the inherent weaknesses are most likely to become evident. Now of course that is a man's job.

It seems to me that safety as a man's job is wrongly measured. I think it a wrong measuring stick we are using. I would rather think that you are going to get safety by policing. But penalizing in any other way now is an economic thing. This question of safety, while it has strong spiritual and human elements, is after all economic success. It is an economic consideration, not only economic with regard to the particular employer and job and the individuals involved, but socially economic. This is to me the biggest aspect of this safety movement. It is a triumphal meet, a great economic situation. Even though we clothe our discussion with a spiritual aspect

and a strong attitude of consideration toward humanity, after all the economic phase is the basis, and of course to handle anything great from an economic standpoint is always a man's job.

The man who is capable of dealing with the problems of construction at all is capable of dealing with safety. The trouble with the safety issue is that it has never been emphasized until this movement emphasized it and brought it with all of its picturesqueness before the employing world. The Safety Council if it has done nothing else has done this. It has given the issue an emphasis which state organizations, as part of our government, our factory inspection and all that sort of thing, could never do. It is the prime idea in the hearts and hands and minds of the employers that could not be eliminated if the Safety Council went out of business tomorrow. That thing is itself done. It has made the employers think. It has set forth many a standard of procedure in dealing with human lives and bodies that we never had before, and it is so implanted that it will not be easily eliminated.

It is not a question of this movement carrying on now; it is a question of how shall this movement carry on, what shall be the direction in which it shall proceed, because its main job, that of arousing that understanding in the employer, has been well done. The employer has accepted the challenges which the Safety Council sent out, and tries to measure up to it and really makes safety an important phase of his work. But I was thinking, coming down here this morning, that after all there are inherent human weaknesses in the employee, and that is the thing that we have to contend with, not the desire to do good or bad, right or wrong, but the manner in which a man subconsciously proceeds to do a thing that he does efficiently and well without consideration of surrounding conditions.

I wonder if we can enlarge a lot on the workman's responsibility toward the question of accident prevention. We do penalize the employer in that his insurance rate is affected very materially by the manner in which he conducts his work and the percentage of accidents and the expenses to which he puts the insurance company. There is a penalty there.

There is an economic question. Whenever there is a penalty there is the question of what it is going to cost business, but when I talk about economics in this question I am talking about the loss of a man, not the loss of dollars. The loss of dollars is a tremendously important issue but the most important issue is the loss of a human being, the loss of a competent employee, the loss of a person who performs, the taking away from society of one who might contribute to society much that is worth while and through his employment make the greatest contribution by real satisfaction in the importance of his employment. Regardless of how small a part is the whole operation he takes, he performs that job.

When I mention the loss to society, the loss of the man and again the throwing upon society the care of a family when the man is gone, I talk about it economically in the broader sense, rather than merely the small question of whether your insurance rate is a little higher or a little lower, and yet I do think that most employers are going to be most affected by the direct attack upon their pocketbook. They even feel they can fill the place of a man. They do not measure a man as a man; they measure men as servants of the cause, merely the doers of an operation that is being done by hundreds of thousands of other men throughout the world. There is no position that can't be filled and therefore the loss of a man just means the filling of a place, whether it is through a temporary loss or whether it becomes a permanent loss through death. There is one of the inherent weaknesses in the human element.

The employer wonders if the penalty for apparently negligible accidents is not too high. I wonder if without considering the question of contributing anything it wouldn't be possible, as an economic thing, to stir up the greatest activity, the greatest understanding and responsibility on the part of the men themselves, if a penalty were to be exacted, a charge made against all the men for each accident

that may occur upon the job. Just offering this as a thought it might be considered that the men must have a part in this thing.

We are building up and forgetting what went before. You must establish a responsibility in the employee. You must establish not necessarily a contribution to the elimination of accidents, but you must set up a situation where that employee feels that he is his brother's keeper and also that if he himself has an accident he is penalizing every other man on that job who might have an accident that moment he is not contributing.

There was a restaurant in the city of Chicago, a restaurant that I built a great many years ago, where the breaking of dishes was so great that they tried an experiment, and I understand that many other restaurants throughout the country adopted it. They charged up all the dishes they had to their employees and those employees had to maintain those dishes, and every time dishes were broken they all paid for them, they were penalized for the man who broke the dishes and all of them paid for the fellow who dropped the tray. It was just too bad because they were all paying for it. They were very careful about dropping trays. They made them all responsible for everything and they were all given a credit, taking the average. After a number of years they discontinued it and said, "that is the breakage that takes place in every institution, and we will stand that as overhead. Anything beyond that you pay for, anything below that you are going to get credit for. You are going to get it in money. So much of it belongs to us."

Do you know why we can't give consideration to that thought on our jobs? Why can't we make every man on the job his brother's keeper? Why can't we keep the strategical question as well as the economic questions before those men? If they realize that, they will understand why they are paying their own insurance. That isn't the employers' problem. The insurance on the job is paid by all men, and the insurance rate is adjusted by the safety of the job, by the cost of the job. After all, our profit on the job is adjusted by our ability to build that job. We will build economically when we know our figures. Why can't we, if necessary, give those men a bonus, or give them part of that saving in insurance? It is the question of keeping that job running constantly with efficient operators and with men on the job who are happy and satisfied and willing to give their service, and we are more likely to have men of that kind if they feel that there is a bond of sympathy and an understanding between them and their employers.

Why not work out something that spreads that reliability and responsibility over them all? Why not put up a pool that lowers the insurance, if necessary, paid by the companies, and make a portion of it paid out of a pool, and if there is anything left out of the pool give it to the men but let the men also contribute something towards it financially as well as intellectually.

Just offering it as a thought, Mr. Chairman, do you say that this question is a man's job? You asked me to talk on this subject; you laid out the job. I say if it is a man's job let men sit down now and think over the question, not over the question of whether there was a little ice gathered in a winter operation, not over the question of what is the proper construction of a scaffold.

Most of you know these things that we talk about, the bad ladder, the horses that are not properly and efficiently made. We know all of those ordinary things, and we try to guard against them, but why can't we set up a situation where every man on the job defies every other man on that job to have an accident and penalize him should he have one later? Why not set up a situation where constant negligence becomes a factor in our dealing with the men themselves. I don't think we need to make it a legal set-up and fine the men; a part of the loss shall be paid by them and if there is anything left in the fund it shall go to the men.

CHAIRMAN RUSSELL: I think every man in this room is obligated to you for your clear analysis of this situation. At the Executive Meeting held this noon we can consider your suggestion and perhaps arrive at some conclusion. Thank you very much.

It is rather interesting to look down through the crowd here and then visualize eleven years ago, the meeting in 1920 held on top of the bandstand in Milwaukee. Here is a larger crowd but not a more interested crowd than that in 1920. Where the next Safety Congress may be held is a question, and I think Mr. Tubesing who comes from Milwaukee would like to say a few words about Milwaukee to us.

W. F. TUBESING (W. F. Tubesing Co., Milwaukee): I have been with this unit since its inception. The first meeting was held when the Construction Section was so small that they met in the only place that they could give them, and that was on top of the bandstand. That was where this Section had its first meeting. Now years have rolled by. Milwaukee entertained the National Safety Council in 1920. We have been very seriously endeavoring to get the convention next year. I hope to see you in Milwaukee.

CHAIRMAN RUSSELL: Gentlemen, you have all heard what Mr. Tubesing had to say in regard to the next Safety Congress being held in Milwaukee, and I would like to take this opportunity to ask this section to pass a resolution here today sanctioning the next Congress to be held in Milwaukee. That will be the Twenty-first Annual Safety Congress.

W. G. WHEELER (Building Trades Employers' Association, New York, N. Y.): I so move.

(The motion was seconded, put to a vote and carried.)

CHAIRMAN RUSSELL: I appoint Mr. Widua chairman of the Resolutions Committee who will pick his committee and draw up the resolution and present it later.

It is significant that the safety movement has suffered to no extent in the period through which we are now passing. Mr. Richards' paper, "Progress of Safety in Construction," might well be titled the Progress of accident economies in Construction. I take great pleasure in introducing Mr. Richards.

Progress of Safety in Construction

By W. R. RICHARDS,
Safety Director, Associated General Contractors of America, Inc.,
Washington, D. C.

Six months ago I prepared an address on the same subject which has been assigned to me here today and which was read before the construction and maintenance section of the Foreman's Safety School of the Milwaukee Association of Commerce. In that talk I summarized what I believe to be the four salient points of progress in this prodigious task that we have undertaken in preventing accidents in construction.

I emphasized to these foremen that the degree of progress must necessarily depend upon the point of view that the individual holds in regard to this movement; that we have not and cannot transform construction overnight into the class of "white collar" safety, but that we are making definite and encouraging progress in our educational campaign, which is the only means by which we will get the upper hand over the costly and man-maiming accident.

I summarized the progress of organized safety, in so far as the construction industry is concerned, as follows:

1. The sentiment for organized accident prevention as an economic and humanitarian necessity is being steadily crystallized.
2. An ever increasing number of contractors are taking up the work with encouraging results.
3. The necessary educational material and plans of procedure have been prepared in easily accessible form for all who want them.
4. The educational system has been proved in practice to be effective in dealing with the situation, so that the future progress of safety may well be measured by the degree of resolution and sincerity with which the industry as a whole—from the

top down—adopts the same practical plans and teachings that have been perfected for it.

I still stand by that analysis of the situation and we intend to continue to direct the safety campaign of the Associated General Contractors accordingly. Mind you, we are not satisfied with the results that have been secured, but we are not discouraged, for we know human nature and have common sense enough to realize that making construction safe in face of so many adverse conditions as the field presents is a long-pull proposition. As I have just said, I believe we have the means of attaining that end, but we cannot force its application, we can only secure it through education and voluntary acquiescence. If it were possible to do it in another and quicker and more thorough way, we would favor that way, but we well know that you can lead a mule to water but you cannot force him to drink. We can lead our mule contractors and workmen to safe waters in the form of organized safety work, but we cannot force them to abandon the carelessness and indifference which are the cause of so many of our accidents.

This being so, we intend to patiently crusade along, doing our best to appeal to the common sense and humane instincts of those concerned; and I am confident of ultimate success because the appeal is sound and to the self interest of everyone who has anything to do with the construction industry. Surely the country has had ample proof of the futility of endeavoring to force social measures upon an unconverted public, and accident prevention is primarily a social problem. All of the traffic regulations and all of the elaborate and expensive control and safety devices of recent years have not curbed the ever-mounting number of motor vehicle accidents and it is unreasonable to believe that similar regulations would be any more effective in preventing construction accidents. No, we must recognize that carelessness or ignorance is back of practically every accident and that these can be overcome only by wholehearted conversion to the principles of safety.

Now I realize that there are those in this Council who do not concur in the principles that I have just set forth; there are those who believe that more drastic action would bring greater results than I have been able to report as safety director of that large part of the construction industry, the A. G. C. In fact I have taken the topic assigned to me on this program—the Progress of Safety in Construction—as a demand for a vindication of the principles which the Associated General Contractors has followed in its safety crusade. In answer, we are perfectly willing to let the records presented at this meeting by the president of the A. G. C., A. P. Greensfelder, speak for themselves. These records show that in our 1930 Individual Cup Contest thirteen members, with a combined exposure of 1,070,025 hours, had perfect scores, and that 6 reporting members had severity rates of less than 2 per cent for the year. President Greensfelder also has the records for our chapter contest in which 14 members completed the year with perfect scores. I question whether anyone will contend that these records can be equaled or even approached by other than enthusiastic, voluntary educational efforts on the part of the contractor and his men, and I believe that they, together with the other records that Mr. Greensfelder presents, constitute an eloquent report of real progress in construction accident prevention.

I think one of the greatest recent endorsements of our system is the fact that the internationally known Ulen & Company, Lebanon, Indiana, has adopted it and the A. G. C. Manual of Accident Prevention in Construction for use on one of its large projects in ancient Macedonia. To carry on a consistent program, a safety director has been appointed whose duty it is to conduct educational work as well as arrange for mechanical safeguards. Since operations are widely scattered he has formed local committees which create interest among workmen themselves and maintain enthusiasm toward accident prevention. These committees see that any measures adopted are carried out and, of course, offer any suggestions that appear advisable. Suggestions from the workmen are also encouraged and are given careful consideration.

"The organization in Greece," the *Ulen News Letter* states in a recent issue, "like others experienced in handling accident prevention on construction, have learned that severity and frequency rates are largely beyond the control of any regulations and mechanical devices. The principal safeguard comes from educational work, which teaches men how to avoid injury and keeps a safety consciousness continually present in their minds."

That is the main thing—to keep a "safety consciousness" continually in mind. We need no hard and fast rules and formulas to cover each individual situation. What we need and what we are trying to inculcate is prudence, discriminating judgment and an adequate knowledge by the superintendents, foremen and workmen of the multiple construction hazards which must be guarded against. That has been the main objective of our Accident Prevention Manual and we believe it to be a thousand times more effective than all of the codes, tables of loads and stresses, etc., that could be devised. With genuine interest aroused in safety, there is no need for hard and fast rules, and without wholehearted interest and support no amount of attempted regulation could cope with the situation. You cannot make a contractor a safe constructor, you cannot make a workman a safe worker, unless they of their own free will want to be, so I say let us continue to devote our efforts toward awakening that desire, long since though it has proved to be. We can reach one man by a plea for his own personal safety and consideration for his loved ones, another by a purely humanitarian appeal, and still another class through the strictly dollars and cents appeal of accident prevention in construction.

In connection with this latter appeal, there are, as you all undoubtedly are aware, some very tangible developments in the proposed increase in compensation rates in thirty-three of our states, which I believe we safety workers should strongly capitalize in our campaigns. They clearly show the cost trend of indifference to safety, which in some localities will amount to as much as \$9.31 additional premium per \$100 payroll. These proposed increases mean that the day is drawing near when every individual contractor will have to pay more attention to accident prevention, and I personally feel that an even greater preferential rate might well be arranged for those that do. The accident-prone contractor is, of course, paying more today for his insurance than is his safety-sold competitor, but I think it would be a wonderful thing for the progress of accident prevention in construction if the rate differential between these two classes could be made so overwhelmingly in favor of the latter that the competitive cost factor would force every contractor to be a safe contractor in order to remain in business. In other words, make the contractor on whose jobs the accidents occur pay the full carrying cost of his insurance, and relieve his accident-free competitor from any share of the burden which he had no hand in making.

I think that with some such arrangement as this, together with an intensified application of the "Three E's" formula, to which M. T. Fulton, safety supervisor of the Kansas City Southern Railroad, has recently added a very essential fourth "E", the country would soon have grounds for gratification in a greatly reduced accident record for the construction industry. I hope that all of you read Mr. Fulton's article on "The Fourth E" in the September issue of *National Safety News*, for it constructively reaffirms and revives faith in the basic system of all safety work as represented by the abstract terms Engineering, Education, Enforcement and Enthusiasm, the "Fourth E."

We have made progress through the application of that formula and our future progress will be commensurate to the success we meet in securing its more widespread adoption. Contractors know engineering, have the educational material at hand, and enforcement will surely follow the "Fourth E", enthusiasm, which it is our duty to arouse.

CHAIRMAN RUSSELL: I have been around a good many places to hear Mr. Richards talk and I have never been disappointed and I am not disappointed this morning.

We have a number of committees that we want to fill this year in the Construction Section, and if any of you who are interested in committee work, in helping forward the Construction safety movement, will get in touch with me, I will be very glad to see that you are appointed to a committee where you can do the work that you most want to do.

Mr. Widua will now present the report of the Resolutions Committee.

GEORGE WIDUA (Woods Brothers Construction Company, Lincoln, Neb.): Your committee, consisting of Mr. W. F. Austin and myself, present the following Resolution:

WHEREAS, The Safety Movement has always received impetus and support from the city of Milwaukee, and

WHEREAS, The Chamber of Commerce, through one of our prominent members, Mr. W. F. Tubesing, has extended an urgent invitation from Milwaukee, and

WHEREAS, Milwaukee is centrally located and has excellent facilities for the National Safety Council Congress, now therefore be it

RESOLVED, That the Construction Section strongly recommends to the National Safety Council acceptance of this invitation.

W. G. WHEELER (Building Trades Employers' Association, New York, N. Y.): I move that the resolution as read by Mr. Widua be adopted by this section.

(The motion was seconded and carried.)

ADJOURNMENT

Thursday Morning Session

October 15, 1931

JOHN RUSSELL, JR., Chairman

United Engineers and Constructors, Inc., Newark, N. J.

The round table session of the Construction Section convened with General Chairman Russell presiding.

CHAIRMAN RUSSELL: This is to be a round table session. I have here a photograph and records, and I want to show you what can be done by recording safety addresses so that you can take them with you and present them in the plant. Mr. Widua, former General Chairman of the Section, was asked to go to California, and this is the last record of his speech which was made while he was talking. If you are making good speeches we can use a lot of them on phonograph records if you will send them to us.

(The phonograph record was demonstrated.)

CHAIRMAN RUSSELL: One of the most valuable things that we find in the east is the publications put out by the Building Trades Employers' Association of New York City. Mr. Wheeler is secretary of that organization. I have here a copy of Material Platform Hoists, which shows a digest of material that they made for safety on hoists. It is Bulletin No. 12, indicating there were eleven previous ones on other subjects. They are all punched and you can bind them in a book. Mr. Wheeler advises that they have full sets of bulletins, so you can get them from the Building Trades Employers' Association. They are worth while.

There is another thing that I wanted to read into the round table that may start discussion, and I am going to give you copies of it. Our company in starting organized safety work never anticipated that we would make any money on it. I sold the idea of safety work to the company. In 1930 I got out a six-months' report. They were planning for the New York Safety Congress and asked whether or not we could give actual figures on compensation paid out in the last four years. We gave them the actual figures and forgot about it. We received a letter from the Newark Safety Council dated August 9, 1930, which I want to read to you.

Dear Mr. Russell:

Thank you for permitting me to see your safety engineering report for the first half of 1930. It is certainly most interesting and tells of your effective work.

I was very much impressed by the financial story of your five years' accident experience. The reduction in compensation payments from \$5.60 per hundred dollars pay roll in 1925 to \$1.80 in 1929 is remarkable and according to my figures you have saved over \$250,000.00 in compensation payments during the last four years.

Humanitarian considerations are, and must continue to be, the mainspring for industrial safety work, but it is certainly inspiring to find that it pays so definitely in dollars and cents, too. I am wondering whether your record does not prove that effective safety engineering work is a distinct factor in reducing operating costs and thus a factor in meeting competition?

By the way, if you apply the 4 to 1 ratio to the money savings of your company for the last four years they reach the magnificent total of \$1,250,000. You will recall that the 4 to 1 ratio was developed by the Travelers Insurance Company which stated that after an investigation of thousands of cases it was quite certain that for every dollar paid in compensation and medical costs the employer paid an additional \$4.00 in "hidden" accident costs.

So I feel that the United Engineers and Constructors and you are to be con-

gratulated! I am sure that the achievement recorded will be an inspiration to continued and even greater efforts in the future.

Fred M. Rosseland,
Secretary-Manager.

This shows the actual reduction, savings in compensation costs that were paid out decreasingly from 1925 on. I think that tells the story. It isn't what we believe, but what somebody else believes.

With the ideas that have been expressed here I wonder if someone will give us a topic to start the round table.

Mr. GEORGE WIDUA (Woods Brothers Construction Co., Lincoln, Nebr.): I might say that our company has a very complete way of keeping a check on accidents in so far as learning the nature of the man having the accident is concerned, the date of the accident, and the foreman in whose department it happens. From that we work up our monthly sheets, as we ourselves are sure we want those figures, and they are pretty complete. If we have a man who has too many accidents we get after him, and sometimes we find out from him that the foreman is careless and it is surprising we don't have more accidents with that foreman. We get after the foreman. We don't fire a man who has too many accidents if we can correct him. Sometimes there is a physical defect that can be corrected.

I think these statistical records are very important not only for your own company but also for our Section. From these reports that we gather is worked up our report for our Statistical Committee. We plead and beg and cry to get in such reports every year from our members to make up our national statistics to find what is causing our accidents, the cost of them, and so forth, and we don't get them. If we got them it would help us a lot as to the nature and causes of accidents and the costs of them.

CHAIRMAN RUSSELL: In the March News-Letter of 1931 you will find the story and the forms used by the Woods Brothers Construction Company, with whom Mr. Widua is connected. If you watch these News-Letters you will be amazed at the amount of material that is there that you can make use of. For instance, his safety bulletins go out to all his people from Lincoln to New Orleans. You can get the material by writing to Mr. Widua, I am sure.

J. W. JOCKEL (Sec'y, State Conference of Bricklayers of Ohio, Cleveland, Ohio): I represent the employees' safety organization of Ohio and came here to learn something. While I am not a safety man I have been interested in it since 1918. At that time we first started our safety construction code in Ohio, and it took five years to get it adopted. We have so many employers who do not cooperate, that we thought we would have to have some kind of a law to have safe places to work. The information I have gotten from the speeches is going to give me a lot of information to take back to our employees to make them interested in safety.

In 1923 we had three meetings, with five at the first meeting, three at the next and three at the next, and we got discouraged. Two years ago we revised our construction safety code and we had 126 sections. Today we have 139, and about 100 subsections. According to our code, in case of accident the employer is penalized. After this was revised the employers in Ohio got busy and decided to have a joint committee to stop accidents. When they found they were going to be penalized they decided to have safety organizations.

I appeared before our employers' organization and told them that they didn't want to have men injured, saying, "You are all humanitarian like we are, but you are not sold on safety." They told me to give my little speech and leave and they would let me hear from them in a couple of days. They let me know they were interested in safety and said for me to come back and submit a plan.

The first two or three months we were going along nicely with an employers' forum. We adopted a card for the state of Ohio and in case of an accident the employee and employer have to make out the card. It seems that since the foremen

and superintendents found that accidents were going to be charged to them, they have tried to keep the reports back from us. In the case of the laborers, we gave one or two or three warnings and then if they were careless they were discharged. They were satisfied to have any man discharged who was careless because it was injurious to the workman and also cost the employer.

On the card it states, "fatal or non-fatal, the injury, and description of the accident." On the back of the card we list to whom charged. We charge it to the employer, or the employee injured, or another employee. If the employee steps on a nail we charge it against the employee and employer, because we think the employer should have had the nail taken out, and the employee should have looked where he was stepping.

I should like to find out from you employers today how to get the employers more interested. They don't want to have anyone hurt or killed in Ohio, but they are not sold on safety yet. I realize we have got to get our employees interested and I don't know how. It seems that to touch the employee he has to be hurt. To touch some employers you have to touch their pocketbooks.

CHAIRMAN RUSSELL: In the August issue of the Construction News-Letter, just to show you the value that you can get from these, the L. E. Myers Company of Chicago outlined their method of rewarding a foreman for safety, also keeping a statistical record properly so they have information regardless of whether they are going ahead or behind in the rise or fall of the frequency of severity rate.

Mr. Forester, the newly elected chairman of the Statistics Committee, will show you how he keeps up statistics.

J. C. FORESTER (Vice President, The L. E. Myers Co., Chicago): Our greatest trouble in starting out was trying to keep statistical records. We developed just a small 3 x 5 card and put in the employee's name, foreman's name, how long the employee had been with the company, and a cause classification number. Then we ran these off on different colored cards through the ditto machine. The office boy could do that and it didn't mean any additional work. We file them according to the employee's name, accident number, and another card according to the length of time of employment.

With these cards we have been able to get quite a few statistics and they have proved very important.

We also classify our accidents according to the part of the body injured, and we just figured out the other day how much it cost us for compensation for the different parts of the body. It was quite interesting that the eye accidents ran about 50 per cent. It surprised me because I didn't expect it. We know our eye accidents are quite costly. The doctors charge a lot just to take a little dirt out of the eye.

I am interested to see if we can simplify our method.

We give our employees buttons for good records. All employees who go for a year without a lost time accident are awarded these buttons. We attach a note from the president of our company congratulating them and also telling them that in the case of non-employment we will give them preference in employment again.

Our new button will say two years instead of one year.

I think our most successful plan, although Mr. Russell was somewhat against it, was giving the foreman \$10 for every three months that he went without a lost time accident. Ten dollars doesn't seem very much, but in talking to the superintendents about this we found the men say they can keep the \$10 from their wives and use it in the way they want to. (Laughter) In fact they even go so far as to try to discharge the men under them if they have a careless accident in one period.

We also have a plan where we give the superintendent a bonus if we have a certain number of man hours without a lost time accident. That isn't as successful as the foreman's award.

CHAIRMAN RUSSELL: I wanted Mr. Forester to speak of his system of awarding, because it seems to be a coming thing to give some tangible award to construction

foremen or construction men who have good safety records. Construction is dependent on roving labor. We know nothing about the labor when it comes to the window looking for a job. We are spending considerable money on accident prevention work and should have some way of tracing men who come in contact with it. When a man comes to your window and applies for employment, with a certificate or a button or a personal letter, you know he must at least have contacted a safety engineer and know something about what you want to tell him.

So far as I know the first button issued was by Stone & Webster, and that button is given to foremen who have good records. If a man comes and shows you one of these buttons you can call back if you want to and find out if the button belongs to him. They will give you the man's record as far as accidents are concerned.

I haven't checked this, but I think the next thing was the planning of certificates. The value of this as seen by my company is that the man's name appears on the certificate, so that when he hands you his certificate you can check back on him. These have been particularly helpful in the last year where some of our men have been forced to go to seek other connections. Two of them have reported back that they were given preference because they held these certificates. On the back of the certificate is the story. You will notice under No. 1 that the certificates are awarded only when the construction foreman on the job notifies the office that the job desires to be awarded certificates. That is an interesting psychological point to bring out because when we started we had a lot of foremen who thought, "We get a lot of these. Sure. Put them on the wall. What are they good for?" We wanted to see that the men who had vision received them, and not the other men. The result was that after a year some of the foremen who weren't getting them began to say, "Why aren't we getting these?" We wanted that. We showed them that if they asked to have their jobs awarded these certificates we would award them, and we made them retroactive. We uncovered some things that we wouldn't have found out in any other way.

This certificate was a cover of one of the News-Letters. I keep stressing these News-Letters of the Construction Section because they are the only method of getting in touch with members, and if you don't read them and put them where you can refer to them, there is a lot of good material that you are losing.

The next one that came to my attention was the L. E. Myers Company, and you have heard Mr. Forester speak of it.

This has become a pet idea of mine, and I expect to stress it where it is possible. I was pleased when I came to Chicago and went to Mr. Widua's house to find that the Woods Brothers Construction Company had also started a scheme. Mr. Widua, will you say a word on yours?

Mr. WIDUA: We give three awards. The certificate itself, is for the first three months' perfect record. When a man completes six months we give him this little universal safety button, and after a year we give him the other gold-filled one-year award. We have approximately 1300 men working month by month this year. Up to September first we had issued 490 of these safety certificates. Up to the same period we have issued 186 of the six-months buttons, and of course we don't know how many we are going to issue of the one-year because it hasn't expired. I imagine we will issue a hundred of those. It is very effective and the men appreciate it. When we transfer men from one job to another, the superintendent says, "Where have you been?" The man pulls out this certificate and it is signed by the superintendent and that is all he needs.

CHAIRMAN RUSSELL: Did that help you, Mr. Jockel?

MR. JOCKEL: Yes.

R. C. BARR (Supervisor of Safety, Lumbermen's Mutual Casualty Co., Chicago): I believe I can give one idea as to a method of interesting employers generally, and that is to sell them on the idea of keeping track of their own accidents. In

doing that they will have to have something to keep a record of them on. Sometimes they use a book and sometimes a card.

Just a short time ago I ran across a card that is printed by one of the office supply houses in Chicago, called the employees' accident and compensation card. There is pertinent information relative to the individual accident on the front of the card. On the back is a record of the medical treatments that have been necessary on that one case. If you get the employer interested enough to keep records of his own accidents, your problem is half over in creating that interest necessary to reduce losses, because the average employer you go to will find it a revelation to see how many accidents have occurred and what has happened in his own work.

CHAIRMAN RUSSELL: Mr. Goldstine, who is the new Poster Committee Chairman, has been working along those lines.

EDWARD N. GOLDSTINE (Safety Engineer, Barrett & Hilp Co., San Francisco, Cal.): I am not going to go into this thoroughly. I will say that if Mr. Jockel will get in touch with Mr. Kearns of the Ohio Commission he will find he has a rather elaborate folder I prepared for him.

If anyone is sincerely interested in anything, he must express his interest in some form of motion. He must do something, and if he doesn't, the interest evaporates. One of the ways of getting interest, that I found stimulating personally, is to read the things that I thought would help me in accident prevention, and I have tried to read all the literature that I could get my hands on. I have not read all of it, but I have read some. "Mental Causes of Accidents," by Fisher, is interesting. Mr. Heinrich of the Travelers has recently published an interesting book on accident prevention. In this book he brings out the fact that for every dollar that the insurance company pays out on insured losses, the employer, employee and society pay out four more dollars for those losses. I would recommend that book to anyone who is interested in reading about accident prevention.

I feel that keeping the right kind of statistics is another means of making interest. In our organization we use an ordinary book that corresponds to a journal. We give one, two or three pages, as might be required, to each letter of the alphabet, and as the accident reports are turned in, a girl in the office enters them by dates, nature of accident, the amount of incurred loss as far as medical attention is concerned and as far as other loss is concerned. We can determine whether certain employees are repeaters. If we see one man two or three times getting medical protection we do something about it. We usually have only 300 or 400 men working, but it is a suggestion that might be worth following through.

One means of expression we have that I believe is not being used as it should be is maintaining a bulletin board with posters that should be instructive. I have a bulletin board which holds anywhere from two to three posters, sometimes with special bulletins I have prepared. If any member of the Section is interested in this sort of thing and requests it through Mr. Russell, we can make arrangements to show them these posters and the manner in which they were prepared. We can loan our book to anyone who wants to see it. Instead of getting out posters saying "Be Careful," "Work Carefully," we try to show them what it means to do it. We show them what is safe about ladder construction, if the angle isn't right, if they haven't got a handhold at the top, if there is an opening that they can fall into. We are trying to take each important cause of accidents and work against it, and we believe that in the course of two years' time (this is a big subject, gentlemen, and we can't do it in fifteen minutes) we can cover all the accidents, both mental and physical causes, so the men will understand them. The thing will be touched upon not once but a number of times.

In our organization we do something that I think should be done much more extensively. Every employee who works for us gets once a month our employees' publication. It is mimeographed, sometimes five or six pages long. It costs about six or eight cents a copy. In this we tell some of the things that the employer

should tell his men. Usually one page is devoted to safety, building construction methods. There is a page of personals, and that is the page they first refer to. They want to know where their next job will be in case they run out.

We feel that we are spending in the neighborhood of 50 cents a day for insurance on our carpenters, 30 cents a day for workmen's compensation on our laborers. Why can't we spend 15 cents a week for safety. Every time we save a dollar in insurance, we are not only benefiting our own experience rating but we feel we are doing something that is of social value to the community. We make it unnecessary for that man and his family to become an object of charity. We are developing a spirit of good will. I find our fellows are interested in these things, and a great many of them are working with us.

Besides the method of the bulletin board, we are developing quite a number of other ideas. We wrote the Siesel Company and asked them about the form they were using in connection with payroll checks. Our checks were all printed and we didn't want to run them through the presses again, so we used rubber stamps.

They look at the payroll checks, they are important. We have a dozen different messages that we have worked up. We change them every so often. For example, here is one of the messages (we took the message of the Siesel organization and changed it slightly): "A pay roll check is always larger than a compensation check. Don't get hurt." "The best safety device is above the neck. Use your head." "Think! Would a stepfather be as good to your children as you are?" There are a dozen of them. You can't show a fellow one of these checks and expect him to be reformed instantly, but it is just another angle of safety work.

One thing I feel strongly on is a matter of investigations and safety reports. I don't think we look at our accidents closely enough. In Mr. Heinrich's book he lists something like 42 different causes of accidents. All the causes that I have been able to think of are included in those. Until industry begins to analyze accidents more carefully, I don't think there is going to be much improvement. It isn't easy to analyze this; it takes a lot of study and thought. When a man begins to look at these carefully enough and thoroughly enough he will find out. I don't know how many of you have ever watched a youngster learning to walk. He doesn't do it in the first day, second, third, or first week. It takes months. If any of you have been confined to a hospital for two or three weeks at a time, on your back, you know you don't run very far on the first, second or third day. Your muscles have been still only a few weeks, and it is difficult to walk a week after you get out of bed. If we analyze the situation with the right sources of information, and utilize it in our work, we can do things we have never done before.

Some organizations in this country have made wonderful records in safety, and they haven't done it by a single step. They have used every means they can think of. They are getting results because they are interested and are doing the right thing.

I don't believe the construction industry as a whole is very much interested. On one large building being constructed in Philadelphia there was not a single elevator shaft with a barricade on it. And there were all sorts of other hazards present in that building.

We find that our men, as a result of our efforts, ask for first aid now where they would have considered it self-pity to ask for it before.

If any of you are interested in our methods, if you will write Mr. Russell we will be glad to send you the details.

In connection with some of the other ideas that we have, after you have got to the point where you are putting up safety posters, when you want to find out how to cut down accidents my answer to that is the weekly safety report. I have made some study of that and have developed some interesting forms. It is a waste of time to talk about it with the average company. If you are interested I will be glad to tell you about it.

Mr. WIDUA: The analyzing of accidents is an important thing, but how many of us sitting at a desk get the complete information on an accident report, the information that we need and want? They say a man fell off a ladder. That is about the extent of the report that we get. Why did he fall? Was the ladder defective? Did he have poor shoes? Was he working too high? There is a reason for his falling. It is either our fault in furnishing him defective materials to work with or perhaps it is the man's fault in having defective shoes or being careless. Our clerical force has been with us for a number of years (we try to keep the same organization year in and year out) and they are instructed specifically to give us the information as to why the accident happened. In addition to our foreman's report, which is made out at the time of the accident, is the complete information that we want as to why the accident happened.

W. R. RICHARDS (Safety Director, Associated General Contractors of America, Washington, D. C.): Relative to the costs, and so forth, on these reports, I don't see how they can possibly get an accurate cost of any accident unless they have the code number of their compensation insurance classification, on that report. Some companies do have it, I understand, and I have talked to a great many people recently who do not have it on their reports. They have no place on the report for that code number. I wonder if it wouldn't be a good thing to see whether the insurance companies would put a place on their reports for that information. For instance, Code No. 5040, iron and steel erection, erecting of iron and steel construction, and so forth. If that code number were on that report it would show them right away what it was.

Mr. WIDUA: We put it on. We don't give that information out on the job.

Mr. RICHARDS: Does the code number go on the insurance report?

Mr. WIDUA: No.

Mr. RICHARDS: How does he classify it?

R. C. BARR (Supervisor of Safety, Lumbermen's Mutual Casualty Co., Chicago): I might be able to answer it in one way. See if the coding of the insurance company and your own coding are the same.

Mr. RICHARDS: Some companies, but not all of them, use that system. I know your company does.

Mr. GOLDSTONE: One of the things I feel strongly about is the matter of insurance company accident reports. I think they are trying to get the reports on one sheet of paper instead of trying to have something on them that will be of help to the industry. The information concerning an accident should cover at least two sheets of paper and should have an analysis of the accident. They should determine how the accident could have been prevented. I think it is worth thinking about. We intend in our organization some time in the next few months to work up something that will do that.

I think another thing that deserves consideration is the use of the standard terminology that was passed on in 1926 in Washington. In order to use that terminology it is necessary to have some sort of a booklet to find out what works should be used. In that way we can have statistics that mean something.

CHAIRMAN RUSSELL: In Newark there is a foremen's safety club, the only one in the East, with a membership of a thousand men. They meet once a month all the year around. They have various sections. There is an article in "Trained Men," which is the pamphlet magazine of the International Correspondence School, coming out in November, which may give you some information. We can give you any information at any time, Mr. Jockel.

A. E. HOAST (Secretary-Treasurer, Henry W. Horst Co., Philadelphia, Pa.): I wanted to add a remark about the foreman. We have had fairly good success getting our foremen together. During the last year and a half or two years we have been constructing a subway in Philadelphia, and have had a number of nail

injuries on the job. We got the men together to try to see what could be done to stop them. We also developed that there were many head injuries.

To overcome some of the nail injuries, the foremen said we should force the men to wear good shoes. The foremen were willing to start wearing nailproof shoes. It wasn't very long before about half the laboring crew on the job were using them. With respect to the head injuries, we had to demand that all men working in caissons wear protective hats. That is one of the requirements of the work. After they had worn them for three or four weeks, we found other men on the job working under the decking, for instance, wearing them. That all started because the foremen, seemingly, took the lead in the way of educating the men.

CHAIRMAN RUSSELL: That is interesting.

Here is a safety shoe, which is a very good protection. We have had some remarkable experiences with those shoes and they have done a real job. They are a dress shoe and I wore them to the convention to see if anyone would detect it.

J. W. JOCKEL (State Secretary, Cleveland, Ohio): I would like to ask the man from Wisconsin about the upkeep of the safety school he spoke of.

MR. TEBBING: It is for all the industry, operated through the Association of Commerce. It is part of our Association of Commerce work, to keep up this safety school.

W. R. RICHARDS (Safety Director, Associated General Contractors of America, Washington, D. C.): For Mr. Jockel's information, the Los Angeles Chapter of the Associated General Contractors has been running a safety school for many years. It has been very successful. They carry on that school for four months each year, meeting once a week, and have a wonderful attendance. They give a certificate for attendance and a prize at the end of the school term, which I think is completed some time around the middle of April.

MR. JOCKEL: How long does it last?

MR. RICHARDS: It starts in February and runs until the middle of April.

R. J. REIGELUTH (Vice President, C. W. Blakeslee & Sons, Inc., New Haven, Conn.): I came out here to listen expecting to learn something, and I have obtained several good ideas this morning, and some of you gentlemen have said things that call to my mind some of our experiences in combating accidents. Our firm was founded in 1840, and from that fact you can realize that we have extreme conservatism in the management of our company. Most of our foremen and all of our superintendents are trained in our own organization, whatever they know they have learned from us and what they don't know we have failed to teach them. We were up against a very severe problem about five years ago. We were carrying part of our insurance with an Insurance Company and part of our jobs we were carrying ourselves. Jobs that we felt were comparatively safe we were carrying ourselves, and jobs that we felt were extremely hazardous we passed on to the insurance companies.

After a year or two of that, the insurance company called our executives together and sent a couple of their executives down, and explained that they would have to raise our rates on account of our having so many accidents. That started us to thinking that something was wrong, and I was appointed to solve the problem. We found that our own accidents were costing us more than the ones the insurance company was carrying for us. Our own jobs, which were supposed to be safe jobs, were costing us more than the hazardous jobs were costing us through the insurance company. So we didn't blame the insurance company.

We decided to educate our foremen and superintendents as has been suggested here. We tried to appeal to them through every known channel. It didn't seem to produce any better results. Finally we came to the conclusion that we had a right to tell the people who worked for us how they should work, we had a right to tell them what kind of work to do and how to do it. We layed down some pretty stiff rules and told them to do it that way or get out. It is a little different proposi-

tion to appeal to the public to do something. The men who are taking your money have to deliver what you want.

We had meetings every month of our foremen and superintendents. We had about 60 or 70 first class foremen and superintendents. Some of them had to come perhaps 70 miles to attend these meetings, but we felt they could afford to do that once a month. We laid the law down to them and we called the men on the carpet at the meetings. We had the information before them, and we asked them to explain why such-and-such an accident had occurred. Sometimes they had a pretty tough job explaining it. I think that was as effective as anything we did in bringing the men to a realization of the fact that they were doing things they could not explain. It cost us something, but we felt it was worth while.

Another thing that is in the embryonic state now but we think is going to work out is that certain men suggested that there is certain knowledge that ought to be known to the foremen in general. Well, it is true that there is a lot of knowledge available in various forms for the foremen and superintendents if they know where to look for it. Our town is an educational town, and we say an educated man is one who knows where to find something that he doesn't know. Our men don't know where to find it. We have compiled a handbook, have been working on it for about a year, which is small enough for the foreman or superintendent to carry around in his pocket. It tells how much a post will carry, how much a plank will carry on a span, how much ropes will carry. It is all in there where a foreman or superintendent can find it.

We are trying to get that so it can be used by the foreman and superintendent, and we think it might be of use to the industry in general.

I want to tell you that the result of our accidents has been this: In 1929 we had 4½ lost hours per thousand hours, and we have come down to .95 hour per thousand.

L. J. RARE (Superintendent of Accident Prevention, Metropolitan and Commercial Casualty Co., Chicago): I have a word that might be of interest, particularly in the construction game, on one of the largest projects under construction at the present time in Chicago. In the beginning we were running along very smoothly without accidents, and all at once there was an avalanche of cement burns. I think seven or eight went to the hospital within three days, and possibly in a week there were twenty-three very serious burns. It seems that these were mostly colored men, carrying cement from automobile trucks and freight cars into storage houses, being used in caisson and cement construction work.

The matter was turned over to me for analysis. We usually analyze almost every accident and try to find a way of preventing a recurrence of it. In making an analysis of this particular run of accidents, I found that the cement in the first place was coming in rather warm. It was in paper bags mostly, sifting through, closing the pores of the skin, chafing, and creating a rash that gradually permeated the whole body.

The remedy was very simple, lanolin grease. Those fellows are greased on the neck, shoulders, arms, some carrying the cement on the shoulders and some otherwise. With the use of lanolin, after the man completed his carload of cement he took a bath, and we haven't had a burn. Any sort of vaseline or grease, if they will grease themselves thoroughly, will do. This same company now is using this preventive method on all of the jobs.

CHAIRMAN RUSSELL: We tried vaseline and lanolin, and we found it was difficult to get vaseline out of the skin. After considerable investigation we ran across a cream put out by the General Electric Company, and it is used by them.

MR. REIGELUTH: What is the name of that cream?

CHAIRMAN RUSSELL: G. E. Hand Cream, made by the General Electric Company.

MR. RARE: Lanolin seemed to work better. It was an absolute cure.

EDGAR N. GOLDBSTEIN (Safety Engineer, Barrett & Hilt Co., San Francisco, Cal.): I want to answer the remarks that were made in connection with detailed specifications for construction. The specifications that I had in mind were minimum requirements for certain types of work, and not maximum requirements. As a rule accidents occur when a number of different conditions get together. I had occasion to make a very thorough investigation of an air compressor explosion. I found out that the blow-up was a result of seven different conditions coming together at the same time. If any one of them had been different it would not have occurred.

Whenever there are unusual conditions in any part of our jobs, scaffold design, tower design, or anything else, special attention must be given to that condition and if possible some sort of effort made to take care of that condition. Otherwise there is a strong possibility of an accident occurring.

MR. OGE J. GAUSE (Special Investigator, Safety & Hygiene Division, Ohio Industrial Commission): I want to state the actual experience of a man who is out as a special investigator, touching all kinds of construction work. The drift of the talk that I get here today is from men that I presume are all large contractors, or men representing the large contractors through the insurance company, and so on. In my position I inspect every job in that section of Ohio, which consists of seven-teen counties, whether they have one man or a thousand men working for them.

In my experience, which has extended over the last two years in the inspection department and about thirty-five years as a builder and practical mechanic, a carpenter, by the way, I have found this out: I have more trouble in what we term the shanty work, or in other words in a small town where there are possibly ten or fifteen or twenty thousand inhabitants and they are building several small buildings, five, six or eight rooms. I have more trouble on a job with six men than I do where there is a six-story building where there are 60 men, or a real large operation where there are 600 men. To be frank with you I have more trouble with the six-men job than the 600-men job. The larger contractors in the large companies realize what is best for them. As a matter of fact they know that when they preach safety they are saving themselves money. One of the worst things we have in the construction game today is that there are entirely too many small contractors, men starting in the contracting game without as much as a thousand dollars. They go to the bank and get the money and get the owner to back them and stick the owner when they can. There is no use camouflaging it because we know that is the trouble in the construction game today.

It is astonishing throughout our district the amount of premiums they have to pay. This hits the large fellow as well as the small one. The small fellow has so many accidents, and that raises the premium on the large fellow. What we are trying to do (it is hard during this depression) is to go into the cities of any size at all and get the contractors and workmen together for mass meetings. That is the hardest job in the world, to get the contractors to come to the meeting, or even to get the men to come to a meeting, because the contractors want to play golf and the mechanics generally want to go fishing when a meeting is on.

There is another thing I want to bring up for consideration by the Construction Section. Yesterday or day before I was in the Woodworking meeting, which was a very interesting one. Some of you may have never had much experience in wood-working. When I was young I tried to learn it and got most of my fingers cut off, so I gave it up. They had a picture that showed the actual way the men get injured. They had wax fingers and hands. Anyone who saw them will never forget them. We have pictures to show at these talks we make. I think it would be a wonderful thing if we could show these at the national convention.

W. R. RICHARDS (Safety Director, Associated General Contractors of America, Washington, D. C.): As I said yesterday at our meeting, we are continually hearing talks here, all on building construction. We never say anything about the other

construction. This is a Construction Section, taking in every class of construction. I think that the engineering contractors who do highway work, bridge work, municipal work, railroad work, should have something to say, and somebody should make some reference to them and give them information.

We have a number of them in our association who have practiced safety, and they are municipal and highway contractors. Mr. Horst is an engineering contractor and has made a wonderful record. Mr. Wilkinson of California is another good contractor. I can name you hundreds of them. This division doesn't refer to anything but building all the time. I would like to see more information for the other class of contractors. Just as this gentleman from Ohio said a while ago, there are more contractors in that line of business that need education. We should try to see them.

A. E. HOAST (Secretary Treasurer, Henry W. Horst Co., Philadelphia, Pa.): We have been out of highway construction for four or five years. We couldn't make any money and quit it. I haven't any positive way to suggest relative to highway work. I indicated a while ago what we did on our subway work in Philadelphia. We happened to be carrying our insurance with an insurance company that put on a special man with the work that is being handled in Philadelphia. If the man couldn't get the information from the foreman on the job or the superintendent that he thought he should, he would then come to the office and talk to us, and we had a meeting about once a month of the foremen and sub-foremen on the job.

C. O. TAYLOR (Safety Director, United Power and Light Corp., Abilene, Kansas): Being a stranger at your meetings, I came this morning trying to learn more about construction in our line of work which differs from building. I don't find any others here interested in my line of work. But our work is construction work never the less. We are running up against hazards. We hold our safety meetings among our workmen. We have at the present time about a hundred workmen out in line crews over our four hundred and some miles of territory, and it is my job to hold a safety meeting in every district each month. Every Monday morning each line truck foreman must hold a safety meeting before he starts on the job, and check his truck to see that he has his proper safety material on it.

We are getting some wonderful results out of those meetings. We keep a statistical record. On every accident that happens the foreman must make a report, and that report must cover in detail how that accident occurred. When that arrives, whether it is a lost time accident or a serious accident, it is wired to my office and I immediately investigate along with the superintendent of the division and the engineer of the division. The three of us investigate and see how that can be stopped. Then we draw up a sketch on the particular job on which the accident occurred, and I take the sketch over every district and talk about that particular accident.

We have the biggest hazard, I suppose, in the wearing of jewelry by the men. They cannot wear rings, wrist watches, or watch chains, any metal. But it is pretty hard to put that proposition over because it becomes a habit. By these meetings we are conquering that problem.

In connection with our statistics I keep a record by divisions of the minor and major injuries. I know how many accidents we have each month, how many days have been lost by each of the lost-time accidents, how much it has cost us by way of medical bills. Then we make a current sheet every month by each district so that we know what it costs against the man hours worked. At the end of the year we total it and get the combined cost of every accident that happens in our company.

The general manager in starting out did a wonderful thing. You spoke of the employers taking an interest. When I came on the job a few years ago from the state safety department of Kansas, where I had been for a long time, the general manager himself went with me to every district and we had a general meeting, and we impressed on their minds that we wanted safety embodied in their work and

we wanted them to study safety before they started the job. That is the way we started out, and we are conquering it.

I was in hopes I would hear more from the industry today, but I have gained a lot from the round table discussion here that I know I can carry back to my boys, and it will help them wonderfully.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Delivery, Taxicab and Bus Section

Officers 1930-31

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Tuesday Morning Session October 13, 1931

T. A. HORROCKS, Chairman

Minnesota Truck Owners Association, Minneapolis, Minn.

The first session of the Delivery, Taxicab and Bus Section convened with General Chairman T. A. Horrocks presiding.

CHAIRMAN HORROCKS: It is with great pleasure that I greet you at this, the

Twentieth Annual Congress of the National Safety Council. As one views the progress made by the Council in this humanitarian enterprise, we do well to pause for a moment and contemplate the tremendous tasks which have been undertaken. Little the sponsors realized at the beginning that the work would grow to such monumental proportions. "They builded better than they knew."

To the organizers of the Council, we acknowledge our debt, and in appreciation thereof we should "carry on" in the same spirit of self-sacrifice and with the same determination to succeed.

The Delivery, Taxicab and Bus Section was organized about eleven years ago. That this Section has made progress cannot be disputed.

The past year has seen our membership increased—in the face of adverse business conditions.

Committee chairmen have rendered a good account of their stewardship, as will be noted by the reading of the Monthly News Letter, by reports made at this Congress, and by observing the splendid programs provided for our sectional meetings.

Particularly I want to call your attention to: (1) progress made in awarding recognition to drivers who, by their conscientious efforts, have helped materially to reduce accidents; (2) to the statistical division for the laborious task involving accident experience records; (3) to the splendid work of the Membership Committee; (4) to the painstaking efforts of the Program Committee, who have arranged our programs and secured speakers; (5) to the Nominating Committee, who have chosen a fine group of sectional leaders for the coming year; and (6) to the meritorious work done by members of the Council staff.

Three sides of a great problem, a question in which all fleet owners must, or should, be vitally interested will be presented now. Our discussion involves the attitude of the commercial vehicle driver, what the commercial driver requires of the public and of other drivers, and what the public requires of fleet owners and their drivers.

I take pleasure in calling upon Mr. F. C. Lynch, of the Kansas City Safety Council. Major Lynch was in charge of Warehouse and Transportation Ordnance for the 22nd Division in France, and was at one time superintendent of the Supply Maintenance Division of the Kansas City Public Service Company. His experience covers a very wide field.

What the Public Requires of the Commercial Vehicle Operator

By F. C. LYNCH

Director, Kansas City Safety Council, Kansas City, Mo.

In the presentation of this paper it would be much more logical, perhaps, for us to discuss what the public expects of the commercial vehicle operator and then to make a few observations on what the public may require of the commercial vehicle operator if it does not obtain what it expects. Since the only implements of war employed by the public in its battle against a common enemy are regulation and taxation, neither of which very often proves desirable, it behooves any industry to keep a close check upon their operations in order to make sure that they are not unnecessarily creating an adverse public opinion as a result of the manner in which they are contacting with the public. Any of you who have had an opportunity in the past few years of visiting the Legislature when hearings were being held upon legislation affecting your industry, have heard many uncomplimentary remarks directed toward you. Seldom do you find the public and the press becoming aroused over legislative matters which had to do with an individual industry, therefore, back of these regulatory measures must be some cause which prompted the public and the press to become so interested in these matters.

Commenting editorially on some of this proposed legislation having to do with taxation the following is quoted from one of the metropolitan daily newspapers:

"But of much wider consequence is the issue which affects the entire public. The highways were built for public use and with funds supplied by the public, specifically, as a rule, that large part of it owning or using motor vehicles. They were not designed, and could not have been designed without virtually prohibitive cost, for use of a limited number of vehicles of excessive weight and dimensions. The dominating idea in building roads was that each individual and group benefiting directly from them should be governed by the interest of all. To permit a selfish, monopolistic and dangerous use of the thoroughfares by the few is indirect violation of the whole principle of public road construction and maintenance.

"The present situation in Missouri and no doubt in many other states calls for a higher degree of public protection than now is afforded. The common carriers must be made to pay to the state an amount commensurate with benefits derived from use of the highways, while at the same time there must be enforcement of existing regulations or perhaps such additional regulations as will prevent damage to the highways and danger to the general public using them."

Quoting from another editorial:

"Governor Caulfield is right when he says that many of the commercial trucks operating on Missouri Highways have become a menace to traffic.

"This is apparent to the automobile driver on U. S. Highway No. 40 between Kansas City and St. Louis. The Governor, in a letter to Thomas H. Cutler, the State Highway Engineer, declared that the automobile transport is becoming a greater menace to traffic each day.

"Other drivers of automobiles on the main highway across the State have had the same experience as the Chief Executive in being forced from the pavement by trucks or automobile transport.

"Engineer Cutler says the Highway Department only has the right to prevent the overloading of trucks. The next legislature should restrict the length of transports and clothe the Highway Department with power to arrest all offenders of the traffic regulations. The huge trucks and transports are a heavy burden on the highways and the present tax now imposed on them by the state is wholly inadequate. The tax schedule for the trucks should be increased by the next legislature.

"The traffic problem on the main highways should receive the careful attention of officials of the highway department during the next few months. They should receive the cooperation of the owners of trucks and automobile transports in order that an effective and well balanced traffic code can be presented to the coming legislature.

"Missouri is building a splendid system of highways but they must not be monopolized by commercial trucks. The driver of the pleasure car is furnishing the principal part of the funds to build the roads and he has a right to complain when a truck forces him into the ditch."

It is interesting to note that the first editorial was prompted because of a railroad official pointing out the unfair competition which was existing and he found a ready response from the press because it offered an opportunity to point out the detriment which these commercial vehicles were to the general public welfare from the manner in which they were operated. The second editorial was prompted because the Governor of the State of Missouri was forced into the ditch by the operation of a commercial vehicle and again we find the press bringing into this picture the need for additional taxation. It is a peculiar business condition, but nevertheless, it is true that if you want people to like you, it is necessary that you give the people what they want time and time again. You must advertise your business and prove your worthiness to society and you will gradually win the friend-

ship of society. But, not so with hatred. For example, one truck driver, by crowding the Governor of the State of Missouri off the highway, has created the animosity of the Governor, the Highway Department, the press and the public to such an extent that thousands of courteous, considerate acts will have to be committed in order to gradually overcome this animosity.

With a situation as delicate as this confronting your industry isn't it imperative create the animosity of the public and quickly and surely eliminate them from your that you analyze your operations and determine those things which will tend to operations. It is not necessary for us to cite hundreds and hundreds of cases occurring in your operations in order that we may agree upon the cause for this situation, because all operating executives who have answered the telephone and listened to the remarks of citizens, know that the complaints which are received have to do with the unsafe manner in which their vehicles are being operated; and the compliments they receive, if any, have to do with the courtesy and consideration and thoughtfulness which their operating personnel has shown toward individuals of society.

Then, isn't the answer to the question "What does the public expect of the commercial vehicle operator?" to be found in the statement that the public expects a safe service courteously performed. Many industrial and mercantile establishments have long since come to the conclusion that the best operating frame of mind for their employees to be in is to work with the understanding and the assumption that the customer is always right. This adaptation has occurred almost universally where the customer and the company representative comes in personal contact one with the other. However, this adaptation has not been as quickly accepted by organizations as are represented here. And, even where this has been accepted in the case of some establishments, it has not been enforced, or even advocated perhaps, in the case of their commercial vehicle operations.

Take a specific example of a customer in the department store. We find that when the customer suggests a lighter color, a darker color, a larger size or a smaller size, the customer is right. If the customer suggests standing at a different counter, the sales person, notwithstanding what inconvenience it might cause, gladly brings the merchandise to the customer. From the customer's viewpoint, at least, that is a satisfactory service. Suppose, however, after the purchase was made, the messenger is bringing the package back from the cashier, and would shove aside or even knock over a prospective customer who was standing in the aisle. Would that be considered good business? If perhaps the customer has asked that the package be delivered to his hotel, and upon arrival at the elevator, he finds the elevator crowded and there was only room for one more passenger, he is pushed aside by the messenger now carrying his purchase and required to wait for the next elevator. It is ridiculous to ask if that is considered good business. But let's carry this package just a bit further. Suppose that the purchaser gets into his automobile and a few blocks away from the store, meets the delivery boy with the package in his car, and finds that he quickly has to apply his brakes in order to yield the right-of-way to the delivery boy—and unless he does so, he most likely will become involved in a serious accident. In the examples cited, I hesitated to ask the question as to whether or not that was considered good service because it was so apparently ridiculous to ask it. But, in this case, I do not hesitate to ask the question as to whether or not this is considered good service because I have seen enough of such incidents to know that some men are actually doing it. I will not ask whether or not this is good business and proper service to render to the community because this paper is supposed to be from the standpoint of the public—What does the Public expect in a case of this kind?

I was discussing this paper to a friend of mine for the purpose of receiving criticism and when I very dramatically came to this point and asked the question—"Is This What the Public Expects from the Commercial Vehicle Operator?"—my friend, rudely interrupted with the remark—"Well, he had better expect it or he

won't be a part of the public for long." And this brought me around again to another proposed change in the subject of this paper. It seems that perhaps the paper should be best entitled "How Does the Public Feel About What They Expect from the Commercial Vehicle Operator?" However, knowing that there were usually women in attendance at these sessions, I quickly realized that it would be impossible for me to relate many of the remarks I have heard about how the public feels. However, I will try to give my impression of what the public feels they are entitled to and expect from the commercial vehicle operator.

Without going into the equity or economics of the conditions existing, or attempting to justify the feeling which the public has in this matter, nevertheless, it is apparent from my observation that the foundation upon which society forms its opinion of the commercial vehicle operator is that the public has provided the highways for the operation of the commercial vehicle, and that the commercial vehicles are using these highways for the purpose of serving society, and by virtue of such use and such service the commercial vehicles are receiving profitable benefits thereby. By virtue of this perspective which they have of the situation, the public expects the operators of commercial vehicles to furnish a safe service and to render it in a courteous manner. In order to fulfill this obligation the public expects the commercial vehicle operator to provide the following:

The Vehicle. The public expects the operator to provide a vehicle which is equipped and maintained so as to produce the greatest possible safety in operation. They expect a vehicle to have adequate brakes, and by adequate brakes is meant that the driver can lock all wheels of the vehicle under his control without exerting more than 50 per cent of his potential power. It is expected that the vehicle shall be equipped with headlights, giving the greatest possible road illumination and still complying with the regulations for adjustment existing in the state. The vehicle should be equipped with adequate horn, or signalling device. There should be a rear view mirror so that the operator may be aware of conditions existing in the rear of his vehicle. He should be provided with "Stop" and adequate clearance lights in order that the public may be aware of the size of the vehicle which is approaching. All of these items should be a part of the regular equipment of the vehicle and should be maintained by periodical inspections frequent enough to insure a continuous operation of all safety features on the vehicle. In cold weather, the public expects the driver to be provided with a heated cabin in order to make sure that the safety of the public will not be jeopardized by virtue of the fact that the driver has become so cold from exposure that he can no longer safely operate his vehicle.

The Driver. The public expects the commercial vehicle operator to provide drivers who have passed satisfactory physical examinations in order to assure their physical fitness for the work to which they are assigned. The public further expects periodical physical examinations to be given to these drivers in order to make sure that no deficiencies have developed in the condition of the driver in order to cause him to jeopardize the safety of the public when operating his vehicle.

The Skill of the Driver. The public expects the commercial vehicle operator to make sure, by examination and educational work, that the driver is adequately skilled in the operation of the vehicle under his control and sufficiently supplied with the judgment of conditions under which he will drive in order to be certain that no deficiencies in the skill or the judgment of the driver will be a public hazard.

The Alertness of the Driver. The public expects the commercial vehicle operators to so manage their operations and so interest their drivers in the operation of these vehicles that they will constantly be alert to the conditions under which they are operating, in order that by virtue of their alertness, they will anticipate potential accidents a period of time sufficient for them to take the necessary precautions in order to prevent such accidents from occurring.

Courtesy. The public expects that the management will require of the commercial vehicle drivers that the same courtesy should be shown toward the public when

contacting with them upon the highways as the management requires that shall be shown toward the public when they change from the potential customer upon the highways to the actual customer in the store.

All of these items which we have mentioned have largely to do with the moving vehicle upon the roadway. There is another occasion where the public and the commercial vehicle operator have an opportunity to conflict, and that is the case of the standing vehicle which is double parked or improperly parked any place in the roadway. The public has the right, at least, to expect that the operator of a commercial vehicle will comply with the traffic regulations governing the operation of vehicles upon the highways and the public further feels that if any unjust irregularities occur in the traffic ordinance that the operator of the commercial vehicle will be a much better citizen if he will take such complaints to the legislative branch of the city for correction, rather than to constantly violate the regulation because it appears to be unjust.

Summarizing the whole situation, it appeared to me that the public expects to receive from the commercial vehicle operator, a safe service courteously rendered. Whether or not it is good business for commercial vehicle operators to render it voluntarily is an economic problem which each of you will have to solve to your own satisfaction. However, it is my opinion that many commercial vehicle operators could well afford to take paint and a brush and paint their name off of their commercial vehicles, leaving it up to the public to guess what truck had committed the violation, rather than to definitely identify the violation with the corporation operating the vehicle. The sequel to what the public expects of a commercial vehicle is "What Will the Public Require of the Commercial Vehicle" and as has been previously pointed out, the competitive enemies of the commercial vehicle are quick to capitalize upon adverse public sentiment which you have builded up in the community by virtue of your failure to furnish a safe service, courteously rendered.

Not only does the public expect you to render a safe service courteously to avoid its adverse opinion but it also expects the commercial vehicle operator to render a safer service courteously in order to deserve its good will. And what executive can differ with the statement which Owen D. Young, of the General Electric Company, recently made to a group of his employees:

"Everyone has had mornings, hates to hear the telephone ring, or to see the office door open. I beg of you, gentlemen, when next you meet such a morning, take a stick of dynamite and blow up one of our plants. But do not take it out on a customer of General Electric. We can replace the plant you have destroyed, we know its value, we have a reserve from which we can rebuild. But we cannot measure the good will you have destroyed and we can never know if we have replaced it."

CHAIRMAN HOBBS: We thank you very much, Mr. Lynch. Now we will consider another side to this problem, presented by Mr. E. A. Dannemann, of the Parmelee System.

What the Commercial Vehicle Operator Requires of the Public and Private Car Operator

By EMIL A. DANNEMANN
Division Manager, Parmelee System, Brooklyn, N. Y.

Upon receiving the invitation to address this group, my thoughts naturally turned to the subject allotted me. After pondering it for awhile, I decided that the author must have made an error, as up to that moment the thought had been firmly fixed in my mind that commercial vehicle operators as a class had no right to require anything from other types of operators.

During many years of association with a company which operates about 10,000 taxicabs that travel about 300,000,000 miles annually, so many requirements have been made of our drivers by private car operators, civic bodies, state and city authorities, that I naturally reached the conclusion that there were no requirements left for us to demand from others. However, after due consideration, I decided that commercial vehicle operators have until now been suffering from an inferiority complex and that this was the right opportunity to require recognition of the outstanding differences between the several classes of operators.

If you will ask the average citizen who, in his opinion, as a class are the most reckless and careless operators of motor vehicles, he will probably answer, "Drivers of cabs and trucks or other commercial vehicles." Perhaps in the early days of the automotive vehicle this opinion was based on facts. In those days only the well-to-do and outstanding members of a community were able to possess an automobile. It naturally followed that this class of owner and operator was well above the average of his community in intelligence, ability and caution, and consequently applied these characteristics to the operation of his automobile.

As production increased, the price went down and the motor vehicle found its way into the hands of the masses with a consequent lowering of the natural standards of common sense, courtesy and ability, with a result that accident frequency not only kept pace with registrations but as a matter of fact outdistanced them.

Naturally the higher ratio of accidents came to the notice of authorities and in some states rigid driver's license laws were passed. There is no question but that these laws were helpful and as a matter of fact during the period 1916 to 1929 inclusive, the automobile fatality rate in this group of states was 29 per cent lower than the rate in non-licensed states. However, I think all of us will agree that you cannot legislate common sense into a person's head.

The commercial vehicle operator goes beyond the ordinary requirements of the law and particularly equips himself for the job of operating a vehicle by various methods. He is, as a rule, one of many drivers working for an employer operating a fleet of vehicles. This employer when he is in need of a driver does not merely hire drivers who have a license to operate an automobile, but he demands proof of the applicant's driving ability both by reference and actual road test. After the man is employed a detailed service record is made of that driver's accomplishments and he is made to realize that his conduct on the road and his method of driving will be used to gage his ability. Every fleet operator will go to extremes to prevent accidents and enforce safety through various methods such as road supervision, organized safety movements, etc. In other words, the employer is constantly making every effort to keep the thought "Safety" in the minds of his drivers. The fleet operator realizes that accidents can mean the difference between profit and loss and can also destroy or build up good will in his business.

I think we will all agree that the mechanical condition of automotive vehicles is a factor to be considered in any discussion pertaining to the subject of accident prevention. It is my opinion that the average commercial vehicle is better maintained mechanically than the average private car. Certainly there is far greater incentive for the commercial vehicle operator to keep his equipment in proper mechanical condition than there is for the private car operator to do likewise. The former has to maintain certain definite schedules and has to provide safe and dependable transportation to its patrons if he is a public carrier. To accomplish this he usually maintains his own repair shops to provide systematic checkup and inspection of his equipment to prevent mechanical failure. In most commercial fleets today vehicles are examined and tested daily. The driver is invited to report mechanical troubles to his superior and most employers emphatically warn their operators not to take a vehicle from the garage unless it is mechanically fit. Contrast this with the attitude of the average private car operator who usually waits for something to happen before he visits the repair shop.

A good many of the cars on the streets today should be licensed as pushcarts rather than automobiles. In my opinion state licensing authorities should devise ways and means of ascertaining the mechanical condition of a car before issuing a license. In some states the authorities have at times undertaken this work on licensed vehicles and also in some cities the authorities have taken similar steps. However, these inspections are so infrequent that little permanent good results from them. The methods used in one particular state, with which I am familiar, made a joke of the inspection in that certain repair shops were authorized to do this work and to issue certificates indicating that the inspection had been made and the car was satisfactory. The result was that the repair man issued these certificates promiscuously to his local friends without even seeing the cars.

In the matter of responsibility, a commercial vehicle operator must necessarily carry sufficient insurance to protect himself against liability arising out of claims for injuries, property damage, etc. The private car operator knows that as a rule when he is in collision with a commercial vehicle he is in a position to demand and obtain redress, either direct or through the courts. On the other hand, the commercial vehicle operator suffers in this respect by reason of the fact that a good percentage of our private cars do not carry one cent of insurance and in a great many cases where the commercial operator does obtain judgment against the private car operator or owner, he is left holding the bag because of the lack of insurance or other assets.

When a negligence case reaches our courts a jury of our peers likes nothing better than to mulct a commercial vehicle operator, especially if it is a corporation and, as compared with a private car operator, the awards in damage suits usually run one-third to fifty percent higher. As a matter of fact, often an accident which results in a claim of a private car owner against a large commercial fleet operator is considered due cause for appropriate celebration.

Now if a citizen sees carelessness on the part of an express company driver or a taxicab chauffeur, he finds it convenient to say that those express company drivers or taxicab chauffeurs are reckless and careless. Since the private car operator cannot be readily classified and designated, the public rather neglects them in their criticism of driving conditions. An investigation would soon uncover the fact that there is more carelessness amongst individually owned and owner driven cars than among the employees of organized fleets. I think proof of this statement can be found in the fact that from 1927 to 1930 inclusive, there was an increase of 37 per cent in fatal accidents by private cars, whereas trucks, taxicabs and busses showed a decline of 14 per cent, 25 per cent and 19 per cent respectively.

The commercial vehicle operator must of necessity do a better job of driving than the driver at the wheel of a private automobile. He knows that if he is involved in even a minor accident or other violation of safety rules of his company, he will be called to account and disciplined. A serious accident or violation may result in the loss of his job and may prove to be almost an insurmountable obstacle in obtaining employment elsewhere. He knows that his employer's hands are free to deal with him and that politics do not play any part in the consideration of his case.

The fleet operator on the other hand is confronted with certain policies which in a measure affect the morale of his drivers and at times these obstacles make it difficult for an employer to control the safe operation of his vehicles. The fleet operator has been told time and again that communities want safer highway conditions. He has seen thousands of dollars disbursed for traffic signals and elaborate codes adopted and he has seen both the regulations and signals generally ignored. He knows that when enforcement is attempted that the leading citizens of the town merely have to call upon the district leader or other local politician to fix it up. At times the fleet operator wonders whether the community really wants safety or just wants to talk about it. On the other hand, when the commercial vehicle operator breaks a company rule and company rules include all traffic rules and regulations, the fair minded executive hates to penalize his own men for misdeemeanor-

which he knows the community does not itself enforce. The fleet owner and the commercial vehicle operator expect the community to determine what kind of safety and traffic regulations they require, what the penalties for their violations are, then be thinks they should stick to them and enforce them.

In glancing over the program for this morning's session, I notice no thought has been given to the pedestrian and his relationship to our problems. I think you will agree that all operators should require something of the pedestrian since in our own company pedestrian accidents account for about 35 per cent of the total.

From time immemorial the courts have built up their decisions on precedent, giving little consideration to change in conditions. We have become so accustomed to the use of precedent by the courts that it would almost be heresy to challenge the correctness of this procedure. The law has always given preference to the pedestrian and today we find the court maintaining the ridiculous position that the pedestrian may ignore a traffic signal and if he or she be injured by a motor car, the driver may be held negligent. Recently the Pennsylvania Courts upheld a verdict in a case of this kind. We are all familiar with the complete failure of efforts of the police to have pedestrians pay attention to traffic lights, crosswalks, etc. We do not maintain that the thoughtless driver should be encouraged by law to run down pedestrians but it seems only reasonable that the driver in congested areas should be assured of a clear chance at crossings controlled by traffic lights. Little or no effort has been made to control the pedestrian and the writer cannot understand why it should not be considered just as much a violation for a pedestrian to cross a thoroughfare against a traffic signal as in the case of a motor vehicle. Referring again to the attitude of the courts, I feel that the fleet owner has a right to expect modification in the court's attitude and a departure from precedent where new conditions have made old conditions and rulings inequitable.

In conclusion permit me to say that this study has given me a new angle on various classes of operators. We all agree that there is still considerable progress to be made in the direction of properly educating commercial vehicle operators in accident prevention work. However, if this is true about this class of operator, I think it can be fairly stated that there is certainly room for improvement in a class where no organized safety movement, or no orderly process of education or control has even been started.

Finally, the commercial vehicle operator should at least require from the public and private car operator and others, a competent understanding of his aims, objects and accomplishments.

CHAIRMAN HORROCKS: The paper has been very instructive indeed. Considering we have so many commercial vehicles—the registration in 1930 was, I think, over three and one-half million—and that the great majority of those are motor trucks, and in the hands of two and one-half million individual owners, I believe that the trucks in this safety movement are going to crowd the busses and the taxicabs.

C. V. WELLS (Pillsbury Flour Mills, Minneapolis, Minn.): In questioning people who are injured, what is their attitude or reaction as to the liability of the company? Do they also feel that the company is liable, or the driver liable, or will they admit liability?

MR. DANNEMANN: No, I don't believe that the public ever admits liability, or rather the claimant does not. It is difficult for us to get our own drivers to admit liability. I think it is more difficult to get the claimant to admit his or her liability.

MR. WELLS: Going against a stop light?

MR. DANNEMANN: No, they don't admit anything.

CHAIRMAN HORROCKS: The next subject presents another side to this very moot question, and will be presented by Commissioner Robbins B. Stoeckel, Connecticut.

What the State Requires of All Commercial Vehicle Operators

By ROBBINS E. STOECKEL

Commissioner of Motor Vehicles for Connecticut, Hartford, Conn.

This is an assigned subject. Its wording bears analysis for it includes more than it seems to. It does not apply solely to motor vehicle operators but includes all operators of vehicles as well. Further, the word "operator" as used for the purposes of this discussion, while it obviously includes the actual drivers of Commercial Motor Vehicles, yet it also covers those that control the management of large fleets and groups of delivery trucks and wagons. These are the so-called "fleet operators." With this preliminary statement as to what the scope of the subject may include all those operators of other vehicles than those which are motorized can be at once disposed of by a general statement to the effect that all such except those which are for specialized purposes are handicapped in comparison with motor vehicles.

Horse Drawn Vehicles

It seems to be a cheaper and better policy for certain industries in certain localities, usually in cities, to use horses and there still survives an extensive short haul business which is horse drawn. Tax statistics seem to show that the horse is used as extensively as ever. That is, there appear to be in many states as many horses as formerly, but it probably is a fair conclusion that the use of the horse is now withdrawn from the highways to a considerable extent and intensified upon the farms and back roads. So far as the horse and wagon on the highway are concerned those who order their use ought, for the sake of everyone, to instruct the drivers that their primary duty is to keep out of the way of faster traffic as much as possible. The horse drawn vehicle is so much slower than even the slowest motor vehicle that its detrimental effect on traffic as a whole is much exaggerated if its driver does not give way to faster vehicles. Nearly all horse drawn vehicles are out at unusual hours. They are used by milkmen, icemen, farmers and by other similar tradesmen who are mostly early morning or late afternoon and evening delivery-men. They are on the roads when there is the minimum of motor vehicle traffic. Aside from general practice, the horse drawn vehicle owner and driver ought to see to it that such management of the vehicle for the sake of others is indulged in as appears sensible and useful. That is about all that can be done.

Such vehicles and all teams which are used after dark should be marked with reflectors as well as with lights. In most states lights are required, but the light at best, if left to the driver of a team, is never 100 per cent efficient. There is an authentic instance where an accident occurred because there was no light visible, but the teamster went into court and swore a light was going. On cross examination it developed that because it was a cold night, he had wrapped the light in a blanket alongside his feet to keep them warm. The reflector is a better warning than the light. It is 100 per cent efficient in its modern manufactured perfection because it can be readily seen if it is well placed on a wagon. Most laws which require lights on teams will soon be amended to say "lights or reflectors." This is about all which one can say about teams. To sum up, teamsters must for safety keep exactly where they belong in the road and carry a warning light after dark. A motor vehicle commissioner is not expected to be expert in the discussion of horses.

Fleet Operators

The main duties of fleet operators of commercial motor vehicles are easily set forth.

As a class they include the direction for all that performance which is specifically

within the control of the owner through his fleet operator and includes all those activities where an agent should receive express authority and for which the drivers ought not to be expected to take the responsibility. Fleet operation and the orders given by the superintendent to his driver ought to be accomplished in a manner beneficial, or at least not injurious, to the public even though there be some sacrifice on the part of the owner.

Overloading

Overloading continues to be one of the most dangerous and difficult offenses to handle. The payload on a commercial motor vehicle is within the control of the owner. He it is who ought to be held responsible for overloads beyond the safety factors provided by the manufacturer. States are coming to a definite policy which ties the permitted payload to the manufacturer's guarantee. Nobody knows any better than the manufacturer what the tensile strength of his steels and other materials which have gone into the making of the truck ought reasonably to carry, how much the springs will safely support and what load the axles and tires are made for, so that it is fair and proper that his guarantee should control. It is sufficiently liberal because of the fact competition forces liberality.

In following out enforcement principles the authorities will continue to set the manufacturer's guarantee as a standard, and where overloading has taken place and has become an offense, will proceed with corrective methods, both by court convictions and suspension of registrations and operators' licenses. Any state which has an operators' licensing system has at hand adequate means to punish a truck driver who violates the principles set forth, but this is particularly an offense authorized, or at least constructively permitted by an owner, so that enforcement, instead of applying invariably to the driver, as it too frequently has in the past, ought to reach out and get the owner as the true culprit. There is a duty upon the owner to instruct his drivers as to the size of loads they are to carry, and to hold them responsible that this limit is not exceeded. The State expects every owner to do this, and will be more inclined as time goes on to hold him to it.

Ganging In Line

Another form of owner's direction, either personally or through the superintendents of fleets, ought to make it clear to the drivers that the owner is apt to be held responsible if the drivers gang up their trucks with other large vehicles. There is no offense more inexcusable or a greater menace than to find two or three large vehicles traveling along in close proximity to each other, so that the faster traffic, instead of having a simple problem of passing one large motor vehicle has a group to negotiate without space enough to get in between any of the trucks in the line.

States have laws about this. They are usually broad expressions to the effect that traffic must be spread out enough to allow a roadway for everyone. The offense has become common. It happens not only with trucks, but also frequently with large busses. It must be corrected. It appears that it is the owner's duty to so correct it by his orders, because he has the power to do so without actual enforcement, whereas the State in order to accomplish the same result might find it necessary to use its police forces. Owners should take this into consideration, and if every one of them was to see that this simple direction to their drivers is heeded and carried out, a decided change for the better in highway accidents should be at once apparent.

It is of course a temptation for drivers who belong to the same organization to travel along together, to stop at the same place to eat or sleep on long runs, and the owner is the only person who can by direct orders bring a stop to the consequent tendency on the operators' part to drive too closely together. Unless direct orders are given and enforced by the owner it soon becomes a natural manifestation of psychological reaction in the mind of a commercial motor vehicle operator that he

may impose upon the rest of the traffic because he has a large and heavy vehicle with which it would be disastrous for smaller vehicles to collide. In the colloquial he "hogs the road", usually without realizing that he is doing so. This tendency needs to be fought and the owner is the man who can fight it the best.

Keeping to the Right

Unless the owner insists upon his driver keeping to the right side of the road and not riding its crown, the tendency to drive toward the middle will express itself. Highways are now constructed so that on the main roads at least there is no reason at all why a commercial motor vehicle should not keep strictly to the right hand path. This is especially true on four-way roads, yet that is the very place where observation shows the offense of riding the crown, or where the crown would be if there was any, is the commonest. There should be strict orders that there is to be no imposition on the rest of traffic, that the commercial vehicle is to be driven to the right of the road and a free passage allowed for all following and passing traffic, without need for signal wherever that can be accomplished. The driver of a commercial vehicle soon gets into the habit, unless he is watched or watches himself, of sticking to his course and letting other people turn out for him. This is the easiest action and consequently the commonest. A driver who gets into the habit eventually loses all of that consideration which is reasonably expected of him and imposes himself upon traffic. The owner has the authority to stop it, so it is his duty, but also it is the State's duty to see that it is done. To accomplish it by state action means a disagreeable use of police and enforcement, all of which the owner can save.

It is a common performance to find the operator of a large commercial vehicle helping to direct traffic, that is, signalling one to come on from behind, or showing in some manner that he is aware that there is a following vehicle and will permit it to pass. This is commendable and useful. At the same time, the following operator needs to realize that after all it is his own judgment that is to control, and that what the operator of the commercial vehicle is extending to him is courtesy and kindness and not direction. There is no responsibility taken from the following driver because he chooses to accept the suggestion from a commercial operator.

Equipment

The machinery of trucks, their operation and equipment, including mirrors, reflectors and outfitting in general is good, yet there are altogether too many cases where by reason of the construction of the cab on the truck, or by the manner in which the truck is loaded, the operator's view to the rear is obscured. Here again is an owner's duty. He must see that his trucks are legally equipped, that the loading is so carried on that all the equipment is available, and if he does not do that, it ought to be his legal peril and not the peril of the operator. Mirrors are possibly one of the most useful bits of equipment yet devised for safe operation, but an even better signal might be devised for certain large and wide commercials if engineers could be induced to give thought to the use of the selenium cell. By means of it possibly a following car might by the reflection of lights or use of the horn on this cell, make a contact, so that a bell or a buzzer might be set off in the driver's cab. Whether that is a practical suggestion or not, I do not know, but it seems as though something of the sort might be devised. Certainly an amplifier arranged with a reception at the rear of the truck would not be too expensive, and would make it possible to invariably hear the horn of a following car.

Proper Parking

There are other details of fleet truck operation in which drivers ought to be instructed by owners, and directions given and insisted upon as a part of successful

commercial motor vehicle operation. Among these may be mentioned that the owner ought to see that he loads and reloads off the highway so far as that is possible, and that where it is necessary for his truck to stand in the highway for any purpose, that he takes a place which is convenient for all the rest of the traffic, and stays for as short a time as is necessary. At least he ought to place his vehicle so as to be the least possible nuisance to others. Parking of a commercial motor vehicle is a bad situation while the driver rests, or for any purpose at all, is another dangerous practice. It happens too often. Instructions ought to go through the discussion of where it is dangerous to park, and talks given against it.

Tired Drivers

One particular and more modern difficulty than the others is the over exertion of drivers which is permitted by some owners. There have been many instances in the last few months where commercial motor vehicle operators have gone to sleep on long runs, due unquestionably to over exertion and lack of rest. While it is undoubtedly the case that the owner has not in any instance directed his men to drive for longer than definite safe periods of time without rest, yet he may have made it possible through some form or other of profit sharing trip payments for men to do more driving than they ought at one stretch.

The State holds the owner responsible for that. Extensive investigations into this subject are now going on and while it is expected and hoped that it may not be necessary to impose hours of labor upon any industry, yet the safety of the public at large is of such importance that the matter must be fully considered. So if owners themselves do not take cognizance of this situation and do as they ought about supervising the hours which men are allowed to drive, it is fair to assume that the public will demand that legislatures take action. It only needs one or two more serious accidents caused by some worn out and tired operator who is trying to make an extra dollar, which of course is praiseworthy in itself, but dangerous under all the circumstances of the case. It is neither for safety nor economy that such practices should be allowed to continue.

Duties of Drivers

Now, having set forth the general duties which appear to be enforceable by a State upon its fleet operators, a few words may perhaps profitably be said about the driver himself.

The State requires of him principally that he be a man among men, that he not only do his own work well and capably, but that he consider the human elements which enter into operation in traffic, that he be constantly aware that he will meet with all sorts and conditions of persons who have all kinds of reactions, running from over-confidence on the one hand to fear on the other, and that he be such a man himself as to be able to cope with the problems presented by all these people in a manner which is successful and right. This sounds like a big prescription, but 85 out of every 100 people are capable operators. There are only about 15 out of every 100 for whom the commercial vehicle operator has to look out. He needs to be able to help them to take care of themselves. At any moment he is apt to meet a car driven at an unreasonable fast rate of speed or one which is going slower than is reasonable. In either instance an immediate problem presents itself which he must help solve. There are many complications and emergencies which are sure to occur on every trip so he must be the kind of a man who can meet those emergencies and still preserve his equanimity, and continue to be a safe driver himself.

To put it concisely, he must not be nervous or too complacent and easy going. He must come within the safe average, and have in his makeup those particular elements of consideration for others which are especially imposed upon him by the kind of a vehicle which he has to operate. In general, the State expects him to obey all the laws, and his obedience to those laws, again on account of his peculiar type

of vehicle compared with others, must be more exact, more pains-taking, and more careful. There is not so much leeway provided for him by enforcement authorities as there is for the pleasure car. In the first place, his vehicle usually has been, and still is, restricted as compared with pleasure cars, so called. It is either bigger and heavier, and usually wider, or on account of its body, built for specific purposes, less manageable than the pleasure car, all of which he has to remember. So State authorities have arrived at a frame of mind where they expect more of a man who has limitations and restrictions upon the vehicle which he operates, than of those who have none. That is an anomaly, but of course it is true.

A handicap in traffic on account of the type of vehicle which is operated calls for additional qualities in the driver. The driver has to make up for those things which the vehicle cannot do, and the only means provided is to use his brains and be even more alert and wide-awake than the average driver. A truck driver has to be more or less a superhuman driver. He always is a better driver than the hit and miss man who poses as such. As compared with the ordinary operator of a pleasure car who never has driven a commercial, he can afford to look down as from a pinnacle upon all those who go by him, sometimes with disdain, priding themselves upon the quality of their high priced cars, and yet constantly committing driving faults which he not only will not be permitted to do, but which he knows better than to do.

On statistical information, it appears that commercial motor vehicles in proportion to their number as compared with pleasure cars and all other vehicles of every kind, are less and less involved in difficulties and accidents: There is a steady improvement and a downturn in the line of disasters, and an upturn in the line of accomplishment. This is because of the very fact that it is harder to drive a commercial motor vehicle than it is a pleasure car, that the difficulties which beset its operator are greater, and that consequently the drivers have been educated and brought up to a point of better accomplishment than the pleasure car driver. The result is shown. It is attributed sometimes to the fact that the commercial vehicle operator is under two controls. He is the agent of the owner and under his control as well as that of the State, while the pleasure car operator is going his own sweet will with only the State to watch him. But that is not the reason. The reason is, of course, that the necessary duties of the commercial operator call for a higher type of performance, and he has had to learn and has learned to carry through.

It would be very easy to make a long list of specific duties which a State might require of its truck drivers. This would include many specific precautions for both moral and legal obedience to rules. It is unnecessary to go into those. Every man knows what they are and knows within himself how closely all those whom he represents obey them, or causes them to be obeyed. Every rule and law which exists is probably necessary. There is supposed to be reason behind each and none ought to be disregarded. Among the many laws provided for owners and operators, there are one or two which are especially honored in the breach. One in particular, is that for keeping markers on trucks clean and in shape. A driver ought to be made responsible for seeing that this is done, or in other words, the driver owes that duty to the owners who cannot be expected to run around to see that his markers are clean. The driver ought to report at once any lack of equipment or any accidents to any part of his equipment, to windshield wiper, his reflectors, his lights, his markers or his brakes. If he knows about those, and does not tell his owner, and has no inspection made, there might be a serious question as to the criminal negligence in event he had an accident, and enforcement might probably be against him.

To close this paper, it may be well to generalize for just a moment. While it is admitted now that commercial operators are probably the best of all, whatever the reason may be, yet there are plenty of ways in which they can be better. The main object of this paper is to show that commercial operation is usually a joint action. Even where an individual operates his own car, there are two capacities related to

each other, one as owner and one as commercial operator. Those cars which are the most difficult to handle and the greatest problems in traffic are usually the big commercial motor vehicles owned by firms, corporations and individuals and driven by hired operators. There ought to be a very distinct and determined attempt to segregate the duties of the owner from those of the operator at law so that enforcement by a state can in the future be free from injustice to operators for what is the owners' fault, and to owners for what is the operators' fault.

In the time I have left, I shall talk about the driver. What we require of a driver is just this, in a nut shell. He must be a man among men. He has got to have those personal characteristics which are necessary to look out for himself and for the rest of the traffic, because he is proceeding under a tremendous advantage over the rest of the traffic in its ability to do damage. He has a larger vehicle, or a vehicle with a body built so it is a handicap to drive it. And as was said by the earlier speaker, we are going to demand more of the truck operator and of the bus operator than we do of the ordinary operator. We are going to require his qualifications in a very much more specific manner in the near future. We are going to see that he is the kind of a man the State ought to permit on the highways, of whom in the case of the passenger carrier, taxicab man or bus driver, his public need not be afraid.

In the case of truck drivers, to some extent the same thing is true, but in any event, it is essential that he be courteous and make allowances for the rest of the traffic.

It would be very easy to make a long list of specific duties which the State will require of its truck drivers, and this, of course, will include many moral obligations as well as a lot of specific legal ones, but it is not necessary to do that if, as I say, the owner takes his part of the responsibility, and the driver takes his; there is no reason why increasing perfection among motor vehicle operators of commercial vehicles shall not come and come very fast.

I want to admit and frankly that I consider the commercial motor vehicle driver better than the driver of the pleasure car. I think the fundamental reason why that is so is that he has to be. He has to realize the troubles of others on account of the vehicle he controls, where he has a schedule to follow, and a definite route to take, and he learns consideration and kindness. It is not an uncommon thing at all to find splendid drivers of pleasure cars who have been in the past drivers of commercial motor vehicles.

I once had an experience with a truck driver. In those days we hadn't much in the line of roads. I had been appointed only a few months and had issued a few manifestos in the newspapers and things of that kind.

I was going to New York and driving pretty fast, part of the way on the wrong side of the road. I went around a curve very quickly. It was very early in the morning, somewhere about 4:30, and there in my path directly ahead was a little truck coming the other way, driven by two young men. They gave a startled look at my old yellow car and fled—went right out of the road and over into the meadow.

I got out and hustled back extracting cigars to give them. I deserved a real good talking to; I expected to get it, and in language which would be understandable if rude.

This truck driver said, "Say, old man, that is not being done this year. We have a Commissioner who won't stand for it."

CHAIRMAN HORROCKS: Thank you, Mr. Commissioner. Before discussion, I should like to ask a question though not directed particularly to the speaker. To just what extent are reflectors being used on motor trucks?

I. F. JONES (The Independence Indemnity Company, Chicago, Ill.): Here in Chicago during the last six months, we have been quite successful in having fleet owners equip their trucks with reflectors or "targets." We find that lanterns or stop lights are not sufficient for stopped vehicles to be detected in time by vehicles following

them to stop and avoid accidents. We find that the use of the reflector or target offers a great deal more security, and that it can be seen at a greater distance.

A big help we found in preventing trailer accidents on the highways is painting the canvas similar to the approach to a railroad track. This has been very helpful. Reflectors, I now understand, are used by most industrial trucks throughout Indiana.

CHAIRMAN HORROCKS: I would like to introduce Mr. Jack V. Scott of the National Safety Council Staff, who will describe some new activities of the Council.

JACK V. SCOTT (National Safety Council): The Delivery, Taxicab and Bus Section has grown this year until it is now the largest among the National Safety Council's thirty Industrial Sections. Just a year ago, the membership was about 450 fleets with an estimated 100,000 trucks. Today the membership is nearly 1,000 fleets, with an estimated total of 300,000 trucks. That increase is due principally to a new Vehicle Membership which includes several new features that were brought out during the past year.

Best known of those features is "the Safe Driver" magazine for vehicle operators. Also outstanding is the No-Accident Driver Award. The Award is a small emblem which is given to the drivers of member fleets who can qualify with a year's record of no accidents of any kind. In the first six months, we distributed approximately 700 of these to drivers throughout the country.

CHAIRMAN HORROCKS: The Nominating Committee which will name officers for the coming year is composed of Mr. Robert Clair, Chairman, Liberty Mutual Insurance Company, Boston; Mr. A. F. Waite, Green Cab Company, Cleveland; and Mr. Dale Harman, Yellow Cab Company, Kansas City. They will report tomorrow morning.

ADJOURNMENT

Wednesday Morning Session October 14, 1931

T. A. HORROCKS, Chairman

Minnesota Truck Owners Association, Minneapolis, Minn.

The second session of the Delivery, Taxicab and Bus Section convened with General Chairman T. A. Horrocks presiding.

CHAIRMAN HORROCKS: The first item of business is the election of officers for the ensuing year. Mr. Robert Clair of Boston, chairman of the Nominating Committee, is not present and Mr. W. C. Washburn of New York City will read the nominations.

Report of the Nominating Committee

W. C. WASHBURN (New York City): Mr. Chairman, your Nominating Committee is pleased to present the following list of officers for the Delivery, Taxicab and Bus Section:

General Chairman—MARCUS A. DOW, Greyhound Management Co., Cleveland, Ohio.
Vice-Chairman—Delivery Fleets—J. J. ZEITNER, Continental Baking Co., New York City.

Vice-Chairman Taxicab Fleets—BENJAMIN SAMUELS, Yellow Cab Co., Chicago, Ill.
Vice-Chairman Bus Fleets—MOSS PATTERSON, Oklahoma Transportation Co., Oklahoma City, Okla.

Secretary & News Letter Editor—RICHARD LEONARD, The Taxi Weekly, New York City.

Engineering Committee Chairman—G. F. C. TAYLOR, Shell Eastern Petroleum Products, Inc., New York City.

Membership Committee Chairman—C. V. WELLS, Pillsbury Flour Mills Co., Minneapolis, Minn.

Poster, Slides and Safety Kinks Committee Chairman—H. V. SCHREIBER, The Capital Traction Co., Washington, D. C.

Program Committee Chairman—E. R. ALDEN, Vacuum Oil Company, Inc., New York City.

Statistics and Contest Committee Chairman—A. E. LUNDSTADT, Bowman Dairy Co., Chicago, Ill.

Chairman Publicity Committee—AUSTIN W. STROMBERG, Power Wagon, Chicago, Ill.

Executive Committee—THE OFFICERS AND

ROBERT CLAIR, Liberty Mutual Insurance Co., Boston, Mass.

A. A. CLARKE, General Baking Company, New York City.

H. L. CUMMINGS, Yellow Cab Co., Richmond, Va.

DALE HARMAN, Yellow Cab Co., Kansas City, Mo.

T. A. HORROCKS, Minnesota Truck Owners Ass'n, Minneapolis, Minn.

H. A. INNESS-BROWN, The Taxi Weekly, New York City.

T. R. JOHNSON, United Parcel Service of New York, New York City.

A. F. WAITE, The Green Cab Co., Cleveland, Ohio.

J. G. WILLIAMS, Nat. Ass'n Taxicab Owners, Chicago, Ill.

That completes the list of the nominations and I move, Mr. Chairman, that this list be adopted.

(The motion was seconded.)

CHAIRMAN HORROCKS: Gentlemen, you have heard the report of the Nominating Committee regularly moved and seconded. Is there any discussion on the adoption of the report? If not, please signify the acceptance of the report by saying aye. Opposed, no. The motion is carried.

I think that we are particularly fortunate in having Mr. Dow to head the section for the coming year. Most of you know that Marcus Dow has spent almost his entire life in the cause of safety and that he is a past-president of the National Safety Council.

I trust that every member of the organization will give these officers the utmost support and inspire them to even greater efforts than the section has made in the eleven years of its existence. It gives me great pleasure next to introduce Dr. Lauer.

The Selection and Training of Vehicle Operators

By ALVHH R. LAUER, Ph. D.

Associate Professor of Psychology, Iowa State College, Ames, Iowa

In accepting the invitation to address this body of men, I scarcely realized the great responsibility which devolves upon such obligation. It will be extremely difficult to take you through three years of study in the brief period of thirty minutes. Unless some retrospective account of the work is presented you will hardly be in a position to appreciate fully the nature of our studies and their relation to the problem of highway and general safety. Consequently, I shall first tell you something of the background of our researches. We shall then proceed to the methods devised for measuring capacity for motor vehicle operation, and finally we shall consider some of the applications to the selection of automotive operators.

Most of you are men out in the field who know the problems of vehicle operation first hand. It is not necessary to call your attention to the enormous loss in life and property resulting from accidents. You are aware that the task of selecting drivers is a perennial one and that it is complicated by many related circumstances. To set up specific methods which would apply in all situations would be next to impossible. On the other hand there must exist certain basic principles which may guide us in handling any given situation. The primary aim in undertaking this research was to seek out, describe, and render serviceable such basic principles. If you will keep this point in view during the first part of this address it will help "break the ice" for the applications which are to be given later.

The problem of safety in connection with motor vehicle traffic has been a rapidly growing monster to the general public as well as to industry. The National Safety Council has been largely responsible for calling our attention to the accident situation as a whole. Everyone is familiar with his immediate problems but his opinions are likely to be dominated by local conditions. If few accidents occur during a given period, he feels the situation is getting better everywhere. If many accidents occur he feels that it is getting worse. These are purely local conditions which fluctuate with the seasons, the condition of traction, the nature of the driving, and many other factors.

Before going further it might be well to point out the reason why psychologists have become interested in the problem. Modern experimental psychology is quite different from the post-war attempts to classify men solely by analogic tests. Behavioristic psychology has taken for its data the overt or observable types of human behavior. Whether that behavior be driving an automobile, laying bricks, running a milling machine, operating a drill press, writing a life insurance policy, selling a suit of clothes, proposing to a girl friend or what not, makes little difference. It suffices that the datum is human behavior which automatically allocates it in the field of psychology. The psychologist is interested in the responses of persons to certain stimuli or situations. The reaction hypothesis is stated that for every stimulus there is a response. A corollary of this hypothesis is that one response predisposes the individual to react in the same way a second time. Thus our prone-to-accident drivers are perhaps the combined product of heredity and training.

The psychologist is thus a human engineer who attempts to use the known facts to predict future conditions. The engineer is interested primarily in the physical, mechanical, or economic aspects of safety while the psychologist is interested in the human side. The two supplement each other very well and the psychologist who goes far into the physical field becomes an engineer, while the engineer who goes too far on the personnel side becomes a psychologist. Training always limits the value of generalizations outside of one's field.

Again it was the National Safety Council, and specifically Sidney J. Williams, who pointed out the importance of the human element in accident causation. Safety devices were of no value if removed by the workmen. The best brakes are useless if not applied in proper time. Stop signals are of no consequence, if not observed by motor vehicle operators.

Pioneer studies of street car operators were made by Munsterberg. Recently, Dr. Bingham and Dr. Slocombe have made much more complete studies and with much better results. These researches have convinced even the most skeptical of the need for studies of accident-prone individuals in order to formulate principles from which we may devise selective measures of automotive operators.

It was in 1926 that the First Hoover Conference called attention to the lack of uniformity in traffic regulations throughout the country. They also recommended standardization of licensing laws and examinations. However, no one knew the differences between good and bad drivers and the National Research Council appointed a committee to ascertain the causes of traffic mishaps. The problem was delegated to the Division of Psychology and Anthropology under the general title of "Psychology of the Highway." This was broad enough to include the reactions of the individual to internal as well as to external stimuli.

The project was launched at the Ohio State University with Dr. A. P. Weiss (recently deceased) as chairman. It happened to be my good fortune to assist Dr. Weiss in the initiation of the project. We began by making a study of traffic conditions and by collecting various licensing practices from all known sources. Also analyses of accident statistics by the National Safety Council proved very valuable in giving suggestions as to the best means of attack. Our first step was to systematize and group the causes of accidents under tentative headings in order that further specific evidence might be accumulated. This process was a progressive one and I am not sure that we had all of the factors given here in our original list. At least, the method of attack will be better understood when we consider the possible causes of accidents. A few will be listed here.

1. Poor coordination or manipulative capacity.
2. Tendency to become excited easily.
3. Low state of attention. This might be caused by
 - a. Ill health.
 - b. Low mental capacity.
 - c. Absent-mindedness. Often associated with high intelligence.
 - d. Failure to realize the seriousness of the danger.
4. Inferior sensory equipment.
 - a. Refractive errors of vision.
 - b. Retinal disturbances. Such as night blindness, color blindness, presence of lacunae, etc.
 - c. Muscular imbalance and muscle strain.
 - d. Restricted field of vision.
 - e. Poor hearing.
 - f. Natural anaesthesia or numbness.
5. Inferior perception or interpretative ability.
 - a. Lack of appreciation of distance and speed.
 - b. Inability to allow for the possible movements of pedestrians and other vehicles.

- c. Tardiness in observing signs and markers.
- d. Failure to recognize mechanical maladjustments of the vehicle.
- 6. Bad habits of thinking.
 - a. Lack of road or traffic ethics.
 - b. Failure to consider the dangers of driving and to be prepared for an emergency.
 - c. Tendency to get even or to beat the other fellow.
 - d. Perseveration or the tendency for thoughts to continue in consciousness.
 - e. Willingness to take a chance—a gambling tendency.
 - f. Lapses of consciousness due to epilepsy, etc. A cessation of thinking.
- 7. Lack of information.
 - a. Of the limitations of the vehicle driven.
 - b. Of traffic regulations.
- 8. Lack of intellectual capacity and judgment.
- 9. Recklessness.

The latter term is quite often a "catch-all" for many of the other deficiencies listed above. Recklessness, in a strict sense, is better described by its synonym carelessness. An indifferent attitude, lack of responsibility and the "devil-may-care" type belong to this group. We are prone to include all classes of poor drivers in this group. Our studies indicate that most so-called recklessness can be traced to one or more of the above causes. Let us consider an example.

A large company operating a fleet of trucks had us study their drivers. One man about 58 or 60 years old had been having a series of accidents. One day when driving in heavy traffic he crashed into the rear end of a street car. Witnesses of the accident said he was just "..... careless." He was looking off to the side and ran deliberately into the street car. He was considered a valuable man to the company in other respects and was known to be very much interested in his work. Upon investigation we found that his field of vision was very much restricted; i. e., he could see relatively a small area directly in front of him. When looking ahead the movements of cars coming alongside were obscured. Consequently it was necessary to turn his head to see at the side. Traffic was moving and in order to safeguard himself it was necessary to notice the vehicles moving parallel with him. While doing this the street car stopped and he struck it. This man was too careful rather than careless.

Another driver had always been hit in the rear by other cars. Of course it was not his fault! The other drivers were to blame. He had never hit another car. Upon investigation we found that he could not judge distance. Moving along in traffic at a moderate speed he would get very close behind vehicles before noticing the danger. When traffic slackened speed he was adept enough to stop his truck without danger to the car ahead but with frequent disaster to the car behind.

These two cases will illustrate what I mean by the statement that most recklessness can be analyzed into one or more specific disabilities.

The above list of causes of accidents is by no means complete and there is some overlapping. It served as a basis for the inauguration of experimental studies and has been shown to have scientific validity by actual results which I shall present at the close of this address. Our first task was to set up experimental techniques which would measure or differentiate individuals with respect to these traits, then to determine which of the traits had anything to do with driving ability and particularly freedom from accidents. This, in a sentence, constituted the core of our problem.

There were three possibilities of approach to the study. The first was that of pure laboratory methods, the second a semi-laboratory method using a miniature field similar to that used in the army, and third the standard road and field tests of driving. When investigated further we found that the average driver has an accident only every 14.20 years while even prone-to-accident drivers (this list included all drivers who had one accident) could get along for 4.01 years without trouble.

Obviously we did not expect to live as long as Methusala and the field tests had to be abandoned. Automobiles would be obsolete before we could gather enough information to be of value. The small field had possibilities but it is hard to administer to a large number of persons, and the expense connected with it rendered the plan impractical at the time. After much study we devised a coordination apparatus.

While primarily a measure of coordination, the apparatus can be used as a test of vision, perception, emotional stability and other factors important to driving ability. In many cases measures of these particular capacities or abilities have already been developed and were available for use. I have particular reference to techniques to diagnosing defects of vision, measures of intelligence and to some extent emotional stability.

Without going into detail I shall now show you the possibilities of the proper application of these types of tests. In the first place they obviously have their limitations. Accidents are caused by a number of factors, and accident-proneness, like illness, can only be reduced and not completely eradicated. Our general formulation is that each driver should be analyzed and shown his weaknesses. If he has too many we had best not hire him. If he has some (and all of us have) he should have specific training along these lines. In other words we are sure that proper analysis of drivers' abilities will result in a substantial reduction of all accidents.

In summarizing the important points to be considered in the selection of drivers a number of factors need to be considered. It is essential to have someone on the job all the time. That individual must be trained in the best methods of analyzing human behavior in general and must be able to devise new techniques to meet new situations. Dr. Snow did some very excellent work with the Yellow Cab Company a few years ago in this city, although there are some who may not have been in complete sympathy with the methods. Having lived in the city at that time I remember the high regard we had for the drivers of this company. No doubt the effects of the work are still operative to some extent. The reason for having a trained man on the job is two-fold. In the first place new problems are constantly arising. In addition to this the effect of changing methods and continued studies of drivers on the job tends to keep them out of trouble. It seems fundamentally absurd to assume that "once a good driver always a good driver." Also a company that carefully selects its employees is not flooded by a host of unqualified applicants.

Another thing we must consider is, what shall be the qualifications of a good driver? Below are some of the items which can be quite adequately measured and which seem to be necessary to safe commercial driving. Of course, one may have some defects and drive his own vehicle for pleasure with little danger so long as he recognizes his limitations, but the driver who must get out and earn a livelihood by his driving must be free from these handicaps.

1. Manipulative ability average or above. When speed is a factor the upper 25 per cent only should be selected. This can be measured by means of the coordination apparatus above referred to and described in a bulletin on "Psychological Principles of Automobile Driving" published by the Ohio State University Press.

2. Visual acuity should be good but need not be perfect. For taxicab work the driver should have at least 80 per cent vision after correction. It is fundamentally important that the eyes be balanced in acuity. If one eye is weaker than the other there is danger of strain. For truck drivers perhaps a good man might get along with 60-70 per cent vision. Regular optometric measures are everywhere available.

3. Color blindness has not been found by us to cause a large number of accidents directly. It may be a handicap however and even one serious accident averted for a company would well repay the precaution of making this simple test. Approximately one-third of persons who fail on this test cannot discriminate traffic lights.

4. Muscular unbalance and any tendencies toward heterophoria such as "cockeye" or "crosseye" should be rigorously discriminated against. This was found to be very significant. The Maddox red test can be used in the absence of better measures.

5. The field of vision must be normal. Restricted field was found to be highly associated with accident-proneness.

6. The driver should be emotionally stable. These tests are rather involved and cannot be described in detail here.

7. On the whole the better educated individuals have fewer accidents. There are notable exceptions to this rule but if an applicant were of questionable caliber and were illiterate his chances of overcoming deficiencies would be much less. We have not decided the lower limit of education but certainly high school graduates should be given preference.

8. Closely related to the above is the matter of intelligence. We have found that there is danger at both ends of the scale. Some are too intelligent to drive cars while others are not intelligent enough. Based upon the Detroit Intelligence Test an individual should have at least an I. Q. of 85. An operator should be about normal (95-100 per cent) to be most successful. The chief worry of transportation companies is of getting those with low intelligence. They will have few applicants with too much intelligence.

9. The applicant should not have strong prejudices concerning religion, race, or nationality. A scale for measuring certain tendencies of this type is being worked out at present. (A sample copy of the general plan may be had on application.) Mark the scale very rapidly, then see if you have more than an average amount of extreme values. If you do you have more prejudices than average. Also note your tendencies on the items relating to running over snakes, chickens, etc. Much information can be gleaned from these sheets that the person would never tell through direct questioning. It will probably show more about the driving habits of the individual than you could get in any other way. This scale is being extended.

10. The applicant should be thoroughly familiar with the type of vehicle he is driving. We have found evidence of perseveration, as noted by Drs. Bingham and Stencombe among street car operators, in automobile driving. A man accustomed to driving a Ford cannot handle a Pierce-Arrow or large bus equally well. Companies should not transfer men from one type of vehicle to another.

11. The driver should be thoroughly familiar with state and city ordinances.

12. Home conditions often distract and handicap the otherwise capable driver. Information regarding health of family, as well as domestic and economic relations is essential. It may seem unfair to discriminate against a man with illness in the home but he must at least be made to realize the handicap is a source of danger.

13. In general we have found active males of average health and size between the ages of 23-35 to be the best drivers. Drivers under 20 are inclined to take chances while those over 35 may have inadequate training, be handicapped by ill health, etc. So far as age alone is concerned we find some correlation, but blood pressure and physical conditions would perhaps be a safe index as to upper age limits.

In closing I wish to say that no one has said the last word on the selection of drivers. Many things remain to be studied and companies inaugurating such work will find new criteria of driving in their own fields. The above 13 items will serve as a good starting point and we feel confident that at least 50 per cent of all accidents due to personal factors could be eliminated by rigid application of these principles in the selection of drivers. The results however will be no better than the training of those administering the principles, as Mr. Williams has already voiced on other occasions. If the suggestions and explanations herein given will in any small way benefit this group I shall be well repaid for the efforts put forth.

Very little has been said directly concerning the training of drivers. It is of course fundamentally important to diagnose the difficulties before any education can be done. It is our opinion that a live safety director will be able to get across the necessary information to keep a driver out of trouble if the real cause can be discovered. Any training program must be more or less individual to be effective. Any general program of routine training will lose its value if not varied constantly.

We have a form, "Implicit Reactions, Ways of Thinking, Mental Ways of Thinking and Intelligence and Attitude toward Law and Order."

If any company wants to use them (now I am not offering them as a cure for your ills) we will be willing to send you on request, enough copies to give out to your men and we will send you back the best account of the individual that we can.

CHAIRMAN HORROCKS: We are very much pleased Dr. Lauer, with this demonstration and the presentation of this very interesting subject.

We now will consider a proposal, which, in my opinion, is one of the most important new activities of our Section. We should know just what progress our fleets are making in accident prevention. Mr. A. E. Lundsteadt, Chairman of our Statistics Committee, and he will now present his report. I wish that Mr. Lundsteadt, in addition to outlining the proposed nation-wide Fleet Safety Contest, would first give us a brief report on the commercial vehicle accident experience during 1930.

Commercial Vehicle Accident Experience During 1930

By A. E. LUNDSTEADT

Bowman Dairy Company, Chicago, Ill.

There were two important developments in our commercial vehicle accident statistics last year; (1) an increase of over 300 in the number of fleets reporting their 1930 records to headquarters and an increase in vehicles operated of over 12,000, and (2) the publication of Safe Practices Pamphlet No. D-4 which explains how to keep and use vehicular accident records.

A uniform method of recording vehicular accidents is absolutely essential for the development of reliable statistics and the plan recommended in Safe Practices D-4 should be considered by every member of this section. The general adoption of this plan will aid us in measuring the progress of the section in accident prevention work, and will provide facts which will guide our efforts most directly and effectively. The traffic accident problem is becoming so serious that we should know all the facts about every accident in which our vehicles are involved. This means carefully kept and complete records by each member. The statistics of our section are developed from individual fleet records, and consequently, they are only as reliable, complete and uniform as the records on which they are based.

By adopting a single method of keeping records we can avoid the confusion and false comparisons which have occurred from time to time among industrial plants when records were kept on different bases. When a member is discussing his record with another, both should be talking the same language. Each should understand, for example, that the standard definition includes any accident in which the vehicle is involved whether in motion, temporarily stopped, or which results in (1) personal injury, (2) property damage, or (3) both, regardless of who was hurt, what property was damaged, or who was responsible.

All comparisons are made on the basis of accident rates; this is very essential because it allows fleets of various sizes to compare their experience on a common basis. Two rates are now being used—one the number of accidents per 100,000 hours of operation and the other per 100,000 vehicle miles traveled. The mileage basis is becoming generally preferred.

As I have indicated, we received 1930 reports from 369 fleets with almost 20,000 vehicles in operation. In this connection I want to acknowledge the splendid cooperation of certain local safety councils who helped in the collection of data by submitting vehicular accident reports of their members. Of these, 248 fleets with 10,000 vehicles reported on both the mileage and hourly basis. The number of reporters is considered sufficiently large to give considerable reliability to our accident experience. Furthermore, practically every type of vehicle in operation on the streets and highways of the country is represented among 1930 reporters.

For vehicles of all types, there were approximately 25 accidents for each 100,000 hours of operation. Horse drawn vehicles, represented by only five fleets, had the lowest rate, 18.58, and motor buses had the highest, 104.80. Among commercial trucks of all kinds, those engaged in the delivery of petroleum products averaged only 10 accidents per 100,000 vehicle hours, in comparison to a frequency rate of 43.0 for department stores, which was the highest of the group.

When vehicles of different types are compared on the mileage basis, however, the results are quite different. All fleets reporting on this basis had 7.77 accidents per 100,000 vehicles miles traveled. Horse drawn vehicles had twice the average rate and far above that for any other type of vehicle although you will recall that these same vehicles had the lowest frequency rate on the hourly basis. The experience of motor buses is much better on the mileage basis for they averaged only 8.2 accidents per 100,000 miles traveled in comparison, for example, with the much slower moving commercial trucks, which averaged 6.44. Of the fleets operating the latter type of vehicle, trucks delivering lumber and building materials had particularly good records, averaging 2.65 accidents per 100,000 vehicle miles operated. Delivery trucks of department stores, on the other hand, had the highest frequency rate, 11.21.

Records of individual fleets of the same type likewise show large variations. Among transfer, freighting, and trucking companies, for example, which made up one of the largest groups of 1930 reporters, there were 10 fleets, ranging in size from 2 to 10 trucks, which did not have a single vehicular accident during 1930. Among others, frequency rates on the hourly basis ranged upward to over 100, and, on the mileage basis, to over 20.0. The average frequency rate is 26.0 on the hourly basis and 3.42 on the mileage basis. Of the 42 fleets represented in this group, 33 had lower than average frequency on the hourly basis, indicating that the smaller fleets had better experience than the larger ones. Considering fleets of about the same size, 45 to 50 vehicles, for example, rates on the hourly basis vary from 7.33 to over 97.0. It is very probable that fleets not members of this section have higher rates than these. You can easily conceive the difference in the amounts of money spent for insurance and repairs between the low frequency and high frequency fleets.

To determine whether the section is making progress in accident prevention work from year to year can be determined only by the records of fleets that report every year. Since reports were collected on a large scale for the first time in 1930, we do not have a sufficient number of consistently reporting establishments to furnish reliable figures on reductions that may have been made by the section last year. With the large increase in reporters this year—an increase which we hope will be continued in the future—we expect to be able to check up on the results of our accident prevention efforts in the future with a high degree of reliability. Every member of the section, therefore, should support our statistical service by sending his 1931 report.

CHAIRMAN HORROCKS: I think the report speaks for itself, and for the tremendous progress that is being made in that direction. Mr. Lundsteadt, if you will now report on the proposed Contest, we will be glad to take that under consideration.

An Inter-Fleet Safety Contest in the Delivery, Taxicab and Bus Section

By A. E. LUNDSTEADT
Bowman Dairy Company, Chicago, Ill.

Safety competitions have proved an excellent means of attracting attention and stimulating and maintaining interest in preventing accidents. The idea of a game appeals to many employees whose interest and enthusiasm would be difficult to arouse

in any other way. Other sections—the Paper and Pulp, the Metals, Public Utilities, and Petroleum—have conducted contests with excellent results to members. In fact, contests have been a regular part of the activities of these sections during the last five years. The officers of this section feel, that, owing to the rapid growth of our group in the last year, a contest among our members would be of distinct benefit to those participating and would be an excellent means for stimulating interest in the work of the section itself.

Last August Chairman T. A. Horrocks appointed a Contest Committee, with myself as chairman, and including Marcus Dow of the Greyhound Bus Lines, A. F. Waine of the Green Cab Company at Cleveland, and W. C. Washburn of Sheffield Farms Dairy, New York City. We have recently added Lewis MacBrayne, of the Massachusetts Safety Council, where a fleet contest has been in operation for some time.

Tentative rules, of which you have copies, have been prepared for the conduct of a contest. These rules were drafted originally by the headquarters staff on the basis of experience in other contests. Our committee met yesterday and after considerable discussion we wish to make one or two changes in the rules as you now have them. I want to go through these rules with you, pointing out the suggested changes and getting your opinion on these and the other points.

Rule 1. The contest, starting January 1, 1932, and ending June 30, 1932, is open to all members of the Delivery, Taxicab and Bus Section, National Safety Council, operating five or more vehicles from a given location and on the public streets and highways.

We propose a six months contest, to start. We also propose a minimum limit on the number of vehicles of one type which can be entered, because of the advantage which a small group has by being able to establish a no-accident record which can not be overcome by a larger organization with four or five times as many vehicles. I think there is no serious question regarding the desirability of this rule.

Rule 2. (a) A vehicle shall be any conveyance, either gasoline, electric motor driven, or horse-drawn, company owned and used wholly for business. (b) A location shall be any garage or yard of a company. Two or more garages or yards located in the same or adjacent city blocks shall be entered jointly.

You will notice that horse-drawn vehicles are to be included. There are reasons both for and against this. It has seemed to us, however, that many companies that will be interested in this contest operate horse-drawn vehicles and that they would hesitate to enter a contest where certain of their drivers would be excluded.

Rule 3. The rules now in your hands provide that the contest shall be divided into divisions, as follows:

Bakeries	Laundries
Building supplies	Merchandise—groceries, meats, etc. (Wholesale)
Busses	Merchandise—groceries, meats, etc. (Retail)
Cleaners and dyers	Oil and gasoline
Coal	Public Utilities—service
Ice	Public Utilities—passenger
Ice Cream	Taxicabs
Dairy Products	Transfer, cartage and storage
Department Stores	General Industrial
Furniture	Other

You will notice in Rule 5 that this is not a binding classification but is set up merely as a possible guide for grouping. Your committee now feels, however, that it may be well to simplify the classification by combining the following groups: Laundries with Cleaners and Dyers, Coal with Ice, Ice Cream with Dairy Products, and Department with Furniture stores. We also suggest the elimination of the item "Public Utilities—passenger." These would be principally bus operations which can be entered along with other buses.

Rule 4. Each division shall be divided into two groups, each group containing approximately the same number of contestants. One group shall contain the larger and the other the smaller fleets.

This rule is proposed to enable large fleets to compete against each other and not give the small fleet the advantage. Furthermore, competition between fleets of about equal size is keener and creates more enthusiasm.

Rule 5. The National Safety Council shall reserve the right to combine any groups and/or divisions when the registered number in each group and/or divisions is deemed insufficient to sustain a contest.

This rule is necessary because it is impossible to know the number and size of the different types of fleets which will enter until registration blanks have been returned. If only 10 fleets are entered by cleaning and dyeing and only 12 laundry fleets, these could be combined into one group without any advantage accruing to either. The National Safety Council has found it necessary to provide this sort of a ruling in all of its other sectional contests and I think you will agree that it is desirable for us.

Rule 6. The winner of each group shall be the unit having the lowest number of accidents per 100,000 vehicle-miles operated at the conclusion of the contest. In the event two or more units are tied for first place in any group, the winner of that group shall be that unit, among those tied, operating the largest number of vehicle miles.

We originally chose the mileage basis for determining the winners because it is generally believed that miles traveled is a better measure of exposure to accidents than the length of time which a vehicle is in operation. The tendency to compute the occurrence of accidents on the mileage basis rather than the hourly basis is becoming more general among fleets owners and probably will become standard.

However your committee also believes that there are many fleets that could provide information on hours, but not miles. We are therefore inclined to recommend an hourly basis for this first contest. The provision made for determining the winner in the event of a tie is the one generally followed in industrial safety contests—the unit with the greatest exposure in accidents should be the winner.

Rule 7. "A reportable accident shall be any accident in which the vehicle is involved, whether in motion, temporarily stopped, parked, or being loaded or unloaded, which results in (1) death, (2) personal injury, or (3) property damage, regardless of who was hurt, what property was damaged, or who was responsible."

As you know, this is the definition of an accident now included in our Safe Practices Pamphlet D-4. There has been one serious objection raised to this definition, and that relates to counting accidents to a properly parked vehicle. Many think that counting such accidents tends to discourage the driver in charge of the vehicle because it is the sort of an accident which he could not possibly have prevented.

To serve this purpose and to get as simple a definition as possible we now suggest the following to take the place of that now given in Rule 7:

"An accident shall be any contact between a contesting company's vehicle and another vehicle, a person or an object, except where contestant's vehicle is properly parked.

If a contestant's vehicle runs off the road, it shall only be counted as an accident where damage or injury results."

While this definition sounds considerably different from the one in the tentative rules you have, please notice that the only important difference in meaning relates to the elimination of the properly parked vehicle.

Rule 8. Reports are to be submitted on a "Fleet Contest Monthly Report" form (to be prepared by the National Safety Council) and the definitions given on this form and in the contest Rules are to govern reporting. Obviously, the successful carrying on of this contest demands such a ruling.

Rule 9. Your rules provide that all questions will be referred to the Statistical Bureau of the National Safety Council, whose decisions shall be final.

Your committee understands that reports will be made to headquarters Statistical Bureau. We feel, however, that since this contest is a new proposition there should be continuous contact with a committee of the section—either the present one or a new one—to assist in meeting questions that are bound to arise. We therefore propose the following substitute for Rule 9:

"All questions will be referred for decision to the Contest Committee of the Delivery Taxicab and Bus Section."

Rule 10. A report for each month shall be filled out and mailed to reach the National Safety Council office not later than the 15th of the following month. Contestants whose reports are 30 days in arrears will be dropped from the contest.

A time limit on reports is essential in order that members may have the results from month to month as promptly as possible. I know of no reason why a company can not get its report in by the 15th of the following month.

Rule 11. All monthly reports are to be considered strictly confidential and identification will be by key number only. The final ranking of all contestants identified by name will be published when the awards are made.

Notice that this ruling, as it stands, makes monthly reports confidential but that at the end of the contest the final ranking will show contestants identified by name. After considerable discussion your committee recommends the omission of the second sentence, thus making everything confidential.

Rule 12. Suitable awards will be made to group or division winners by the National Safety Council at the Annual Congress.

Obviously, it would be impossible to say at this time just what these awards will be, but you are all familiar with the splendid awards that are made in sectional contests in other sections.

Rule 13. A monthly bulletin will be mailed to each contestant, summarizing the results of the contest to date and giving each member's standing.

This bulletin furnishes you with information which will put a punch in your safety program.

Rule 14. All registrations must be made on the "Official Registration" form and received at the National Safety Council, 20 N. Wacker Drive, Chicago, Illinois, on or before February 1, 1932.

Discussion

SIDNEY J. WILLIAMS (National Safety Council, Chicago): Some Sections have had great success with contests, and have developed a lot of interest by them. The average American will fight harder to win a prize, even if the prize is intrinsically worth but a nickel, than he often will to even save his own or somebody else's life. That seems to be our national psychology. Many of you are using contests already in your own companies and we hope you will agree that it would be desirable to institute a contest of this sort.

I might point out to you what seem to us the three or four important points in this report so that we may have the benefit of discussion on them. The first and most important item of all is definition of what constitutes an accident. We have had for years clear definitions of an accident, but when we come to the definition in our Safe Practices Pamphlet No. D-4 on fleet accident reporting, we find it has not been entirely satisfactory. The main objection is to the definition of an accident to a vehicle properly parked. If a utility truck, for example, is parked in a particular place and the men on the truck go into a building to make a telephone call or something of that sort, they may be away from the truck a few minutes. Suppose when they come out, they find that somebody ran into the truck and broke a tail

light or dented a fender? They don't even know who did it. They feel it quite unfair to charge such an accident against the driver.

It does seem there is quite a lot of truth in that and we discussed the matter of the definition in the conference of our Community Safety Council managers this week. As I think you know, quite a number of our local Safety Councils are conducting contests among fleets in their own cities and we publish those comparative records every month for the fleets in the different sections.

It is obviously important that we have a uniform definition of an accident to be used by this Section direct and also by the different city organizations. The local managers decided, after quite lengthy discussion, that they would favor a change in the definition to eliminate vehicles properly parked.

Now there is another type of accident on which there has been some question as to whether it should be counted or not and that is the question of personal injury to the driver of the vehicle when the vehicle is not in motion. An extreme case would be where the driver or helper is making a delivery in an apartment house and sprains his ankle in going up or down the building when he is a hundred feet away from the vehicle. Should that be counted as an accident in connection with that vehicle? There has been some difference of practice on that. Most of you would say that should not be counted as an accident in connection with the vehicle. A little more different case is where the driver or his helper is injured in getting on or off the vehicle after the vehicle is stopped at the curb, loading or unloading directly from the vehicle.

I quite agree with the action of your committee in deciding yesterday to substitute the definition Mr. Lundsteadt read to you, which I think was proposed by Mr. Dow and which was used by him in the work of the Greyhound Lines.

CHAIRMAN HODGKINS: Gentlemen, this matter has been given a great deal of thought by members of the Council's staff and also by members of your Statistics Committee. The committee felt that they would like to have the members of this section give their opinion or suggest any changes. Of course it is understood that this is the first contest and possibly there will be brought out certain weaknesses in the set-up as it is now.

C. V. WELLS (Pillsbury Flour Mills Co., Minneapolis): Mr. Chairman, that wording "properly parked" brings to my mind an accident that happened in Fargo, N. D. Our man pulled up to the curb and went into the store to make a purchase and while he was there his car rolled down hill and damaged another car. It seems to me that the thought of "properly parked" should be identified with the orders of the city or with regard to the brakes.

MR. WILLIAMS: Just off-hand, Mr. Wells, I should say that on either basis that car was not properly parked and was not so left or so parked that it would stay in position. The car should be parked so that it certainly complies with the law and also with the rules of the company. Somebody raised the question that some communities permit double parking. I have in mind one community that we thought was very foolish that permitted double parking for five minutes. My personal opinion would be that we shouldn't consider a car properly parked unless it is at the edge of the curb.

These are the kind of questions that will come up. They are coming up all the time in our Industrial Contests; they come up in anything of this sort, and we will just have to build up a body of rules as these things come up. The idea is that the car should be parked legally and safely and according to what any of you would consider good driving practices; certainly not so that it will run down hill.

MARCUS A. DOW (Greyhound Management Co., Cleveland, O.): It seems to me that you necessarily have to leave the interpretation of this rule to some extent, at least, upon the judgment of the concern that is in the Contest. For instance, this rule which has been adopted is one that I have worked under for about two years and found very satisfactory. Cases sometimes come up that raise the question as to whether or not the rule would apply to them. For instance, we had a very trivial

accident a short time ago. One of our buses observed a car coming from the opposite direction and it was zig-zagging along the road. The driver of the bus, in exercising his good judgment, immediately came to the conclusion that the driver of that car was intoxicated, so he pulled over to the shoulder of the road and came to a complete stop. He was standing still when the other car came zig-zagging by and scratched the fender of the bus. We came to the conclusion that the accident happened while properly parked.

I cannot too strongly recommend this idea to this group. We have certainly found it a tremendous benefit in our own company. It does imbue the driver with a great deal of enthusiasm if it is properly told him by the supervising committee and interest can be aroused which will have a very beneficial result.

E. A. DANNEMANN (Parmelee System, New York City): In the contests we run among our various garages, we have no exceptions at all, because it leads into so many ramifications and it is extremely difficult to determine the proper definitions.

There is one other point in this plan that I think should be discussed and that is the advisability of putting this contest on an hourly basis or a mileage basis. I discussed the tentative plan with my people before I left New York. They were inclined to go along with the idea providing it was established on a mileage basis. In our business, our vehicles certainly pile up a tremendous mileage and we feel they pile up more mileage proportionate to the working hours than other types of businesses.

DALE HARMON (Vice. Pres. & Mgr. Yellow Cab Co., Kansas City): There are points about which I would like to give you our viewpoints. First is the question of the driver's responsibility. One is likely to think that certain accidents should not be charged if it is the opinion of the company that the driver could not have avoided the accident, but if you try to do anything of that sort, you run into any number of border line cases.

For example, the car stopping for a red light at the intersection. As Dr. Lauer declared, we find drivers that have accidents of that sort, rear end collisions when the driver is stopped at the red light. It really is the fault of the driver that was struck because he stopped too quickly. He speeded up to that red light.

The other point of mileage ought to be discussed. You will recall in Mr. Lundsteadt's report, that the first proposal was to run the contest on a mileage basis and that is undoubtedly a better basis, I think. I think the committee decided on an hourly basis merely because they feared they would not be able to get enough fleets that would have the mileage data. Now, if the majority in the section today prefers to run this contest on a mileage basis, I don't think that the committee would object, would they Mr. Chairman?

MR. DANNEMANN: I wonder if it would not be practical to work rules on this basis. For instance, cab companies could operate on a mileage basis and another group on an hourly basis.

WM. C. WASHBURN (Sheffield Farms Co., New York City): In New York City, where cruising is at a maximum, it would not be fair to compare it with a smaller city where there was not the amount of cruising which there is in New York City. Every taxicab company can give you the mileage and I assume the same as buses can and there may be certain groups even now who put it on a mileage basis. The door should be open for certain groups who are more accustomed to the hourly basis, that don't have special speedometers to give you their mileage so that they can compete and not be excluded from the contest.

MR. WILLIAMS: Our first inquiries will be made very soon and will ask whether members could report on an hourly or a mileage basis and then it would be put up to the Contest Committee to decide what basis should be followed.

MR. DOW: To liquidate this, I would like to make a motion that the proposed contest be governed by the set of rules that have been proposed, that they be adopted in principle and referred back to the committee to work out.

(Mr. Lundsteadt seconded the motion and it was carried.)

CHAIRMAN HORROCKS: I want to take this opportunity of introducing to you the new General Chairman of the Section.

MR. MARCUS DOW: Of course, I am very much interested in the work of the Delivery Taxicab and Bus Section but unfortunately for me, in connection with General Chairmanship of this Section, my jurisdiction on the transportation system that I am connected with extends from the Atlantic to the Pacific Coast, over some forty-five thousand miles of highway, and of course I have a great deal of traveling to do. I am afraid that I am going to have to rely upon the headquarters of the Council to do a great deal of the major work in connection with it.

I hope however to be able to be in frequent contact with the headquarters staff and give them fullest cooperation. I want to assure you gentlemen that at least that is my intention. I hope that every member will take enough personal and individual responsibility to build up as great an interest in the work of this section as he can possibly bring about. I can assure you that I will certainly devote as much time as my company interests will permit, because I know that the reduction of accidents on the highways can only be effected by the united cooperation of those members who have interests of this kind at stake. Let's all work together during the coming year for the outstanding success of what I consider one of the most important Sections of the National Safety Council.

ADJOURNMENT

Thursday Afternoon Session

October 15, 1931

Joint Meeting of the Delivery, Taxicab and Bus with the Food Section

T. A. HORROCKS, Chairman

Minnesota Truck Owners Association, Minneapolis, Minn.

The joint meeting of the Delivery, Taxicab and Bus Section with the Food Section was called to order by T. A. Horrocks, General Chairman of the Delivery, Taxicab and Bus Section.

CHAIRMAN HORROCKS: The first subject that is to be presented this afternoon is a very important one. I take great pleasure in introducing Mr. F. C. Oldham.

Vehicle Maintenance—A Factor in Safe Distribution

By FRED C. OLDHAM

Safety Supervisor, Richards Storage Corporation, Grand Rapids, Mich.

Coupled with accident prevention, we usually find statistics, and there are those speakers who can reel off statistics by the yard. And this reminds me of what a newspaper friend of mine once said when he was giving a talk: "If all after-dinner speakers who quote statistics about this, that or the other thing, were laid end to end—the world would be better off." Statistics are undoubtedly very important in reaching a solution to a problem, or for finding causes and results of accidents in connection with safety and so on, but I know you are more interested in hearing common facts, coupled with as few statistics as possible.

Vehicle maintenance, as you know, should begin the moment a car leaves the factory. The manufacturer stipulates a moderate rate of speed the vehicle should be driven for a certain distance, and the principal reason for that, as I see it, is to keep the car in the best possible working order while being broken in and thus insuring longer life to the vehicle.

Vehicle maintenance is an insurance—a mechanical insurance—and is just as important from a safety standpoint as property damage and public liability insurance, or any of the other insurances you may carry on your car. It protects you against unnecessary items of expense that usually crop up when a vehicle is not properly taken care of.

Vehicle maintenance should be viewed in the same light as the Chinese consider their doctors. Chinese doctors are paid by their clients to keep them well. We pay our doctors to make us well—after we have become ill. We wait until we are sick, then call the doctor in and expect him to perform a miracle and make us well over night. The comparison with vehicle maintenance is obvious.

Our method is usually the most costly procedure of the two, and when you let your automobile or truck go so long that it hammers and knocks, and your tires are badly worn, or the car wobbles all over the highway, then you are running true to form with our modern way of thinking, and then you expect the garageman to make a brand new car out of a decrepit old wreck.

Just think how much more economical it would be, from the standpoint of the purse, and how much more productive to safety it would be, if you worked on the assumption that automobile mechanics are trained to keep automobiles and trucks in first class running order, than to leave it for them to doctor the cars up after they had all gone to the dickens.

Now when I refer to car, we are going to use that to cover either a car or a vehicle, to cover trucks, taxicabs, automobiles or anything of the kind that runs on four wheels on the highway.

When it comes to the subject of vehicle maintenance, I don't doubt for one minute that every man in this room knows as much, or maybe more than I do, about the care and upkeep of motor vehicles, but you will find when I get further along with this paper there are some points many of you overlook, and the importance of these I intend to drive home to you as emphatically as possible.

Let us consider the various important parts of a motor vehicle, beginning with the motor. From the standpoint of safety, about all I can say about the motor is that all gasoline connections should be tight and there be no leakages. The wiring should be in good order, with the prime idea in mind of avoiding fire. As regards the mechanical set-up and maintenance of the motor, there is no need for us to discuss that because every fleet operator is being continually bombarded with literature, and is being called on by salesmen who keep impressing on him the necessity of using good oil, and of changing the oil every 500 or 1000 miles. They keep your attention attracted to the oil filters, if you use them, and the necessity of changing your plugs every 10,000 miles or so, and your mechanics, if they do what they are paid to do, will see to it that the motors are kept in good running order. This applies also to the transmission and differential.

A fleet owner's natural pride will see to it that the paint jobs and general appearance of his vehicles will look well at all times.

With regard to the tires and batteries, we find we can fall back on the service being rendered by the larger tire distributors, who will on a contract basis make a weekly check of the air in the tires of all your vehicles, check the batteries and fill them with water at the same time. An arrangement such as this is considerably more positive than leaving it to the care of the driver or a garage mechanic.

With the laws that are now in effect in a great number of states, we find that periodically the police, with the assistance of the garages, conduct brake testing campaigns. This of course means that brakes will be watched more carefully, the horn will blow when needed, the lights will be kept in good working order and properly focussed. You will also find the rear view mirrors are where they belong and the windshield wipers properly working.

Most talks on vehicle maintenance are either of a technical or a mechanical nature. The speaker will usually attempt to tell you how a vehicle should be maintained and kept in good running order.

This is not the purpose of this paper. It is our desire to look at vehicle maintenance from the standpoint of safety—first, last and always.

Now, inasmuch as a vehicle standing still is not liable to be the cause of accidents, unless improperly parked, we must therefore consider the vehicle in motion. From the time you start your car to drive somewhere, the steering wheel is in your hands at all times and this is the foremost controlling power you have over that tremendous weight which is under you, rolling along over the highway, and which, when not under proper control, is a death-dealing instrument to yourself and others. So when we consider a car in motion we are forced to consider the controlling devices, or the steering mechanism and running gear.

Here is the spot where I place my finger on the motor vehicle and say—"This is what I consider the most important part of the car, and it is that which needs the utmost of attention from the standpoint of vehicle maintenance—a factor in safe distribution."

I will venture to say there is a very small percentage of men who have had the front end or steering assembly of their cars properly checked within the last six months. In spite of the fact that a car may be new and may only have been away from the factory for a short time, a change takes place in the front end of that car that, without an atom of doubt, will change the alignment of the wheels.

"Two of the reasons that bring about this change are the gradual sag of the springs and the use of the front wheel brakes. The front end of your car is adjusted to within one one-hundredth part of an inch in its angles and connections, when it leaves the factory. Such things as the amount of toe-in, the amount of "pitch" or "camber" and the degrees of "caster" are scientifically figured out by the engineers, and any change from the correct adjustment will gradually bring about that well-known "shimmy", or the car will be found to wander and weave, or a condition is brought about whereby the car has to be continually "steered."

There are hundreds of men driving cars over the highway today with a shimmy in the front end that would do justice to a Hula Dancer, and these fellows either know or do not know why the car is difficult to handle, but the majority of them have enough sense not to allow anyone else to drive the wobbly outfit, except, perhaps, their mother-in-law.

Again, I say, from a standpoint of safety we have got to consider the controlling features of the automobile, and that is the front end.

Suppose we consider what may go wrong in this part of the vehicle and the effect it will have on the control of that car.

Twisted axles are very common today and the cause for this is principally due to the front wheel brakes. Just imagine—when you are driving along the highway at 50 miles an hour or so, and you jam on your brakes; what happens? The tendency is for the weight of the car to dive or heave itself forward. The action is upward in the rear and down at the front, and if exaggerated would cause the car to turn end for end. Now, if one of the front wheel brakes grabs before the other, and this can happen very easily, the axle at that spot is going to receive the brunt of the entire weight when the car pitches forward. Therefore with the back pressure of the brake and the dragging of the tire, it is the axle that takes the shock, and there is no small wonder that with this taking place every time you stop the car, that you have twisted axles.

A twist in the axle upsets all the delicately balanced and adjusted steering angles, principally toe-in and caster. And it is this change that brings about such things as shimmy, hard steering, wandering and weaving, cupping and excessive wear of tires, making the car hard to control. It immediately places that car in the category of a hazard to public safety.

I do not want you gentlemen to feel for a moment or think that I am trying to sell an idea of brake or wheel lining or anything like that. The idea I want to get across, based upon my knowledge of motor vehicles is that since the advent of four wheeled brakes and balloon tires, the matter of misalignment of wheels is something new, something we have not had to cope with in the past. The average talk that you might hear on vehicle maintenance has always been change your oil, do this and do that and the other thing, but I have never yet heard this subject of wheel alignment brought out. So when I found from investigation that a great number of accidents were taking place on the highways, due to defective steering mechanism, I naturally concluded that here would be the meat of a paper on vehicle maintenance, a factor in safe distribution.

We find the most careful drivers today are those fellows who risk their lives on the Indianapolis Race Track. The cars they drive have been designed and built by engineers from a scientific standpoint with the thought in mind of studying the changes that take place in the vehicle after a long grind at high speed. The public greets these contests as sport and they get plenty of thrills at seeing these fellows race madly around the track at a tremendous speed, risking lives and limbs. No one knows what risks they run more than these drivers themselves. They are cool and analytical during all stages of the race. They know every feature and part of their respective cars, and will only enter the race when they and their mechanics know, absolutely, that the car is right. Practically the last thing they do before starting is to have the wheel alignment and running gear of their cars checked by experts, on

special wheel aligning machinery, which has been installed at the race track only the last couple of years.

I was told that in 1930 in the city of Evanston an extensive check-up was made on motor vehicles and it was found that 70 out of every 100 cars—think of it—seven out of ten or 70 per cent, had defective running gear; in fact I could go so far as to say they had defective steering mechanism. I think you will agree that a condition like this that applies to one city will be found to be very much universal; and when we think in terms of safety, I know you are with me when I say this is a serious, a very serious situation.

If you go to the average garage and ask them their opinion of it, they will say, "Yes, that fellow's car came in here; yes, it was wrecked. We found the wheels bent and toed in, due to the accident. He probably went to sleep and fell off the highway." The driver himself probably would not admit it, but in these particular instances, we have the stories of the drivers as well as the mechanics who actually checked the cars.

In order to get some definite facts concerning accidents which resulted from defective steering mechanism, I visited our local Police Department, and here I might state that the police of Grand Rapids are noted throughout the country for the statistics they keep in connection with accidents. But they were not able to give me any information at all, other than the number of motor cars involved in accidents that had defective brakes. I therefore went to the representative of the Bear Manufacturing Co., who is conducting a school on wheel alignment in Grand Rapids. I asked him how many cars came into his shop for adjustment of the steering assembly, that had featured in accidents due to the mis-alignment of the wheels; and I asked him if he would give me the data on the next 100 cars that came to him for a check-up. Would you believe it, when he turned this report over to me we found that 19 out of those 100 cars had been involved in accidents, which resulted in a total cost of many hundreds of dollars for repair bills, hospital expenses and other unnecessary costs and—one death. Each of the accidents was the direct result of defective steering mechanism and running gear.

Here I will give you the report, as given either by the driver of the car in each case or that of the alignment mechanic who checked the cars:

- Case No. 101—Car shimmed, went into ditch, broke axle and wrecked car. Driver in hospital four weeks at Kansas City.
- Case No. 102—Car pulled to the right and turned into yard. Driver couldn't pull it back, so ran into tree. Wrecked car.
- Case No. 106—Man, wife and three children. Driver claimed car would weave from one side of road to the other—he tried to pass a load of hay and in doing so the car swerved to the left, and before he could straighten up they went into the ditch. He showed doctor's bills paid for accidents to family, amounting to \$82. Incidentally he was many miles from home.
- Case No. 114—Car wandered and weaved—16 year old boy driving. Crashed into ditch and turned over.
- Case No. 118—This car never steered right, the driver claimed. The wheel jerked out of his hands and the car crashed into bridge abutment.
- Case No. 129—Car shimmed—driver lost control, went through wire fence into ditch.
- Case No. 136—Driver claimed car pulled, first one way, then another. In turning corner he couldn't straighten out and ran into another car. Both cars were badly wrecked.
- Case No. 146—Car shimmed—side swiped lamp post—sister of driver injured.
- Case No. 157—Car turned hard to the right—the steering arm was bent; while the driver was turning into the garage, the wheels locked and car tore garage door off.

- Case No. 159—High speed shimmy. The car jumped right off the road and hit a tree. Broken door glass cut driver's arm badly.
- Case No. 172—Car shimmed, jumped road and turned over.
- Case No. 174—The car wandered and weaved—ran off left side of road and hit a post with left wheel. Woman passenger hurt and was confined to bed for a week.
- Case No. 182—This car was hit by another car that undoubtedly had a bent steering arm and drag link. Driver claimed that, as he hit a bump in the road, the wheel was jerked from his hands, causing his car to crash into another, turning it over on its side in the ditch.
- Case No. 183—This driver claimed his car would wander from one side of road to the other. He took his hands from the steering wheel for a moment and when he came to he and the car were in a farmer's field. Both badly wrecked.
- Case No. 191—Shimmy—a garage man riding with the driver told him to step on it and cut through some traffic. The driver did so, costing him two fenders, radiator, head lights, extensive axle work and a broken nose for his 12 year old boy.
- Case No. 193—This car had been worked on by three different garagemen—no special equipment. It had a shimmy and loose steering connections, also a bent steering arm. The car ran off the road three times; sister's arm was badly cut with broken glass and it was only after that he awakened to the fact that the car had to be properly repaired.
- Case No. 197—Driver claimed car kept pulling from one side to the other. He got mad and gave the wheel a jerk, and before he could pull it back had gone off the left side of road and over steep embankment. Several bad injuries.
- Case No. 198—This car was checked two weeks before the accident and the driver was warned not to drive faster than 45 miles per hour. According to his story afterward he had to speed up to faster than 50 miles per hour to pass another car. His car broke into a shimmy which was so bad he had to release his hold on the steering wheel. The driver of a car ahead slowed down at that moment and before driver No. 1 could slow up and regain control of his car they crashed. I learned he paid a hospital bill of \$200 for the other man, besides the expense of repairing two cars. He had no insurance. Here is a case of a twisted axle and unbalanced wheel and the driver simply couldn't find time to have it repaired.
- Case No. 199—This car was checked and found to have a bent steering arm and unbalanced wheels. When the car was tested the owner was warned that the high speed shimmy in this car was unusually severe owing to the double cause for shimmy. He was in too big a hurry to have the trouble corrected at that time and said he would come in later. A few days afterward, however, while he was trying to pass another car, his car broke into a shimmy, rolled over into the ditch twice, killing the driver's father who was riding in the rear seat.

These few cases only tend to show that in a great many cases where there are accidents there is probably an underlying cause that is not apparent to the general public and perhaps not apparent to the driver's themselves.

The gentlemen here who have fleets of trucks and cars should be interested in accident prevention and vehicle maintenance of the right sort for nine different reasons which I will briefly outline:

- 1.—Abnormal depreciation of equipment. Frequent accidents increase the maintenance costs and lower the trade-in values of the cars.

- 2.—Necessity to invest in extra equipment to take the place of that laid up for repairs due to accidents or neglect.
- 3.—Repairs—Owing to the high cost of collision insurance few fleet owners carry it and are obliged to stand the cost of repairs.
- 4.—Damage to cargo being carried. Damage claims result which are costly.
- 5.—Accidents cause marliable delivery which creates ill will on the part of the customer.
- 6.—Adverse advertising value. Poorly maintained equipment is poor advertising.
- 7.—Effect on efficiency of drivers. If equipment is not right, drivers are more prone to have accidents.
- 8.—Loss of good will. If the equipment is dangerously or carelessly operated it reflects badly on your company.
- 9.—Increased insurance rates are caused by a bad accident record; and properly maintained vehicles carefully driven will create a saving by decreasing your insurance premiums.

I will give you a concrete example of that. In one of our branches, in our Grand Rapids branch, we operated in twenty months seventeen moving vans 312,250 miles without an accident or traffic violation of any kind. Prior to January, 1929, we had been having accidents, more than our share. In January, 1929, we joined up with the local Safety Council and we started a safety movement among our own men. Immediately accidents began to decrease. Our insurance premiums were very high. At the end of 1929, that year, we were fortunate enough in winning the inter-fleet contest for the city of Grand Rapids, and when 1930 came along and we were out looking for insurance, on the strength of our performance in the past twenty months—less than twenty months—our insurance premiums were reduced 57 per cent.

Just think of it! Fifty-seven per cent on our automobile insurance and our compensation insurance was reduced 12 per cent, just on account of the fact that we had a very good accident record; so it pays a great deal to watch that very closely.

In conclusion, I just want to impress on you strongly that if you keep the thought of SAFETY foremost in mind where your car or truck maintenance is concerned, you will naturally create an investment that will pay you a high rate of interest, and save many lives!

CHAIRMAN HORROCKS: I am very much impressed with what Mr. Oldham said about decreased premiums on insurance. It has been my experience where fleets have had intensive safety campaigns. Safety campaigns among individual fleets are a mighty good investment that returns fine dividends. If you have any questions to ask, Mr. Oldham will be very glad to answer them.

W. E. FELLER (West Chester Lighting Company, Mount Vernon, New York): Is there any question about the variations possible in reporting? No two employees have the same method of reporting, and that might have something to do with it.

Mr. OLDHAM: We are quite sure those reports are correct, for this reason: Naturally a corporation having vehicles that are involved in accidents is going to be called on to pay insurance to the other fellow, if there is a collision or there are two vehicles concerned in the accident. And at no time did we have to call on the insurance company to pay any claims during that entire period. That was one thing.

The other thing is that every time a truck comes into our garage from a trip it is very carefully checked by our garage mechanic. If there is a dent in the fender or a scratch along the side of the van,—our vans are highly ducoed or polished—it would be noticeable immediately and the driver would have to explain.

C. W. TURNING (J. H. Harper Company, Duluth, Minnesota): A year ago I think we had some rather interesting discussion regarding check-ups at intervals of the truck in the garage maintenance department.

Mr. OLDHAM: We have not any definite intervals in which we check them up other than the fact that our drivers are required to report any defect, no matter how slight, as soon as noticed in the truck. We endeavor as much as possible that each

driver has his own truck; but I switch those drivers from time to time, put another man on another fellow's truck, just to catch anything that may pop up. Also about once every week, the garage mechanic and I go out and drive each one of those vehicles. I will pick a truck here and there, drive it myself and check the brake, horn and lights and everything in connection. That is because we want to keep our insurance down.

CHAIRMAN HORROCKS: If you find a defect in the car, it might have been caused by the carelessness of the driver on the trip. Do you find your drivers report those faithfully, or do they often come up by chance?

Mr. OLDHAM: No. I think the drivers report them faithfully. It depends very much on the type of driver. Every driver we have is a married man, and with one exception they have families. They know what they are up against, at this particular time of the depression, if it becomes a matter of looking for a job. There is no man in our employ who needs to fear his job, if he tells the truth; and any man that we have who has anything unusual happen in the way of a slight accident, or who breaks a headlight lens or has a damage to a piece of furniture while loading or unloading it, knows he can come to me in the utmost confidence and tell the whole story.

They work along with me, for this reason: If one man is prone to have more than one accident, or a series of accidents, he is not going to be fired. We are going to investigate and find out the real reason for his having those accidents, from what you might term the psychological standpoint, and for that reason we find the fellows work with us a whole lot better. They realized that if they have something go wrong, which later on is discovered, they might lose their job and it would be better to work with us from the first; so I think if you have the confidence of the men working with you and for you, you do not need to have much trouble with the men telling falsehoods. I do not believe they would.

CHAIRMAN HORROCKS: On the method of checking the tires and batteries, I think you meant you had some kind of arrangement with the tire companies that take care of that question. I wondered how general that arrangement is. I know it is in force in a number of places, and I was wondering how general the practice was.

How about yours, Mr. Mineur? How do you check tires and batteries? Are they done systematically?

Mr. MINEUR: Yes. They are. As soon as our cars come in off the day's run, the man we call the gas man checks the tires all the way around by striking them, but does not test the pressure and the exact poundage.

CHAIRMAN HORROCKS: How about batteries, Mr. Lundsteadt?

Mr. LUNDSTEADT: The tires are checked every day and the batteries are checked every day by the garage mechanic.

Mr. FELLER: We have more than 400 cars operating every day. We have night mechanics who make it their business to inspect these cars every night. They not only check up their tires, batteries and all that, but the mechanism generally. In other words, if the driver reports in the log book anything wrong with the car, that is taken care of first, and then after the principal part of the work is done they go back and have a systematic way of checking the cars that are turned into that particular garage. In that way, I think, we have a very careful check on our cars.

WALTER C. BECKER (Chicago Surface Lines, Chicago): I wonder if Mr. Oldham is not taking advantage of some of us maintenance men? I would like to ask him if in those cases that he spoke about, whether or not those were controlled fleets or whether they were just the ordinary individual automobiles? In other words, it seemed to me that some of the causes of these accidents might have been the human element instead of the mechanics of the vehicle.

Mr. OLDHAM: That may be true. In each one of these cases, they were a privately owned and privately driven automobile; but what will apply in a case of an automobile or one large truck or small truck is liable to apply in any truck regardless of how well maintained they are. It only takes one crash to change the entire set-up of

a vehicle, and where the human element enters into it, we find the commercial drivers are less prone to have accidents than the individual drivers, driving in the privately owned cars.

The point I was trying to bring up, more than anything else, was that the fleet operators should not ignore or neglect the steering mechanism of their car in making general check-up. They should give that some kind of prime consideration, because only recently we had every one of our fifty odd trucks checked, and I think there were only about two or three that were right. From now on we are watching that particular thing as closely as anything else.

F. J. MILLAR (Western Electric Company, Chicago): Mr. Oldham spoke briefly on the accident-prone driver. I am wondering if he can tell us how he analyzes these cases and how he gets at them? How he changes an accident-prone driver to one who is not accident-prone?

MR. OLDHAM: We have not had any accidents so I can not very well answer that question. What I mean by that, we have not had enough accidents to make that a very important feature in our organization, except in handling of household goods. We had one case where there was one man had reported four or five accidents in a row, possibly more than others. One day it was a broken table leg; another day he scratched a piano, and the next day it was something else; so I got hold of him one day and asked questions about it. The first thing that entered my mind was whether he got along with his wife or not. This was not it at all. It was his eyesight. He was wearing glasses and had not had the glasses changed in ten years. We sent him down and had his eyes examined, and his eyes were out of focus. We had him fitted up with new glasses, and he has not had any trouble since. That is the only concrete case we have had.

J. L. SWEETIN (Shell Eastern Petroleum Products, Inc., New York City): I would like to ask Mr. Oldham whether or not in their operation they have a central repair shop or whether they have traveling mechanics. Do you operate entirely in Grand Rapids?

MR. OLDHAM: No. We have branches at Kalamazoo, Grand Rapids and Muskegon. Our main shop is in Grand Rapids. Anything of minor importance in the repair of trucks is taken care of in Grand Rapids, but we have a very well set up garage in our Muskegon branch. The other night I had a long distance call from Albany, New York, where one of our drivers had some trouble with his motor. He called up and wanted to know how far we wanted him to go to have it repaired. If it is too far from home to send one of our own mechanics, we have it done on the grounds at the service station that represents that particular make of truck in question.

If it is one hundred or one hundred fifty miles we send our own mechanic. He has a service car and does the necessary repairs.

MR. SWEETIN: The reason I asked that question, we operate over quite a large area, and we have central garages and repair shops where we send the trucks; but we do have cases where a truck is out more or less on its own and has to go to a local repair shop. We also have traveling mechanics. In view of that fact, you can not always keep the same control over your job as you can in your own shop.

MR. OLDHAM: No, we have found cases where you have had work done in outside places and later on the work has to be done over again.

MR. SWEETIN: Another question, which might be pertinent or impertinent; that is, do you receive or have you received any letters, or criticisms claiming your drivers hogged the road, as some transportation trucks do?

MR. OLDHAM: No, not from a moving van, but from driver of a mail truck, going down the road at sixty miles, we have had that sort of complaint. We had to finally fire the driver. He hogged the road at sixty miles an hour. That was purely the fault of the driver. However, where the big trucks are concerned, the men have the rear view mirrors in such a way that they are in duty bound from the standpoint of safety to watch from the rear as well as in front and signal for other cars to go ahead if the way is clear, and pull over to the right.

We try to drive home to the driver that courtesy is one of the best forms of safety insurance that there is on the highway today.

CHAIRMAN HORROCKS: Mr. Oldham, we have all thoroughly enjoyed the subject matter presented by you. I know it has stimulated quite a lot of thought, from the number of questions asked. I want to thank you on behalf of the two joint divisions.

Now we come to a part of our program which many of us have been awaiting with great interest. The subject is: "City-wide Operators' Conferences—Their Value as an Agency for Developing Among Fleet Operators the Best Thought on Commercial Vehicle Safety and a Closer Bond of Interest Among the Same Group."

(At this point Mr. H. J. Mineur and an excellent cast from the Metropolitan Group of Commercial Vehicle Operators of New York City presented in dramatic form the sketch entitled "City-wide Operators' Conferences—Their Value as an Agency for Developing Among Fleet Operators the Best Thought on Commercial Vehicle Safety and a Closer Bond of Interest Among the Same Group." This, in mimeographed form, may be had on request from the National Safety Council, 20 North Wacker Drive, Chicago.)

F. H. DECKMAN (Columbia Eng. & Management Corp., Columbus, O.): I would be very much interested in knowing just how many of the member companies have adopted a definite disciplinary measure within their own organization?

H. J. MINEUR (The Borden Company, New York City): As I understand your question, you would like to have an expression of opinion on the part of those at this session, by a show of hands? (There are six hands.)

H. V. SCHREIBER (Capital Traction Company, Washington, D. C.): I would like to ask if any of these owners and operators have followed that up with conferences with similar groups of drivers? Do you get the driver's reaction to various problems and opinions the same as you did in this group?

MR. MINEUR: Some believe in small groups and some believe in having the entire personnel present. When an accident is reviewed, after being reviewed by the Safety Committee, the man tells about it in his own words, and the others present have an opportunity to inject any particular thought that they might have; but there is no set rule, and the groups vary according to the ideas of the individual companies.

J. L. SWEETIN (Shell Eastern Petroleum Products, Inc., New York City): I would like to take up a few minutes, for the information of this gentleman, in the operation of our Company. We start out with the idea of having all drivers in a certain district. We have five large districts and several smaller areas. We have meetings of all drivers of any kind of vehicle. We bring up in front of the meeting those who have accidents. We have the usual charts and have them explain the accident; we have the district manager, myself and the operating manager as judges. The decision as to the responsibility is made after he explains the accident.

Anybody who was working with him, his terminal manager or anybody who was supervising him may also come forward and bring up any point that he may have overlooked. After the explanation is made, the judges make the decision as to his responsibility in that accident and in very few cases has it ever been questioned by any driver or group of drivers; in fact we put it to the group as a whole in some cases, and they have given the same opinion as we have rendered, without our telling them what our decision was.

During the summer months we had small meetings, involving just those that had accidents. I might tell you that these large meetings very seldom involved more than forty or fifty drivers. In the summer months, with the smaller meetings, bringing in drivers that had accidents, we found over fifty per cent of those who were not invited come in because they liked the meetings and liked to find out what the other fellow was doing that caused him to have his accidents.

MR. MINEUR: There is one thing I did not explain, which is perhaps worthy of mention, and that is the fact that this group is made up entirely of operators. There are only two men that have attended our meetings that are not directly connected and

representing fleet operators. Insurance companies and brokers or any one of that type, any one selling a service of that kind in regard to insurance or safety are not members of that group, unless they come there as direct representatives of some operator.

However, we do expect to have at least once a year, insurance night, at which we will bring up for discussion subjects that are common or rather of common interest to the insurance men and the operators.

C. W. TURNING (J. H. Harper Company, Duluth, Minnesota): Another place where the operators and representatives are doing work is Detroit. I was wondering if there was anybody here from the Detroit Safety Council.

JULIEN H. HARVEY (National Safety Council): I can say that Detroit is doing splendid work along that line, and quite a few of the Community Safety Council cities are doing the same thing. There is one peculiarity of these meetings in New York, which has come to me as quite a revelation.

We started out and after the first two meetings we suggested that Mr. Mineur make a talk on safety committees. He said he would not do that but he would prepare an analytical outline of safety committees and have it mimeographed for the third meeting. He brought copies, spoke for five minutes, and left the discussion to the audience.

It took not one meeting to conclude that subject, but three meetings. The next subject and outline covered three months. I think the interest is because we have broken down the resistance of those people.

When you bring in a speaker from outside the organization, the fellows feel somewhat timid. They feel backward about getting up and disputing the speaker, because he is the guest from out of town and they do not want to take issue with him; but as far as this bunch is concerned, the more they can take issue with the fellows the better they like it.

There are a lot of local Council cities doing jobs of this kind, somewhat along the line of what you speak of in Detroit. St. Louis is doing it, Chicago, Kansas City, the Massachusetts Safety Council in Boston: in fact there are probably eighteen or twenty such organizations. However, we have no local Safety Council, as such, in New York City. We have there a branch office of the National Safety Council, but the set-up of our fleet group could be attempted in any city not now having a Community Safety Council. It is just a question of getting a bunch of the operators together. There is no expense attached to such a series of meetings. In New York they tacked twenty five cents on to the dinner. I think, and that takes care of all postage and anything of that kind. So if any of you are in a community where there is no safety council or no work of this kind being done, I think personally it will be a splendid thing to take the idea and sell it to a half dozen or more of your fellow operators and see what you can do. My prophecy is you will do exactly the same thing as we are doing in New York, with the group there.

CHAIRMAN HORROCKS: How often do you meet?

MR. MINEUR: Once a month.

CHAIRMAN HORROCKS: I am sure the Section appreciates very much the efforts made by Mr. Mineur and his Metropolitan group. Some time ago, information came out relative to report forms. It was our intention to have some consideration of report forms and Mr. Sidney J. Williams of the National Safety Council staff will discuss this.

S. J. WILLIAMS (National Safety Council): In the dramatic presentation, I notice the first item discussed was the subject of accident reports. As a matter of information, I think what was said about reports in their discussion dated back a few months ago, didn't it, Mr. Mineur?

MR. MINEUR: Yes.

MR. WILLIAMS: And most of the insurance companies agreed to accept reports made on the forms since then put out by the National Safety Council, as part of Safe Practices Pamphlet No. D-4.

On those forms there was relatively little mention of the very important subject of personal causes or personal factors or elements in causing an accident. That is a very important thing; one which is pretty hard to get at. In all the Council's statistics committees that have been working on accident report forms for the last seven years, for police departments and motor vehicle departments and also for fleets, we have followed rigidly the policy of putting on those forms items of fact and not items of judgment; with the thought that if items of judgment are put on the report form you get into all kinds of complications. The report form therefore contained such items as will describe what the other driver was doing; what the pedestrian was doing, if any; the condition of the weather, light, etc.; but they have not undertaken to say what was the cause of the accident, or whether the driver was responsible for the accident, because that was so highly a question of opinion.

It has been the thought of all these statistics committees and everybody who has worked on these things, that after the initial report is made, setting forth these items of fact, then the question of fixing responsibility, whether by jury in the police court or state motor vehicle commission in the suspension of license or whether by the company in the matter of driver discipline, that question of fixing responsibility is another, a second matter, that must be kept rather distinct from the first matter of reporting the objective facts of the accident.

Nevertheless, I have come to feel that our report forms probably are defective, are incomplete, in that they give little attention to the important matter of the personal factor in these accidents. What is the answer?

It occurred to us on the staff a few weeks ago, and largely because the matter was brought up in the New York group, that perhaps the time had now come when we could put on the report form or perhaps on a supplementary report form, something about the personal factors in the accident, but carefully reported as items of fact and not as items of judgment. Now, what does that mean? Well, to say that an accident was due to the driver being intoxicated is decidedly a question of judgment. To say the driver had liquor on his breath is a question of fact. To say the driver was apparently under the influence of liquor to the extent that he talked incoherently is a question of fact, and it would be possible to put down three or four or a half dozen items indicating the man was under the influence of liquor, that could be reported as fact without making the judicial decision as to the man was intoxicated.

Now, in like manner, it might be difficult to say that the accident was due to fatigue of the driver; and yet, it would be a matter of fact to put down on the report that the driver had been on duty continuously for a certain number of hours preceding the accident.

We took this up with some of you, and also with our committee of psychologists, which is extremely interested in this subject. We recently had our Mr. J. S. Baker, a staff engineer, compile a tentative schedule of personal factors in an accident which might be added to a report form or made as a supplementary report form. We sent that tentative schedule to some of the members of this Section, some of whom are in the room; we also sent it to our Committee on the Driver, consisting of psychologists. I do not know that this is the place for any long discussion, or certainly any action on that report form; but I would like to have some expression of opinion on it.

Let me mention one more thing. There have been several attempts on the part of various organizations in the past to develop schedules of personal items, running into causes, and some of them we think are open to serious criticism in that they mix up questions of fact and questions of judgment or responsibility.

I have in mind one classification which has a lot of interesting items in it, but it takes an item like "The driver was making a left turn improperly," and puts it under the head of "disobedience of rules." Now, the fact of the driver making a left turn improperly is a fact, but whether it was due to disobedience of rules or whether it was due to the fact that the driver did not understand the rule or due to the driver being fatigued and doing a dumb thing without any intention of doing it, is decidedly

a question of judgment, and that illustrates the great importance of keeping these questions of judgment and questions of fact separate.

Well, we must take up with the Executive Committee of this Section presently a more careful consideration and decision on this, and we might possibly have today some expression of opinion as to whether some of the fleets would like to have the National Safety Council, or rather this Section, through our staff, send suggestions to them of an enlarged report form or supplementary report form which would take up personality items, and then if any of you have advice to give us or suggestions on what kind of personality items should be taken up, that would very well come in the record for our study later.

We talked over this subject with our Committee on the Driver this week, and they gave us advice on certain items, and we hope with the joint efforts of that committee, this Section and our staff, that we can make a real contribution to this important job of helping all of us to get at this elusive and very important personal factor.

CHAIRMAN HORROCKS: Is there any information now that we can give Mr. Williams on this matter?

MR. MINEUR: I think the Section ought certainly to work with the Council's staff in the development of a practical form. Mr. Williams knows I have been very much interested in this question of accident cause classification. Unfortunately, we have never gotten to the point where I could use his forms, and we are using one of our own because we can do it with a whole lot less work.

Just as a concrete illustration, here we have a man on one of these milk wagons or automobiles, traveling down the street, and as you know they can be operated from the side with a hand lever. A man is going down the street and is distracted for just a moment and when he turns he unintentionally hits the lever and the vehicle starts for the curb. He realizes it before hitting the curb, and in order to get out of trouble he quickly snaps it the other way. The vehicle turns over right in the street. It has not left the road. What would you attribute it to? Driver failure. There is nothing wrong with the mechanical features of the rig, nothing wrong with the road, nothing else in his path except that young lady coming down the street that distracted him.

Another case is the rear end collision. I say in a rear end collision it should not be necessary to answer but one question. A rear end collision, whether your man or the other fellow is responsible, gives you the whole story.

MR. WILLIAMS: How do you know who is responsible in case of a rear end collision? How do you determine that?

MR. MINEUR: In our case we determine it by the fact that the fellow in the rear ran into the fellow ahead.

MR. WILLIAMS: You would automatically say in all cases where somebody else hit your fellow in the rear it was the other fellow's fault?

MR. MINEUR: I would, for this reason: A man would have a very difficult job convincing a safety committee he had his car under proper control, that he was traveling at a safe speed, that he was paying attention to his job, if he ran into the vehicle ahead of him.

MR. WILLIAMS: I do not want any of you to get the impression that we disagree about the importance of fixing responsibility. It is merely a question of what sort of items should be on a report form, and whether the original report form should include the judicial decision as to responsibility or whether you should first make your report describing the actual circumstances of the accident, describing what happened, and consider that as statistics, and then as a second step, make whatever investigation your procedure calls for and fix responsibility, and call that fixing responsibility and not call it statistics. That is the only question.

I might say there is quite a difference of opinion about these rear end collisions. Some companies which have studied the accident prone driver have found that here and there a driver will have a record of a number of rear end collisions. On any

one of them alone, the inference would have been that it was the other fellow's fault. But here is a driver that has four or five rear end collisions, and the other fellows are not having them, in the same company, and the inference is that it is our driver's partial responsibility, also; that our driver had a habit of stopping too quickly at a red light or stop sign, thereby being partially responsible for the inattentive driver behind running into him.

MR. MINEUR: The only reason I mentioned responsibility is this: No concern is going to make up any record that is going to tell them merely what kind of accidents have been happening without a definite indication of what proportion of those accidents your own people are responsible for. The operator is interested in that information, and if he is going to compile that data he wants to make it up in such form that it will have practical application in his safety program.

CHAIRMAN HORROCKS: Is there anybody else that has an opinion to express on the subject of report forms? If not, I think we are through with the session and the Twentieth Annual Congress. I want to assure you on behalf of the National Safety Council that we thank you very much for your attendance at the sessions, and also for the close attention to the matters which have been discussed in the sessions.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Electric Railway Section

Officers 1930-31

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E. K. EASTBURN, St. Louis Public Service Co., St. Louis, Mo.

Tuesday Afternoon Session October 13, 1931

GLENN H. SHAW, Chairman
Ohio Edison Company, Akron, O.

The first session of the Electric Railway Section convened with General Chairman Glenn H. Shaw, presiding.

CHAIRMAN SHAW: Our program is supposed to open with remarks by the Chairman. Gentlemen, I have no prepared speech, but we are fortunate to have the privilege of attending this Congress. I think if there ever was a time when safety work should be followed consistently, it is in 1931. The companies represented here recognize that fact. We can probably accomplish more to meet decreased revenue through safety work than through any other medium.

This is a sort of "swan" song for me as I am leaving the railway business. I want to express my appreciation for the support you have given me as chairman of this Section of the Council.

Possibly the most outstanding work of the Section this year has been an endeavor to standardize our methods of accident reporting. A committee has worked all year to present a form of reporting your accident history which would be on an equal basis and understandable to all of us. In the past we have always had some misunderstanding regarding our accident experience. Some properties have had a chargeable and non-chargeable system; others have not; and we have listened here to many reports elaborating upon their accomplishments, saying that they had operated so many thousands of miles per accident, and when it was all said and done we found that the figures were per chargeable accident, and there was no standard set up whereby we could tell what was a chargeable accident. A chargeable accident on some properties was not a chargeable accident on others. We will hear the complete report on Thursday.

The first committee chairman to report will be Mr. Schreiber of the Poster and Slide Committee.

H. V. SCHREIBER (Safety Director, Capital Traction Co., Washington, D. C.): We have at present 18 railway posters with a circulation of over a thousand copies each. Two of these have had an unusually large circulation, because they are also useful for bus and fleet operators. The others have averaged 609 copies per poster.

It is apparent from this year's experience that more of the electric railway posters should be devoted to accidents resulting in collisions with automobiles. These accidents rank first in the experience of the companies and should receive the greatest attention. Next are the boarding and alighting accidents. However, strange as it may seem, there are very few of these used, as there is no new way of presenting the old story of how these accidents occur.

Two of the bus posters had phenomenal circulation. The demand was 7,850 copies. The copy on this particular poster was "Go Slow—Sound Horn at Blind Corners and Proceed Cautiously." It would help a good deal if we could get more ideas on posters from your home-made work.

CHAIRMAN SHAW: The next report is by Ralph Bush, chairman of the Program Committee.

RALPH C. BUSH (Boston Elevated Railway, Boston, Mass.): There is little to report as chairman of the Program Committee. Our work was completed early last winter and the speakers are ready to do their part. If this program appeals to you I shall be sufficiently pleased. Due credit, of course, should be given to the members of the committee who cooperated to the fullest extent in arranging the program. It has been a pleasure to work with these men. We will let the program speak for itself.

CHAIRMAN SHAW: Next is the Publicity Committee and the News-Letter Editor. I have a letter from Mr. Tompkins which the secretary is to read, after which I am going to ask Ray Finch of the Bureau of Safety to make a brief report on the News-Letter. Mr. Tompkins became ill and Mr. Finch has been doing a wonderful job of editing the News-Letter.

Glenn H. Shaw, Esq.
General Chairman

I regret that I shall be unable to attend the Twentieth Safety Congress at Chicago and present any report on the afternoon of October 13. Business here will make it impossible for me to get out of town. I believe there is little to report from my standpoint, except the more or less regular issuance of the News-Letter for the Electric Railway Section. This was interrupted, so far as I was concerned, by an enforced stay in the hospital and a recuperation period totalling in all about two months, during which time Mr. Ferguson of the National Safety Council was good enough to undertake getting out the News-Letter with the aid of Ray A. Finch of the Bureau of Safety, Inc., Chicago. Thanks are certainly due these gentlemen.

The News-Letter has tried under its current editorship to impress upon the street railway industry not only the value of sound methods of teaching and achieving safe operation, but the promotion of patronage through the education of the public to the superior safety of public transportation over other forms. We believe that it has been worthwhile to try, no matter how feebly, to promote recognition of this principle.

I regret, personally, that I shall be unable to undertake editorship of the News-Letter for the coming year, owing to the unusual press of other work. But I want to take this opportunity to thank all the members of the Electric Railway Section for their help and cooperation and to express to you my pleasure and gratification for the opportunity of working with you.

Very truly yours,

R. S. Tompkins.

RAY A. FINCH (Safety Engineer, Bureau of Safety): Since the last Congress there were eight issues of the News-Letter. I had the pleasure of editing the last three but in editing those issues I attempted to carry out the thought and work that Mr. Tompkins had started. It was a pleasure to do this work and I am grateful to all who sent in information to be used in the Letter.

CHAIRMAN SHAW: Mr. Bridges, chairman of the Health Committee, has a report to make.

MELVIN W. BRIDGES (Safety Engineer, Chicago Rapid Transit Co., Chicago): The chairman of the Health Committee is appointed each year and acts on the general Health Committee of the Council. We have been working under the leadership of Dr. Sappington, and it happened that I am the only layman on the committee. All the others are doctors. It was the intention that a layman should be appointed from each section, but the Electric Railway group appears to be the only one that has carried that out.

By the time we come to the next Congress the Health Committee is going to give us a paper to discuss, and I know that any man interested in personnel, safety, and medical work will find there is a great deal that the Section wants to know about industrial health. We know that mental and physical examinations and other health work are big things that help us in this work.

CHAIRMAN SHAW: The first paper on our program was to have been given by Mr. E. J. McIlraith, of the Chicago Surface Lines, but he is not able to be present. Mr. J. B. O'Connell, assistant superintendent of transportation of the Chicago Surface Lines, will read the paper.

Do Operating Hazards Diminish or Increase Through Faster Schedules?

By E. J. McILRAITH
Staff Engineer, Chicago Surface Lines

Public Safety for July, 1931, carries an excellent article on the High Speed Motif in Automobile Advertising. Here were reproduced clippings from advertisements reading "133 horsepower, 90 miles an hour", "flashes from 5 to 55 miles an hour in 19 seconds and eagerly steps up to speeds of 70 to 80 miles an hour." The writer properly states in his comment, "Advertisements such as those quoted broadcast the creed of excessive speed which is the creed of potential death when applied to the average driver."

In the National Safety Council publication "Accident Facts, 1931", it is stated that in 16 per cent of the accidents involving motor vehicles it was clear that the vehicle was exceeding the speed limit. No record can be made to indicate accurately the enormously large number of other accidents which are induced by reckless driving. The words, "speed" and "recklessness" should in reality be coupled together. It is

not always the highest speeds that are incident to recklessness, but I mean speeds which are too high for the circumstances. In some cases 10 m.p.h. is a reckless rate of speed.

It is, therefore, quite important that there be no misunderstanding of the meaning and the intent of the program of increasing speed while improving the safety in the operation of the cars of the Chicago Surface Lines. Speed in this sense is used discreetly to mean the rate of movement. It should not be taken to mean what is often inferred by the term, namely, high speed, reckless speed or to represent the idea of rushing to get somewhere. It would be much safer in creating the right impression if the title expressing such a story were made, "Reducing Delay and Increasing Public Safety."

With the use of the automobile increasing at such an extravagant rate, the streets of the city have become thronged with fast-moving vehicles driven by all sorts of drivers with many varied ideas as to their obligations to others. Mental balance often seems lacking in some who drive automobiles today, and the street cars in Chicago must operate continuously through the busiest of these thoroughfares. Responsibility is divided, but the lack of responsibility existing with many of the drivers puts an excessive burden upon the street railway management in developing the trainmen to become more competent and more efficient in avoiding and preventing accidents.

The growth in the registration of automobiles in Chicago has been 363 per cent in the last ten years. The increased use of each vehicle has caused even a greater increase in the mileage traveled on the streets of the city and, therefore, in increasing the hazard created. It also seems clear that there has been a growing tendency toward carelessness on the part of the drivers and disregard for traffic regulations or for common decency and consideration for the users of the streets. In spite of all this record in 1930 there were 3,969 motormen out of 5,887 who went through the entire year without a chargeable accident. Of these 1,170 had passed two years without a chargeable accident, and 613 had operated cars continuously on these busy streets without an accident for which they were responsible in three successive years. Such a record is one of which we are extremely proud, and for which the accident prevention division and the transportation department should be commended in the most enthusiastic fashion. Hundreds of lives have been saved and many thousands of injuries, because of improved training and because of the resultant alertness and care on the part of the drivers of the public service vehicles in Chicago.

In spite of this growing volume of traffic the average rate of speed of street cars between terminals has been continually increasing and the number of accidents has been continuously decreasing. More passengers have been carried on the street cars each year until 1930, and more pedestrians have been walking on the streets. The potential hazard has been continuously increasing at a marked rate, but the accidents have not grown at all in proportion to the increased opportunity. Such a result can only come from careful attention to training and constant reiteration of good instruction and from the development of a thorough interest in the minds of the trainmen who are responsible for carrying out the company's operation.

Movement on a crowded city street involves danger of collision and injury. That some accidents will result is inevitable. Errors of judgment, lack of attention, excitement, faulty equipment of automobiles or of cars, slippery pavement, poor lighting, quick change of direction or of speed, and many such items all tend to create accident hazards, while the seriousness of the injury and damage resulting from the accident are often directly proportional to the speed.

A vehicle moving at 30 m.p.h. travels 45 feet per second. While a person walks from the curb to the middle of the business street, say a distance of 25 feet, an automobile at 31 miles per hour will come from a distance of 250 feet. In the few moments it takes to count five, a machine can suddenly appear from

nowhere ready to crush out one's life. Two cars traveling toward each other at what is today called a moderate speed, 30 m.p.h., will actually approach each other at the rate of 90 feet for each tick of the clock. If traveling at 50 m.p.h., they are approaching each other at the rate of 150 feet in each second. It is not distance any more that provides the measure of safety, one must calculate the time and extremely small fractions of time at that. Two vehicles operating at right angles to each other may pass over the same spot in a single intersection in the same second of time and yet miss each other by quite a few feet. With just a fraction of a second of delay or error in judgment the vehicles would crash with perhaps fatal results.

The result is that to be safe one must do constantly the expected thing, must keep to the correct line and position making no sudden changes in line of movement or in speed. One must be observant of every detail of movement that might effect him directly or indirectly and must be well able to avoid the possibility of danger by anticipating in time what is likely to happen and hold himself safely able to avoid an accident due to any unexpected contingencies.

The street car has some advantages in its operation. It is true that it cannot swing to one side to dodge another vehicle, but the very fact that it is only able to operate along a fixed route permits all other vehicles to anticipate more accurately what the street car can or will do, and to allow appropriately so as to avoid collision. It has a fixed line in which to operate, stops at definite locations, and as operated in Chicago is given credit for having a purpose to be served and a right to a reasonable use of its lane in serving that purpose without avoidable delay.

The laning of highways is a distinct advantage, reduces accident hazard, and is fortunately becoming so recognized throughout the country. The marking of a center line on the narrow country roads has automatically helped in keeping vehicles to the right. The marking of lanes in such busy highways as that over the Philadelphia Bridge, the one through the Hudson Tunnel, or on LaSalle Street in Chicago, are definite examples of what can be found now in many cities where such restraints against indiscriminate maneuvering, weaving and running out of line both decreases the usefulness of the street and increases seriously the accident hazard. All important streets will soon be laned and restraints will be placed upon running out of line. Individual drivers will then be prevented from reckless speeding but the whole traffic movement will have greater freedom of movement, less hazard, and much more comfort because of greater certainty as to what the other fellow is going to do.

The street railway track on busy streets is not a handicap to safety. It is instead a decided asset. Street cars may be operated with greater safety than can any public carrier running on rubber tires. The street cars in Chicago run faster than do the cars in any other city of the United States except perhaps in Detroit, where due to a considerable amount of express operation with long runs between stops the speed has recently been materially increased to a point where it may be a little higher than in Chicago. This speed has increased in spite of the great growth of traffic and in spite of the fact that the streets on which the surface lines operate are the busiest streets for movement of vehicles and for retail shopping. The reason for this lies in the intensive training of the men, in the careful schooling, in the thorough maintenance of the equipment, and due to the development of respect in the minds of the other vehicle drivers for the purpose and the importance of the street railway operation in serving the public. Most drivers do seem to understand that it is unfair for a single automobile to delay a street car carrying a large number of equally important citizens.

The training to improve the speed has consisted of training to avoid the little elements of delay and also in training the men how to anticipate against hazards. The men have not been trained to apologize for their operation along the street or to move cautiously on the theory that the street car should keep out of every other

fellows way and thus be sure to avoid accident. Rather the men have been taught the need of careful observation, of giving reasonable warning, of keeping the car always under adequate control, and of operating with fixity of purpose well-known to the public, so as to encourage the other users of the street to leave a free way for a street car serving many people.

In avoiding delay and therefore increasing the speed between the point where the passenger gets on and the end of his trip many little things must be constantly observed by alert trainmen. The car must stop reasonably close to where the passengers are waiting, the doors should be opened ready for passenger movement at the instant the car actually stops, the car should start again as quickly as the last passenger has safely boarded, not some seconds afterward when he is well inside and the doors have been closed and locked. The motorman must watch the street while he is standing waiting for a signal so that the instant the signal is passed to him he is ready to move with full understanding of what each other person on the street is about to do. The conductor carefully watches the last passenger, so that no fractions of seconds are lost at his end. On two-man cars no interlocks of the doors exist to delay the starting of the car. The responsibility for safety is placed on careful operation rather than on mechanical interlocks with their attending delays. The use of wider doors and aisles, improvement in the rate of acceleration and of braking, improvement in the smoothness of both acceleration and of braking and the fast operation even over special work when the street is clear, all tend to reduce materially the delays. Little coasting with power off is expected in local operation. The car is expected to be pressed whenever necessary to maintain the schedule. The cars are required to keep on scheduled time at the timepoints which are spaced every mile or mile and one-half along the street, so that there will be uniform headways between cars and, therefore, reasonably uniform loading of passengers. This reduces the amount of crowding, reduces the delay in getting passengers on and off as well as giving better service. Of course better voltage maintenance, better maintenance of the overhead wiring, of the track condition, and the use of easily operated switch controls are also important. The distance between stops or the number of stops per mile has a very important effect upon the schedule. Stops must be kept at approximately eight to the mile to give the best balance between frequency of stopping points and reasonable distance between stops for obtaining free running of the car. If the motorman has good brakes, good equipment, good rail and efficient sanding apparatus for emergency he can move with much better confidence of being able to keep out of trouble, can follow more closely other traffic on the street and can, therefore, prevent much traffic interference that would come from other vehicles running around the street car and cutting in ahead.

Careful supervision of the trainmen insures reasonable adherence of schedule and the maintenance of uniform headway so as to equalize the loads. Constant analysis of the operating conditions, of the appropriateness of the scheduled service and of the accuracy of the running time assigned for each section for each of the different periods of the day when traffic conditions vary, insures the ability of the crews to operate effectively. Of course it would be neither possible nor desirable to schedule operation so that all train crews must press hard to maintain the scheduled operation in running time on each trip. The theory must be that the running time called for in each direction for each of the many varied periods of the day is one for the average crew with the average amount of traffic interference normally met in that section at that hour. The running time is only correct for satisfactory operation when it fits this average crew on the average trip. The crew that is normally more competent than the average in reducing or avoiding delays, or that is unusually lucky in having less traffic interference, will be able to make faster than scheduled time. Therefore such a crew must go slower than would be possible for certain sections, in order that the car shall maintain its correct relative position and pass each timepoint exactly on time. The crew that has an unusually difficult run of

luck in meeting more delays from traffic, in collecting more passengers, or in having slower customers, must do some extra hurrying in sections in order to sustain its assigned position. There is no chance that good service can be given if all crews are forced to hustle all of the time.

It should be clear that all of these items now presented are individually of minor importance in introducing delay; collectively or cumulatively they can produce very great delay in getting a passenger from point of origin to his destination. When these delays are eliminated, the actual maximum speed of the street car between two successive stops is not materially increased, the danger from his movement is not at all increased, but the time required per mile of car movement may be very much decreased by the elimination of these many seemingly trivial sources of delay. Speed for the passenger under such control is not coupled with reckless driving nor with increased hazard of any sort. Speed in such a case is only produced because of an alert crew trying to handle well an important job. Because of that alertness and because of the crew's realization of the importance of the work being done the individual trainmen become more valuable in their work, more competent in preventing accidents, and the whole result is much more pleasing to the public as well as more satisfactory to both men and management.

The individual trainmen are carefully watched as to accident tendencies. Any individual weaknesses are noted so that the man may be carefully instructed in ways and means of correcting his carelessness under certain conditions or may be taught how to use better judgment. Constant advice and assistance are being given to the individuals by competent instructors.

Trainmen Watched for Accident Tendencies

Increased speed without increased recklessness is easily obtained if there is organized supervising agencies in the use of time, so as to give the passengers best possible quality of service and so as to make the best possible use of the street space. Such operation develops better public confidence and creates wider public usefulness. It need not increase the hazard, but should reduce it even in spite of the growing density of traffic. The record of 5,015 conductors and 3,969 motormen, operating throughout the year 1930 without chargeable accident, will substantiate the claim that increased speed does not produce increased hazard, if from the words "increased speed" we take the proper meaning and do not couple the term with the popular conception of recklessness.

Soon it will be possible, after the new company is formed to take over the new franchise, to obtain many improvements in the older cars and many improvements in the form of new cars and equipment which will make for safer operation, still further reduced delays, and further increase the value of the service.

The value of time has been consistently pressed into the individual minds of the people, so that all are impatient with delays, and the entire public is measuring critically the time needed in getting from here to there by different forms of transportation. It is highly important for a public carrier to find ways of reducing the time of each trip in every way that is possible consistent with safety. The best speeds of automobiles cannot be realized in city service with reasonable safety, but it is possible to operate street cars so effectively that a trip of reasonable length of several miles may be made nearly as rapidly by street car as by private automobile; considering the time of parking or of getting out the car, it is frequently possible in the busier sections to make the trip faster by street car.

Such speed is not coincident with reckless operation. As mentioned before, it is accomplished by careful attention to avoidable delays. Again we come back to the need for thinking of this subject in terms of cutting out delays, getting there quickly and improving safety.

CHAIRMAN SHAW: The discussion of this paper will be led by Mr. Chester J. Long.

Discussion of Mr. McIlraith's Paper

By CHESTER J. LONG

Safety Agent, United Traction Company, Albany, N. Y.

I realize that my part on this program is to lead a discussion, rather than to do the discussing myself.

However, with your permission, I should like to say a few words with respect to this carefully prepared paper that Mr. McIlraith has given us in so far as it is applicable to the property I represent.

During the month of July this year, as compared with the corresponding month of 1927, the year we began our present organized accident prevention program, our average running time between terminals was 9.43 per cent faster.

It might be well to add that during this four year period, having in mind the first six months of each year, there has been in the three counties in which we operate an increase of over 16 per cent in the number of automobile registrations, while during the same period we have had a decrease of over 30 per cent in the number of our accidents with vehicles and pedestrians.

This reduction in accidents has been brought about mostly because of the wholehearted response and effort on the part of the platform men to the appeal of the management to help prevent accidents.

We do feel, however, that with the faster schedules, automobile drivers are apparently more content to follow our cars thus lessening the possibility of the cutting-in-ahead type of accident. The platform men are more alert. The mechanical department has assumed a greater moral responsibility even to small details having in mind that an equipment failure at a higher speed may result in a serious accident (incidentally there are fewer car failures). The management has improved the equipment by installing air gongs, removing the apron style of fender and increasing the acceleration and breaking efficiency of the cars. All of which, in our opinion, have helped to decrease the operating hazards, while the last two items have given to the platform men that sense of confidence so necessary for the proper and safe operation of their cars.

Coming back to Mr. McIlraith's paper, he said: "Most drivers do seem to understand that it is unfair for a single automobile to delay a street car carrying a large number of equally important citizens." Also that: "Street cars may be operated with greater safety than can any public carrier running on rubber tires." With respect to the latter we find that our buses operate about 400 more miles per accident than do our cars.

I wonder what the experience of the other members present has been with respect to these and other statements that Mr. McIlraith has made.

General discussion is in order.

W. J. McCARTER (Assistant Superintendent, Personnel Department, The Cleveland Railway Co., Cleveland, O.): I am interested in the work of the Chicago Surface Lines in disconnecting the interlocks. I suggested to our operating department that we disconnect the interlocks on doors of two-man cars and leave the responsibility up to the conductor, so the car could start with the door open if there wasn't anybody in the door. The operating department sent a man out to check on this and reported that it would be impossible to save more than half a minute on a trip on one of our longest lines which is about 10 miles. I wonder if the Chicago Surface Lines have any statistics on this problem.

MR. O'CONNELL: One of the last lines we analyzed is in the northwest section of the city. With the use of interlocks on front and rear doors it required 78 minutes to make the trip of about 12 miles. After the interlocks were removed, and bell signals were used, that trip was made in 65 minutes, or a reduction of 13 minutes. That is about a minute faster per mile. We had the same experience on our Madison Street

line, where we operated with interlocks, with trailers, similar to Cleveland's operation. On a 7-mile run from Austin Avenue on the west to the downtown district, we cut off a minute a mile. The decreased speed was not the only factor which led to disconnecting interlocks. We do some heavy loading on the lines from which we removed the interlocks. If we scheduled 15 cars to pass through in 15 minutes we were lucky to get 15 through. Most of the time we got only ten, or twelve at the most. The crew would come to a corner controlled by a signal light, and the car would stand there, the light would be red again in another half a minute. We couldn't give good service with interlocks. We couldn't depend on our cars being where they were supposed to be. The service was too slow, we couldn't carry the passengers as fast as they would like to go. We had to give out more running time and laying time, and that increased the operating expenses of that particular line.

E. K. EASTHAM (Director of Personnel, St. Louis Public Service Co., St. Louis, Mo.): Local conditions control a great many of these things. In St. Louis our Olive Street line has the heaviest traffic and has the reputation of being the fastest city line in the United States. That is something for a big city line operating over 12 miles per hour. We run interlocking cars altogether. On our two-man cars that haven't the interlocking feature, we insist that the doors be closed before the car is started. We consider that as a safety feature.

There are several factors to consider and we can't make any arbitrary statements on a proposition of this kind. You haven't the same situation in your courts and your legal profession in Chicago. Whether we have the interlocking system or not, men are discharged if they start a car when the door is not closed and the steps cleared. We have brought our running time in the city to over 10.5, and that includes not only between terminals but also the layover. That is an increase over two years ago when we had 9.6. We have increased the speed to that point, and at the same time, in those two years, have materially reduced accidents. My understanding of this particular subject is, how far you can go in increasing your speed. These other things, the number of stops per mile and all of those, are important factors in the situation, but how far you can go in busy city streets in increasing the speed of your street car without increasing accidents. We haven't gone that far. We are still increasing the speed and reducing accidents. I have always felt that there is bound to be a dividing line somewhere, though, and I don't know yet whether we will ever be able to put our finger on it. Up to a certain point, increasing speed makes motormen more alert; up to a certain point it may have the effect that is described of gradually (although it will take some time) making the automobile driver give the right-of-way to the street car.

I would like to hear from some others whether there is a final point beyond which, if you increase speed, with all of your improvements in equipment and so forth, you will increase accidents. We don't know just where that point is, and it varies with the conditions in particular cities and places, yet there is no question, other things being equal, that it takes longer to stop at a higher speed than at a slower speed, and there is bound to be some point where an increased speed will increase accidents.

A. A. OLDFIELD (Safety Director, Wisconsin Power and Light Co., Madison, Wis.): I want to substantiate Mr. Long's remarks. In our combined operation we find the same thing regarding our bus miles per accident.

MR. McCARTER: I don't see anybody from Milwaukee here, but an experiment they had might be interesting. Of course we are all thinking somewhat in terms of one-man operation. Sometimes we over-emphasize the value of these interlocks on the street car. Aside from the accident hazard in taking off the interlocks, considering the speed alone, in Milwaukee when they put in the one-man line, they increased the speed because they felt one man could operate faster. That worked fine as long as they operated on the type of car that had an interlock, but with cars that had previously been open cars, which were then made one-man cars, with the interlocks, they had a terrible time with the schedule. They had to meet every car about one-third of the way down, until that schedule was changed. They were confused by the

fact that these interlocks themselves may cut down the running time, whereas on one-man cars, with interlocks, going in at the same time, there is the advantage of increased speed. We didn't get the true state of affairs in connection with the interlock.

DR. C. P. SEGARD (Assistant Secretary, Third Avenue Railway Co., New York, N. Y.): I am inclined to agree with Mr. Eastham, that local conditions largely determine what your safety devices should be. In the lower East Side of New York if we allowed passengers to stand on the step they would step off backward. On some of ours we are getting as low as 5 2/6 miles.

With regard to bus and car mileage and the accident ratio of each; when we started operating buses the mileage per accident was exactly the same as the trolleys, but the number of passengers carried was naturally from one to two and one-half in favor of the trolleys, allowing 100 per cent standees for street cars and 50 per cent standees for buses. With the number of changes in the buses, more particularly with regard to a better type of business and more intensive training, we have now placed the buses at about 400 miles above the trolleys per accident, and the buses have passed the trolleys in the number of passengers per accident. We count the accidents in the track department and mechanical department as well, so our figures include all accidents within the company. Our buses are now running 24,000 passengers and 1700 to 1800 miles to the accident, our trolleys being below that.

MR. O'CONNELL: There seems to be a controversy about the bus being safer to operate on a street than a rail car. When we make claims like that it must be carefully considered. Can they be truly compared? If we use buses and rail cars where they are supposed to be used, then they are in different territories. The bus always operates in a sparsely settled region or in a region where the traffic density is low. In Chicago the maximum number of passengers we can carry per hour is 4000. We have street car lines in the city of Chicago that run as high as 20,000 passengers per hour. We wouldn't attempt to use a street car the way we use the buses, or the buses like the street cars.

It stands to reason that the business in those areas is correspondingly less. There is less chance for buses to have accidents because there is less traffic. The street cars are in heavy traffic all day long. I don't think you can honestly compare the bus and the street car.

E. D. DOANE (Statistician, Department of Street Railways, Detroit, Mich.): I feel that local conditions may vary the operation of various types of conveyances. Our bus operation runs about 33 1/3 per cent more miles per accident, in other words where our street cars are doing 6000 miles our buses are doing 8000 miles per accident. We have parlor type of buses, with a limited number of passengers, and other buses that run through the downtown section, some running through and some in and out of it again, but practically the same operation. With the exception of our parlor coach operation the average for accident hazard is about the same with the coach run down town or in the outer sections.

PAUL HANSON (Safety Engineer, East St. Louis and Suburban Railway Co., East St. Louis, Ill.): I think the problems in smaller communities are comparable. When I first heard Mr. McCarter's talk on increased schedules in Springfield several years ago, I thought it was another engineer with a pipe dream, and didn't think it could be done. But since that time we have practically changed over all of our city operations to one-man cars with absolute safety features on every car. We have increased our running time. In 1930 our accident rate was almost 50 per cent less with that type of equipment than we have ever had at any time. We are making better time with interlocking devices on our cars than we did with the open type car.

When first put into operation we did have an increase in accidents because the men were not accustomed to "stepping on it," so to speak, and they were upsetting passengers when they stopped the cars. We are getting away from that. One thing that we had to do was put more resistance on the first point on the controller, and that eliminated about fifty per cent of the falls in the cars. We have taught the men how to start the cars without upsetting the passengers.

You can make just as much speed and possibly more with interlocking devices as with open cars. I am sold on the idea in spite of the fact that a few years ago I was on the other side. On our treadle-operated-door cars the step in the rear of the car must be from an inch and a half to an inch to make the contact. Some people fall over that, thinking the step is starting to give.

Increased speed can be accomplished with safety. I am strongly in favor of interlocking devices on cars. It doesn't seem to me to be the safest move to have people boarding cars some distance before the car stops.

W. H. BURKE (North Shore Line, Milwaukee, Wis.): In 1923 we discarded all old type two-man cars in our city operation, and developed a one-man car 52 feet long with electric air control. Increase in schedules will materially assist you in reducing the number of accidents. In 1923 we carried on an average of only about 2,174 passengers per mile. All accidents, chargeable and non-chargeable, are considered as accidents. Up to the thirtieth of September we had operated 24,784 miles per accident. All doors are control doors, treadle rear entrance; the front exit is treadle.

From my experience on speeding up the schedule, I found it made the operator more alert and at the same time it educated the automobile driver, that is it gave you a little more respect than when you were crawling along the streets. I dare say the braking facilities of the automobile have greatly assisted in that. I am strongly for the step control, and wouldn't want to go back to the old system. The actual figures are these: We were operating practically 2000 miles per accident, and up to September 30 we are operating over 24,000 miles per accident.

MR. O'CONNELL: In our street car operation and our bus operation, although we have made no changes to interlocking doors, we have found that boarding accidents have decreased in the last few years tremendously, and I wonder if it isn't because of a better riding public rather than the change in doors.

MR. O'CONNELL: You may have misunderstood me. When I speak of having no encouragement for interlocks, that is confined strictly to two-man cars. That is ordinarily in our minds here in Chicago simple arithmetic. If a man can get off the car and get to the curb before you can go, you have lost two seconds.

On one-man cars we have interlocks. We have 114 trolley buses in operation in Chicago and they are interlocked, treadle-operated rear-exit door only. The front door, which is under the operator's control, is perfectly free, and if you want to talk about a line of demarcation in schedule speeds we can show you some of those bus lines that are operating between terminals up to 13 1/2 miles an hour. They are doing brisk business, and I doubt very much if we could begin to do it otherwise. We find it to be an asset that you cannot possibly eliminate and expect one-man operation to be successful. It has more than exceeded our expectations, and we have it interlocked with the power.

MR. EASTHAM: Do your men start the cars with the doors open?

MR. O'CONNELL: Yes.

MR. LONG: Have you shown a decrease in your boarding and alighting accidents?

MR. O'CONNELL: Our system as a whole would make it very hard to find an increase or decrease. It is pretty stable.

MR. BURKE: The first ten months in Milwaukee we have not had a boarding and alighting accident.

SAMUEL H. REID (Vice President, Bureau of Safety, Chicago): This discussion has been very interesting. It has brought out the experiences that we have had in the different cities. St. Louis seems to be wedded to one idea which seems to work. Chicago has another and the other cities are having their experience. The all-important thing which I think should be emphasized at this time is the training of the men who operate the cars. That is necessary whether you have the interlocking or non-interlocking doors. It is necessary whether you have slow speed or fast speed. The thing is to so train the men that they will operate that equipment with a minimum of accidents. The experience of some show that it can be done, and I think

that every fellow here, when he goes back to his property, will be just as sure that his method of operating cars is the right one as when he came. I feel that it is all-important to train the men to operate the car under these everchanging and increasingly hazardous conditions. That applies not only to training but proper supervision of the men throughout the entire system.

CHAIRMAN SHAW: There is one question, before we pass on. I want to ask Mr. Burke about his increase. Was that from 2000 to 24,000 miles per accident, and for what period?

MR. BURKE: It is from 1923 to date, 2000 miles per accident in 1923, 24,000 miles at present.

CHAIRMAN SHAW: Is that per chargeable accident?

MR. BURKE: Everything included. It is city operation, in the city of Milwaukee. The North Shore Line operates the city line in Milwaukee. It is one city line.

Those accidents include everything but broken glass. They include boarding and alighting, falling in the car, torn clothes, and so forth. We had 12 accidents for the ten months. Three of those were head on, one struck while standing, one a lady falling down in the car while the car was standing still, one where a drunken driver struck the side of a car, and one trainman struck a car.

MR. EASTHAM: How much mileage was that?

MR. BURKE: About 237,000 miles a month.

MR. EASTHAM: Does that line operate in the business section of Milwaukee?

MR. BURKE: Downtown in the heart of the city.

CHAIRMAN SHAW: The reason I raised that question was if you did include all accidents it seemed remarkable that you would be able to operate so many miles per report. During 1931 we have been operating in Akron, buses and cars combined, with a little better than 10,000 miles per collision, including all reports of collisions, and I thought that was a very good record.

Our next paper was to have been given by Mr. Dana, of the Boston Elevated Railway. He was here yesterday and participated in one or two meetings, but was unable to stay over today, so he has turned his paper over to Mr. Ralph C. Bush, Manager of the Mutual Insurance Company of the Boston Elevated Railway. He will present Mr. Dana's paper.

Justifying An Accident Prevention Program

By EDWARD DANA

General Manager, Boston Elevated Railway, Boston, Mass.

There can be but one justification for any particular accident-prevention program: that is, results. On the other hand, there is no justification for any electric railway not having an accident-prevention program of some sort.

Now what do we mean by an accident-prevention program? "Program", in the sense that we are using it here, is a plan of future procedure. In other words, an accident-prevention program consists of things to be done which in the doing will reduce the number and severity of the accidents that result from the operations involved in the occupations under consideration.

In speaking upon the topic assigned to me I shall draw upon the experience of the Boston Elevated Railway as the source of illustration of the fundamentals of the subject. The railway has been a pioneer in accident reduction for many years and has applied in this field most if not all of the principles which have proved to be sound. The railway and individuals connected therewith were awarded the three Anthony N. Brady safety medals in 1914, in recognition of the results achieved during the year ended June 30, 1914. This was the first year of the award. The railway was also awarded the gold medal in 1929 for its record during the year ended Dec. 31, 1928. Finally, on Thursday, Oct. 1 of this year, we received the

Brady award for the third time. In view of this record it should be possible to draw some helpful conclusions from this company's experience.

That the Boston Elevated management had grasped the essentials of accident prevention before 1914 is indicated by this quotation from the presentation to the Brady award committee in that year:

"It is the duty of the transportation company, desiring to meet its highest responsibilities, to adopt effectual mechanical safeguards and to create *safe habits* in the men. To this end, this company has eagerly sought for the former; it has attempted to be alive to the times—if possible ahead of them—and through all channels has tried to keep itself informed of the new thoughts and inventions in this line. To create the safety habit among its men it is doing everything which is known to the transportation world from the time the applicant enters the employment office until his connection with the company comes to an end."

Fifteen years later in its presentation the railway expressed the fundamentals of accident prevention in terms that restated the same attitude while suggesting the progress that had been made during the interim. A brief quotation which illustrates my meaning:

"Two fundamental principles have determined the policy of this railway in its safety work:

"1. That safety is an integral part of management and not something to be taken care of by a special department charged with the administration of safety features only.

"2. That all specific safety efforts must be preceded by and based upon thorough research into past accidents and their causes. The hit-and-miss, trial-and-error type of safety work, which uses hope in place of cortical energy, has been discouraged by this railway."

That the Boston Elevated accident-prevention program has justified itself can be proved by a few recent data. It might be well for me, before quoting data, to explain some pioneer research work that we have been doing for the past few years. This research work was instituted because the Railway was confronted by the rising costs of accidents which has been in progress since the World War. The average cost of claims settled without court procedure has been steadily increasing, and there have been much larger increases per suit from the cases which have gone to the Superior Court. Moreover up to 1927 the percentage of reported accidents which resulted in claims had been steadily increasing. The result of all this was a marked increase in our costs for injuries and damages, which rose from \$620,208 in 1922 (the minimum for a long period) to \$1,400,056 in 1929. These sums include salaries and wages in the legal department having to do with accident claims.

Confronted by these rising costs the Railway in 1927 instituted a study of the human factor in accidents, which was believed to promise most by way of results. Previously considerable sums of money had been spent in bettering the operation of the system and in making the plant and equipment as safe as possible.

Attention was at first concentrated on the car operators whose records showed them to be "accident prone." Each case was studied and remedies were prescribed. A corps of safety inspectors was organized and trained partly to assist the accident-prone operators to overcome their disabilities if possible. As a result collision accidents during 1928 were 17.8 per cent fewer than those in 1927, and 26.6 per cent fewer than the preceding 5-year average.

The average of all collisions for the three years 1925, 1926 and 1927, was 2.3 per 10,000 miles of car and bus operation. In 1930 the average was 1.3 per 10,000 miles, a reduction of 43.5 per cent. The reduction from 1929 to 1930 was from 1.51 to 1.3 per 10,000 miles, or 14 per cent. Thus it is evident that the measures taken to reduce accidents have been of continuing value, and not transient in their effect.

The total cost of injuries and damages was stated earlier to have reached over \$1,400,000 in 1929. This was the second year after the research program had been inaugurated. The cost for 1930 was \$1,112,294 or 20.3 per cent less. During the

first half of 1931 there was a further, although smaller, reduction. Obviously the financial benefits lag somewhat behind the reduction in accidents because in many cases a year or more must elapse before the costs are finally settled.

In making comparisons of recent costs to the Boston Elevated of highway accidents in which it is involved allowance must be made for another factor which affects the financial showing due to accident reduction. On March 1, 1930, the Railway adopted the policy of preventing litigation, as far as possible, and of settling quickly for liability for accidents or for incidents reported which might develop into claims. The speedy settlement was to eliminate, wherever possible, costly suits, unnecessary payments to physicians and lawyers, and expensive jury verdicts. The wisdom of this plan is shown by the fact that at the end of the year 1930 there were 371 fewer suits pending in the Superior Court than at the end of 1929, as well as fewer claims outstanding.

The Human Factor in Accidents

Having outlined the experience of the Boston Elevated Railway in general terms, let me now enlarge upon the railway's recent activities in accident reduction.

The fact that some employees have no accidents, or practically none, while performing their duties, while others working under similar conditions have many accidents, is proof of the fact that most accidents are due to the human factor. They may be caused by insufficient training, by lack of proper discipline, by lack of interest in the job, by worry or other distraction, by poor health, by a wrong attitude toward the job, the employer, the worker's associates, or life in general.

To a large extent, therefore, the solution of the accident problem lies, first, in a study of the individual who tends toward having accidents, and, then, in the application of suitable corrective measures. One case may require simply instruction in the correct method of performing the worker's job; in another case stricter discipline may be required; in a third case aid in the solution of some domestic, business or health problem may be required.

Realizing the importance of the human factor in accident reduction, and therefore in the application of sound psychology in this field, the management of the Boston Elevated Railway several years ago arranged with the Personnel Research Federation of New York to study the possibility of cutting down highway accidents involving its surface cars and buses. Colonel W. V. Bingham, director of the Federation, made a personal study of our situation and assigned Dr. C. S. Slocombe and a small staff to give their entire time to the Railway for an extended period.

From the start it was evident that the best results could be secured by concentration upon the accident-prone motormen of two-man cars and trains and operators of one-man cars and buses. While all types of accidents were included in the study, the collision type was seen to be the one wherein the greatest possibilities of reduction lay.

In due course these car and bus men, first in one division then in others, were divided into "high-accident men" and "low-accident men." A man who had had five or more accidents in a year came in the first group, the others in the second. The accidents included comprise all of those on a man's record, whether chargeable to him or not.

These high-accident men were then given special study and treatment. Accident records were searched to discover tendencies toward particular types of accidents.

Due regard was given to physical and mental condition of the high-accident men. As a result of all this collision accidents were 17.8 per cent fewer in 1928 than in 1927, the best year up to that time. The record for 1928 was 28 per cent under the average for 1925, 1926 and 1927. The record for 1929 was 17 per cent better than that for 1928, and that for 1930 was more than 14 per cent better than that for 1929. Comparing 1930 with the average for 1925, 1926 and 1927 the reduction was over 43 per cent.

The reduction in collisions was accomplished almost entirely as a result of individual study of high-accident men, coupled, of course, with due safeguarding of locations of especially hazardous nature.

Illustrations from Experience

A few illustrations will show just how this plan works out.

Illustration No. 1. An elderly motorman was involved in eleven collisions in one year, most of them with vehicles hit just as the car was starting. He had no home worries, was financially independent, was of good personality and interested in his work. A medical examination showed good health, but defective hearing, especially in one ear. It developed that he had earlier had a boarding accident due to starting his car without a signal.

The conclusion was that, realizing his deafness and the fact that he had had a boarding accident on this account, this motorman was unduly intent upon hearing the signals, so that his attention was distracted from street traffic conditions at starting. He was cautioned to give street traffic due regard, and was followed up until he had formed the correct habit. His accidents at starting ceased and his accident record otherwise became entirely creditable.

Illustration No. 2. A motorman had six accidents on curves out of a total of ten in a year. His physical, mental and social conditions were normal. Investigation revealed habits of fast and reckless operation, particularly on curves, where due allowance was not made for the overhang of his car and for clearance between automobiles and his car. Instructions concentrated on the necessity for more cautious operation, especially on curves. The response was satisfactory and special discipline was unnecessary.

Illustration No. 3. A motorman was having accidents apparently because he could not anticipate the movements of automobiles ahead of his car. Tests showed him to be highly intelligent, but it was learned also that he had a habit of trying to be on the right side of his superiors by making a good impression, rather than performing his duties well. There were no physical or other handicaps in this case. Firm discipline was obviously required here. As soon as he realized that his superintendent was not to be "fooled" this man's accidents ceased.

Illustration No. 4. A bus operator had several accidents with automobiles overtaking him on the left, and others in which automobiles ran into the rear of his bus. He was also involved in collisions at intersections in turning from one street into another. He was in good physical condition, but made a poor record in mental tests. He was a steady, sober worker.

This proved to be not a case of negligence but rather of inability to operate properly. A check on this conclusion was furnished by the man's difficulty in attending to the clerical part of his duties. He was really not fitted for bus work, but he was given special instruction and no discipline with the result that in the year following the poor record he had no accidents.

Illustration No. 5. A young motorman had a bad record of avoidable accidents. Reaction tests showed him to be very hasty and inaccurate. His car operation was reckless, and the mistakes in his fare collections and reports were frequent. He was careless in his relations with patrons. Investigation showed him to be in business outside of his railway hours, and his interest and attention were thus divided. The condition also resulted in an attitude of independence not compatible with his duties.

This was a case for strict discipline, as the motorman was capable and well able to perform his duties. The discipline resulted in marked improvement which, with continual follow-up, proved increasingly beneficial. Only one accident occurred during the year following the study, and only one instance of incorrect turn-in of fares.

Illustration No. 6. A motorman had such a poor accident record that he had been transferred for a time to a non-operating job. Later he was permitted to return to

car work. His blood pressure was high and he scored low in mental tests. His attitude was good and he tried hard to do good work.

In this case discipline was not required, but rather medical attention and adjustment of duties to fit the situation. The man was induced to pick a run on a route where he would not have many emergency conditions to meet, and he was given frequent instruction. Medical attention was also given him to reduce his blood pressure. His accident record was soon materially improved.

These illustrations which I have given indicate the differences which exist among car and bus operators and the difficulty of reaching them by any mass action.

Safety Supervision on the "EI"

The frequent reference which I have made to instruction, supervision and follow-up suggests an explanation of the administrative changes which we have made in connection with our accident-prevention program.

The transportation department of the Railway, for administrative purposes is separated into divisions, each with its superintendent, all reporting to the general superintendent. Formerly each division superintendent handled his own problem of supervision. After the accident-prevention program had been well inaugurated, the necessity for special safety supervision became evident. A small corps was selected from the supervisory forces, with a "supervisor of safe operation" at the head, to assist the divisional supervisory forces in helping the accident-prone motormen and operators to improve their operation.

As the work progressed it became evident that the safety phase of operation is closely tied in with instruction and follow-up. A logical step thus was to make all supervision and road instruction the special function of the safe operation division, the head of which reports directly to the general superintendent. Under this arrangement the division superintendents retain all authority over the men, but the safe operation division supervises operation, gives necessary instruction and recommends discipline when necessary.

The employment and instruction division of the transportation department formerly included a small staff of line instructors for the purpose of following up the instruction given in the instruction school. Under the new plan these instructors were transferred to the safe operation division.

The Personnel Research Federation is retained in a consulting capacity, to review the results which are being obtained and to suggest changes in procedure which might profitably be made.

Other Phases of "EI" Accident Reduction

Deraillments. Up to this point I have discussed highway accidents, particularly collisions, because these have been the ones which seemed most to require attention three or four years ago.

Another, less spectacular development has been going on with us at the same time. I refer to reduction in car deraillments and split switches. These are seldom the cause of personal injury, but they cause delays in service and are a source of some danger to public and employees. The Boston Elevated has brought accidents of this type within control partly through the operation of an inter-departmental committee which studies each accident on the spot and prescribes remedies for the particular type of accident thus illustrated. From more than 900 accidents of this type in 1920 the number was brought down to 145 in 1930, a decrease of 23 per cent as compared with the preceding year. The improvement is due to the use of better equipment and to better maintenance and operating practices.

Deraillments have come to be an almost negligible element in service delays. Most of these are now caused by conditions beyond the Railway's control, such as fires and broken-down vehicles on tracks.

Industrial Accidents. Let us turn now to employee accidents, which have also been greatly reduced on the Boston Elevated Railway.

In the shops, garages, and carhouses the most modern appliances and practices have been used to promote safety. This result is reflected in the premium rate which is set by the Massachusetts Rating and Inspection Bureau under the Workmen's Compensation Act and which determines the amount which the Railway must set aside for payment of the coming year's industrial accidents. After a reduction in premium rates from 1920 to 1930 of about 66 per cent for office employees, 32 per cent for shop employees and 29½ per cent for all other employees, we had a still further average reduction of over 6 per cent for the current year. Our advance premium for 1931 is \$119,000 as compared with \$130,000 for 1930. The difference of 8.5 per cent is partly due to the reduced rates mentioned, and to some reduction in payroll.

Our several departments of power, maintenance, rolling-stock and shops and transportation and the general administrative offices all have their own plans for promoting industrial safety. In all cases, however, the fundamental principle is the same as that followed in the case of public accidents, namely, provision of all possible safeguards, strict discipline and careful study of each accident to discover the causes with a view to minimizing the chance of the same accident occurring again.

Same Plan is Applicable in Other Fields

In conclusion let me state my conviction that the methods which get down to the fundamentals, as employed successfully by the Boston Elevated Railway, are applicable to the solution of the highway accident problem. To be sure, the electric railway has the advantage of centralized, responsible business management, whereas the highway accident situation must be controlled through several agencies. However, the methods which are successful in one case can be applied in the other if the situation is faced squarely and the problem attacked efficiently.

We have only scratched the surface in the control of highway accidents. In Massachusetts the methods employed by the Boston Elevated Railway are being tried out by the Registrar of Motor Vehicles, with the aid of the same expert assistance as the Railway employed. In the City of Somerville during the ten weeks following the inauguration of a new program there were no fatalities and the number of reported accidents dropped from 450 in a comparable previous period to 320. Research has shown that the motorists who are prone to accidents number only about 5 per cent of the total. The plan is to isolate these for special treatment as rapidly as possible. Other municipalities in Massachusetts are becoming interested in this way of minimizing accidents.

CHAIRMAN SHAW: Thank you, Mr. Bush. The paper you have just heard is to be discussed by Mr. William Pasche.

WILLIAM PASCHE (Supervisor of Accident Prevention of the Chicago Surface Lines): The very first sentence of Mr. Dana's paper states: "There can be but one justification for any particular accident prevention program, that is, results." That in itself, it seems to me, says a lot; regardless of what our program of approaching accident prevention might be, whether it is correct in our particular cities depends largely upon whether a result is being obtained.

To me an accident prevention program means nothing if it doesn't reduce accidents as a whole, and I am an advocate of a program basing accident prevention so far as taking it to the man on the car, on the basis of chargeable and non-chargeable.

Mr. Dana dealt extensively with the human factor, and I believe that phase of the paper should be discussed. Mr. Dana said: "The fact that some employees have no accidents, or practically none, while performing their duties, while others working under similar conditions have many accidents, is proof of the fact that most accidents are due to the human factor. They may be caused by insufficient training, by lack of proper discipline, by lack of interest in the job, by worry or other distraction, by poor health, by a wrong attitude toward the job, the employer, the worker's associates, or life in general."

"To a large extent, therefore, the solution of the accident problem lies, first, in a study of the individual who tends toward having accidents, and, then, in the application of suitable corrective measures. One case may require simply instruction in the correct method of performing the worker's job; in another case stricter discipline may be required; in a third case aid in the solution of some domestic, business or health problem may be required."

We should have some interesting discussion on the human phase in accidents.

DR. C. P. SEGARD (Assistant Secretary, Third Avenue Railway Co., New York, N. Y.): We have all heard Dr. Bingham and Dr. Slocombe. With some of their statements I have agreed and with some I have disagreed. Nevertheless, in the case of smaller properties, who cannot afford to have these suggestions by psychologists, I want to make this remark: The human is the only variable in the field of constants. Heretofore we have always dealt with the human as a constant, the same as anything else on the property. I mean steel, iron, the car, equipment, tools, and so forth. And the superintendent in our car barn has constantly dealt with his motormen and conductors as though they were part of the equipment, in other words, as a constant, when as a matter of fact the human is the only variable in the whole field. If some of us would get that as a foundation for our future efforts in dealing with the accident situation, that is as Alfred Adler puts it, come to an understanding of human nature, our accidents would be reduced.

Listen to what your instructors are telling your new men and you will find that they are just like all other instructors, including professors. The oftener they tell the story the less interesting it is to the professor, but remember this, it is the first time the class has listened to it. One of my hard jobs has been to sit and listen to the instructor tell the story over and over again just as though he knew it by heart. He did, but it is a new story to the men and he has to make it new every time he gives it to them.

E. K. EASTHAM (Director of Personnel, St. Louis Public Service Co., St. Louis, Mo.): I agree heartily with Dr. Segard. Even with the smaller companies I believe this is not only possible but a thing that should be and can be done. The smaller company probably cannot employ a trained psychologist as has the Boston Elevated to work out its problems, but if the smaller company recognizes what Dr. Segard said, that the human element is the big element, that the big element is a constantly changing element, covering the whole situation, in other words, if in dealing with the accident situation we deal with it as an individual problem, and that can be done both in small and in large companies, there are many of us who, while not in any sense of the word trained psychologists, yet in our living and learning have reached a point where we can do a fair job along that very line of dealing with the human element. So long as we recognize just the fundamentals that we mean when we discuss human nature and the human element, the emotions that sway not just one man but practically all of us, the different environment, the different stimuli that react on different individuals through that environment. I believe that every company, no matter how small, can take one man and in many of the smallest companies the best and highest man they have, and let him make it his job to deal with this subject of accident prevention more from the standpoint of the individual.

We, like most other properties, in the beginning started out in accident prevention work from the collective standpoint, selling the men, and I think in the beginning probably that is sound, but after you have made the men understand what your campaign of education is about, then I think to have the best results you must of necessity get down to the individual. The accident-prone man, mainly, but even the other fellow who from time to time has a chargeable accident—tries to find out why he had that accident. Don't just lump it into the category of packing case of careless or careful, but why is that man in that particular instance careless or careful? That is what we are working more and more towards in our accident prevention work, with considerable success.

T. G. BRANSTON (Birmingham Electric Co., Birmingham, Ala.): Mr. Pasche said,

"results are to be considered in a matter of this kind." We have had some very favorable results in our experience with that practice on the Birmingham property. We have approximately 600 trainmen; about twenty per cent of them operate one-man cars and the others are on two-man cars. We have found that about 13 per cent of our men had 33 1/3 per cent of the accidents. It is a very simple matter when you get the thing analyzed down to a small group, to follow up that particular group and check up on their method of work. It was significant that when we studied these various individuals first in this high group, we realized that it is a bad practice to beat on the desk and call a fellow names when he has an accident, and putting in the category of carelessness what is really thoughtlessness, and what is really the result of a personal habit, is a bad practice.

A man running a car falls into a habit of doing his work that results in accidents through thoughtlessness, and if you can put your finger on that and distinguish it, point it out to him and show him in many cases that it is almost stupidity, that it is the cause of his accidents, you will not only save your company money in paying for other accidents but you have probably preserved a job for that man and you have made him see his job in a different light.

We had a man in our service who was constantly having collisions with automobiles. He had been a good man, in the service a long time, had been through the regular course of training, and should have been familiar with the way to do his work. We had an observation made of his work by the division superintendent and others of the supervisory staff. It developed in the study of that man that he had a habit of crossing his leg and rubbing his ankle and looking at his hand as he stroked his ankle.

I talked to that man. I said, "John, I notice you have a habit when you run your car of rubbing your ankle. Have you lately developed the habit of wearing socks?"

"No, sir, I have been wearing them all the time."

"Perhaps you have lately acquired the habit of wearing silk socks, and you just naturally love the feel of them."

"No," he denied that.

"Maybe you have a sore ankle or foot."

"No."

"Does it occur to you that you are crossing your legs and rubbing your ankle and looking at it as your car is crossing the street?"

"No."

"Well, I have instructed every man in the supervisory department to tell you to put both feet on the floor. Try that on your own account, and you will be reminded of it if you forget it, and I don't think you will have any more cases of hitting automobiles."

He has not had a case since.

We had another man who had automobiles run into the side of his car at intersections. He was a man of a talkative nature. He talked to anyone who might be on the platform, or in a seat behind him. When approaching an intersection he would involuntarily glance in the overhead mirror to see if a passenger was getting off or on the car. When he looked down he was into the intersection and an automobile would be on him. The first impulse was to stop the car, and the automobile would run into the side of the car.

In the first place we told him he would have to stop so much conversation; that he must quit looking in the mirror and pay attention to the signal. As a result that man has not had an accident of that character since that interview.

You will find in many cases that the majority of those accidents are the result of thoughtlessness rather than what is termed carelessness, and a study of particular personal habits will frequently improve the type and quality of work that that man is giving you and reduce the accidents. We have made observations of about 50 per cent of our personnel, with results that we have reduced the amount of money we are actually spending for accidents and our men are today drawing an accident bonus.

PAUL HOBSON (Safety Engineer, East St. Louis and Suburban Railway Co., East St. Louis, Ill.): I can't help giving the National Safety Council and this Section credit for a great change in the accident prevention work on our property. I tried for several years to get the superintendent of transportation to stop hard-boiled tactics in talking to men. The first thing, on entering the room, they were met with a downpour of thunder and they were scared to death. Consequently he got mostly lies. We changed superintendents a few months ago. He is doing what we think is right. His method is talking to them and asking them if they are right or wrong, and he asks them how much time they think they should serve. One fellow said, "Well, I don't think I should get over two weeks for it." He got only five days, and he was happy.

This man after attending these sessions several years ago changed his ideas of things, because he had worked under the other superintendent, and I must give him personally a great deal of credit for our reduction in accidents. He gives more discipline than the other fellow did, but never to one man more than once, because they think a great deal of him. I believe these sectional meetings did the trick.

MR. PASCHER: We in Chicago have tried for the past six or seven years to break down the so-called hard-boiled side of discipline, but I still have to find the man that could enjoy being suspended for one day or five or ten. I would like to meet that superintendent out there and understand his psychology and find out how he can make a man like to lose about thirty dollars. However, we do believe that the hard-boiled methods are things of the past, and we are trying to inject into this big picture this human factor, and we are having considerable success.

CHAIRMAN SHAW: Gentlemen, we have been coming here for a number of years, we have been hearing reports about wonderful reductions in accidents, and so forth. Some of those reports pertained only to chargeable accidents and some to all reports. It would be beneficial to this Section if we could actually talk about how much our accidents cost, per mile operated or per passenger carried. I think we would be more likely to understand each other.

At the close of the year when the books are finally audited, the boss wants to know what it cost. He wants to know what those accidents cost the company. In that connection, I have been making up such a report on our property. We did show a net saving of over \$90,000 in '30 as compared with '29. It would be a benefit to this Section if we could discuss our accident costs. For some reason we have more or less kept them under cover, and as a result we haven't always understood each other.

ADJOURNMENT

Wednesday Morning Session October 14, 1931

GLENN H. SHAW, Chairman
Ohio Edison Company, Akron, O.

The session convened with General Chairman Shaw presiding.

CHAIRMAN SHAW: The first paper this morning is to be given by Mr. McCarter of the Cleveland Railway Company. I don't believe there is any subject more important than that assigned him, or one that has received more consideration recently.

The Accident-Prone Employee

By WALTER J. McCARTER,

Assistant Superintendent, Personnel Department, The Cleveland Railway Company, Cleveland, O.

All of us have worked with accident-prone men, whether we have called it by that name or not. Some of us may not have classed it under that name, but may have called it discipline or training. The advent of the term "accident-prone" may have caused some of us to concentrate a little more on this type of man, and it may have confused some of us who were doing the same type of work without giving it a specific name.

None of us who follow the trials and tribulations of "Mut and Jeff" would doubt for a moment that they are prone to having accidents. Or if "Jiggs" were required to report some of his misfortunes, most of his reports might read something like this:

"Headed eastbound out of house with full power on, when a westbound rolling pin traveling at a high rate of speed, cut in front of me and hit left front nose just below two eyes. Rolling pin slightly damaged."

The accident-prone study usually starts from a series of reports, each containing about that much information. Just as a doctor must use as his starting point whatever the patient happens to tell him, so must we, who are trying to diagnose the troubles which cause accidents, start with the accident report and work from that. To carry the analogy a little further, the accident-prone work as necessarily carried on by the smaller companies, as compared with the larger, could be compared with the old country doctor who was often somewhat of a genius, as contrasted with the clinic of the larger cities, which is made up of a group of specialists.

Many visitors of our company have been very much discouraged because, as they said, they could not duplicate all of our specialization. Sometimes it may seem that we give altogether too much attention to the specialized phases of accident-prone studies. Does specialization help? It certainly does, but it is not indispensable. Here again let us consider the medical profession. The old country doctor had to do everything by himself. He had no heart or lung specialist, no skin specialist or psychiatrist, whom he could call in, but did he need them? As a rule, he knew his patients so intimately that he was, in fact, his own psychologist and often a pretty good one at that. Common sense remains common sense, whether we dress it up in technical terms or speak of it in everyday language. So it goes. It has taken many specialists to replace the old country doctor, and although we have seen some improvement, we have also seen complication resulting from lack of intimate contact between doctor and patient.

Accident-prone activity is that way, too. If some of us who now and then cast longing eyes toward the specialized work of some of the larger companies and say to ourselves, "How can I carry on any sort of activity all by myself, when I can't get the money to make a set-up like so-and-so has?"—if we could only remember that

some of the specialization which we desire results from the sheer clumsiness of a large organization, then perhaps we might be able to see the situation in the true light: that while we may be handicapped here and there in our efforts, there remains much that we can do well, if not better than any one else, regardless of the organization of our accident prevention activity.

The causes of accident-proneness are varied—physical ailments, mental trouble, domestic grief, or eye-trouble of the sort that Walter Winchell describes. Walter was telling of a young fellow who was walking along the street and happened to see a girl who struck his fancy.

He walked up to her and said, "Pardon me, but do your eyes bother you?"

"Why, no," the girl replied.

"Well," said the young man, "they bother me."

There have been cases of motormen who were accident-prone from that very cause. Such a case was Case No. 12. He was a young chap, married, with about as fine a family as a man could wish for. From all outward appearances, he had everything that the average man would ask for, but that didn't suit him. He started running about with other women, and it wasn't long before he had just about gone to the dogs. Long before he became accident-prone, the company was experiencing trouble with having his wages garnished about every pay-day. The station complained about his frequent missing, and in general, he was falling into bad repute. Confronted in his accident-prone study with the seriousness of the situation, the possibility of losing his job, and general trouble from all sides, he promised to straighten up, and he must have kept his word. He has had no accidents in the last four months, as compared with six accidents in the first four months.

The other day, while riding along on the train, everything was quiet as could be. A little boy about four years old was sitting across the way and had been keeping very quiet for a boy his age, when suddenly he announced at the top of his shrill, little voice, "Mama, I gotta go to the bathroom."

That, in a few words, was the trouble with Case No. 20. He is a man 64 years old, weighs about 165 pounds, and is a pretty good-natured sort of a fellow. He kept getting involved in a large number of accidents. Compared with other men operating under similar conditions, he had a great many accidents which, it seemed, should have been avoided. Observations of his operation showed some operating faults, but no worse than those of many other men who were keeping their records fairly low. Upon being brought in for interview and questioned closely, he volunteered the information that he had great difficulty in controlling his bladder on long trips where he had little layover, and he felt that it could not help but affect his operation. A visit to the doctor revealed an enlarged prostate along with other physical ailments which resulted in shifting the man to a shuttle car where a toilet was available every five minutes.

An entirely different case was No. 3. Speaking of his mental ability, you could say with no fear of contradiction that he lacked about ninety-eight cents of having the right change for a dollar. We knew when he came in for an interview that he could neither read nor write, because he brought along his brother to take care of anything of that nature which he could not handle. What we did not know was that his brother came along to try to help him through any troublesome situations, and was quite incensed when he found that he would have to be interviewed without his brother's assistance. Upon being interviewed and tested, it was evident that the man was dull mentally. The question was, just how dull? Fortunately, it was possible to give him the Stanford-Binet test, which classed him as definitely feeble-minded. He was transferred to a watchman as it was felt that he was bright enough for work of that nature, but he failed on that position. When later he was shifted to car sweeper, he quit of his own accord. He was an extreme case, it is true, but it did occur, and that is the way it was handled. More often, the man's mental ability is such that by doing the best he can every day, he can just about manage to keep an

average accident record. But the man must be made to take his job seriously, which is not so easy, especially with younger men.

Take Case No. 32, for example. He was a young man with ability, all kinds of it; so much, in fact, that he didn't feel that it was necessary for him to take the ordinary precautions to avoid accidents. He had accident after accident, and still never sobered up, remaining just a carefree, happy-go-lucky motorman. Hadn't he completed an apprentice electrician's course, and wasn't he therefore above the other men? It was finally necessary to shift him over to conductor and later discharge him. He simply couldn't realize the seriousness of what he was doing.

Family or financial trouble is another thing that a man sometimes allows to interfere with his work. Case No. 40 had both. As if it were not enough to have a wife who was not well, he had, in addition, an epileptic son who was a constant worry to him. He had gone from specialist to specialist and to various institutions with his son, hoping always that he might find some one who could cure his son, and hoping in vain. When we saw him, the man was pinning his hope in a faith-healer, located some sixty or seventy miles away, to whom he was making weekly visits. All the doctoring had added to the worry about his family's health, the additional worry of where the money was to come from. It cannot be said definitely that this worry was the direct cause of his accidents, but it is a pretty fair guess that it was. It is plainly a case for the Welfare Department, or if we have no Welfare Department, then some one close enough to the man to advise him in such a way as to help him as much as possible. The solution to all these problems is not always easy, but we can at least try.

There are many men who, because of their lack of fundamental ability, should never have been employed. Many of these men have been in the service for a number of years and we are duty bound to do what we can for them. Such was the problem with Case No. 8. He was having a large number of accidents, but as he said, they weren't serious—just a case of not getting stopped quite soon enough. Our motor ability test showed that he had a very slow reaction time. With the knowledge of this difficulty, it is necessary for him to be partially prepared for every emergency. In other words, he must be more alert than the men with the faster reaction time. He will always have to work under that additional strain and will have to be followed up periodically or he will let down again. He really doesn't belong on the front end of a street car.

Case No. 15 was lazy and just full of bad operating practices. When possible, he would cross his feet up over the jack handle, lean back against the vestibule, lay his arm across the controller handle, or rest his elbow on the brake handle. This type of man, if he is kept in service, must be followed up on the road to see that he is on the job. The supervisory force must be closely co-ordinated with the accident-prone work if it is to have any lasting effect. The accident prevention man may prescribe, but it is for the supervisory force to see that the medicine is taken.

Now, thinking back over the cases which have been mentioned—

- (1) The man with too much woman on his mind;
- (2) The man with physical disabilities;
- (3) The man with deficient mental ability;
- (4) The irresponsible chap;
- (5) The man burdened with family or financial grief;
- (6) The man who lacks fundamental ability;
- (7) The lazy and indifferent motorman;

or anyone of a number of cases which we might discuss, don't you agree that there is something that all of us can do to carry on accident-prone studies, regardless of what our equipment happens to be? In some instances, it is an aid to have a doctor, psychologist, psychiatrist, or some other specialist, to be sure; but that is no reason why some of us not so fortunately situated should listen to this discussion and say, "Well, what you say may have worked out very well in your case, but we couldn't do that. With us conditions are different."

Every company has some facilities for carrying on accident-prone studies. It may

have to be done as the old country doctor practiced medicine, but wonderful results have sometimes been obtained in that very way. Because, after all the records have been kept, and the study made, the final outcome depends in no small part upon you. If you can surround yourself with helpful advisors and contrivances, fine! More power to you. But remember, after all is said and done, there is no substitute for knowing your job thoroughly, and at the same time possessing a fair degree of that thing we call common sense. And that is about the only thing necessary to carry on accident-prone studies.

CHAIRMAN SHAW: Thank you, Mr. McCarter. The discussion of this paper will be led by Mr. J. Leo Troy.

J. LEO TROY (Supervisor of Safety, Boston Elevated Railway): I would like to bring up the subject which the chairman spoke of yesterday, and that is that other than the human side of the accident reduction or prevention in the companies, the management of any railway desires to get the cost. In Boston during the last few years we reduced the accident costs about half a million dollars. From that standpoint I think we all should work.

Mr. McCarter said he didn't think specialization is needed on every railway. I believe it is. It might not be necessary to have a psychologist or doctor or highly trained outsider come in but they could be used as consultants, or somebody from the company could do it. Mr. McCarter, will you explain just what you meant by that.

Mr. McCARTER: I don't think it is necessary to have a trained psychologist in every case. Mr. Brabston told us yesterday of some effective results on his property. It isn't necessary, in some of the small companies, to have a full-time safety man. I think possibly the superintendent of transportation can act in a partial capacity in that respect and can make these studies in some cases better than a psychologist.

We have an assistant superintendent who knows all the men. When we bring the case of motorman so-and-so before him, he says, "Let me see, he married the sister to such-and-such a person and he had a case of sickness back a few years ago." He knows that man's history from A to Z. Sometimes, persons closely associated with us can help us out of our troubles better than the ones on the outside.

Our scientific systems help in some cases, but where a man has a good understanding of human nature the local man can work with your accident-prone men better than some of us in larger properties who have not had the opportunity to know our men in that intimate way.

Mr. TROY: During the last few years there have been changes in the transportation department of our organization resulting from the accident prevention program. Do you think a superintendent of transportation or a divisional superintendent would function and get the reduction without an accident prevention department somewhere in the railway. Mr. McCarter suggested that the assistant superintendent might. Does anybody here think he would?

T. G. BRABSTON (Superintendent of Transportation, Birmingham Electric Co., Birmingham, Ala.): The Birmingham property is an average size property in the matter of cars operated, mileage made and men employed. I have an idea that properties such as ours haven't employed any men for some time. We haven't had occasion to employ a new man in more than three years.

In Birmingham we have no independently accredited safety department as it is recognized on some of the larger properties. Property the size of ours doesn't always require that sort of an arrangement if there are available in your supervisory staff men who are competent to follow up the accident prevention measures. In my particular instance I have a chief instructor whose duties to a great extent, in the days when we employed a great many men, were training these men and following them up after they were released into service. He has no duties of that character

at the present time, and therefore is able to carry safety work and to keep in touch with individual instances where men have been discovered as accident-prone.

We have developed through our supervisory staff these various observations. We have field men, supervisors, the instructor, and division superintendents who spend a great deal of their time on the road, and under their observation, answering certain questions that are necessary to determine any peculiar habits and characteristics of a man, we are able to assemble that information, and our assistant superintendent to a great extent administers discipline. As Mr. McCarter said, this man can probably tell who Bill got his hound dog from, or whether he went possum hunting last week, or whether he made a trip into Shelby County after prohibited beverages, or something of that kind. He is in close touch. He is a man who has come up with the operating personnel and is acquainted with every man's history and characteristics.

When this information is assembled regarding a man's peculiarities and habits, that man knows that the supervisor is familiar with his history. So when these things are discussed and developed, it is probably appropriately described as a "country doctor" proposition. He is not a specialist that tells whether the trouble is due to an eye, ear, nose or throat, or whether he has athlete's foot or something else but he is able to put his finger on the trouble from assembling this information. We don't have the elaborate mechanical contrivances and tests that are maintained in Cleveland, and while I think those things are excellent and no doubt essential, if not positively a requisite with a large personnel such as exists in Cleveland or a similar property, where no more than 500 or 600 men are employed, we don't feel that they are indispensable. I do consider the fact that our accident costs and expenditures, which after all is the purpose of this whole discussion, and the results that we obtain determine whether it is worth while or not. Our expenditure savings are at this time something over \$100,000. That is the amount of reduction that we have had in the past 12 months. I attribute that to a great extent to two things: first, the fact that we have few new men in the service and all of the personnel have become more seasoned, and, second, the fact that we have followed up the method of finding the particular man who has a particular kind of accident, and after that has been discovered, he has been interviewed and it has been brought to the man's attention, the supervisory organization is informed of the situation and is instructed to follow up and see that his habits that affect his record are corrected and improved. The result is we are very well satisfied with the progress that we are making. I don't think the time will ever come with us or any other property when there will be a hundred per cent result from that sort of treatment, but I do think that material improvement can be effected without the elaborate machinery and devices. With a supervisory personnel and staff that are familiar with the individual's history, effective work can be accomplished in following this line of accident correction on the part of an operating personnel.

Mr. TROY: Mr. Brabston remarked that a supervisory force or instructors or field men, whatever the different railways want to call them, should be used. In Boston during the last few years as a result of all the accident prevention studies, a group of men were selected who are instructors or inspectors. They were put on the streets as inspectors. They trained them personally to be able to instruct any operator on any kind of equipment. They put the responsibility of schedule making on the street, right up to the inspector, whatever the schedule duties were in his district. They "tied" him together with the supervising of high accident men or accident-prone men. Results have been attained in that manner.

There have been questions at these different meetings about the supervisor in the street. I would like to hear what some of you gentlemen have to say on that.

E. K. EASTHAM (St. Louis Public Service Co., St. Louis, Mo.): A thing that hasn't been brought up here, but which is applicable, is this: We are having considerable success in our conference of forces, in developing the initiative of the supervisory forces and the initiative of the rank and file of trainmen. We started last year holding conferences with our supervisory groups. That is the roadmen, the

street supervisors, also the dispatchers, which we used to call the foremen at the car stations, and the clerks at those car stations. We divide them into groups. Ours is a fairly large property and it takes eight or ten groups to cover them.

Those conferences are just what the name implies. They are conferences. We do not call a certain group in and tell them what they are expected to do. We attempt to find out from those men, through their long experience on their jobs, what they think is the proper way of handling different situations. In the supervisory group, dividing them into four sections, we have about 60 road supervisors. In a conference type meeting you should not have over fifteen men in the group. These meetings last for an hour. The leader is trained as a leader of the conference. He talks very little. He has a blackboard, gets the discussion going, and puts down on the board just what is brought out from that conference. Afterwards that data is assembled and finally worked into a booklet.

I recommend the conference method of procedure in drawing from the reservoir of experience of your different groups, whether trainmen or supervisory forces or what-not, what they have learned and what they can tell us, rather than going just on the line of what we can tell them.

There are certain forms of information which must be instructional in character, certain policies adopted by management which must come to trainmen and supervisory groups in an instructional manner, but totally aside from that, when you get to practical work of a street car system, what can you expect to find that actually will give you more information on how a thing should be done than from the people who for years and years have been doing those very things? So along this entire line of supervisors, whether big properties or small properties, talking with the accident-prone men, along the line of helping to make schedules, giving information from their ideas on schedules, or as to working rules, I believe that if you gentlemen will start the conference system and remember to keep it on a conference basis, getting the information from those men instead of attempting to pass information on to those men, you will uncover a very profitable source of information and general efficiency for your properties.

That applies to any size property. Of course there is nothing new to any portion of this: it is certainly not new to our property. I don't know whether the electric railway industry as a whole started it, probably not. But the electric railway industry has gone into it very thoroughly at the last two or three electric railway conventions. They have thought so much of this conference plan that they have held sessions for the training of conference leaders. We sent men from our personnel department to the last several electric railway conventions to go through those courses. The Federal Vocational Board at Washington also sent a man to us, and we put about fifteen chosen men on our property through that very intensive course, lasting two weeks, five hours a day, so they could get the technique of conducting conferences.

This is not entirely along the line that Mr. Troy wanted to bring out, but I thought it was appropriate at this time to give our experience in conference work. We do the same thing with trainmen, with the three courses of (1) accident prevention, (2) customer contacts and (3) equipment. Up to date out of 3,000 trainmen, over a thousand of them have completed a course in one of those subjects. This means attending on their own time, although it is a union property, at least four out of six meetings which last from an hour and to an hour and a half each. When you get down to the trainmen and hold a conference that is a conference and let them freely express themselves and you get their ideas, you get some magnificent results. Here is the essential point of this as I get it: When a man says something and feels that he is taking part in the discussion, and that his views are being recognized, he is going to be more interested and he is going to remember the general line of thought that has been brought out from that conference to something like five times the extent that he will if he listens merely to a talk or a lecture by some-

one else. No matter how capable a lecturer or teacher may be, if 15 per cent of what is said is really remembered, it is a high percentage. On the other hand, if you conduct that work along the conference basis you get an absolute recollection of something close to 50 per cent. You can bring into that conference pretty nearly any of your problems. But let it appear that it is coming from the other fellow instead of your passing it on to the other fellow.

Mr. TROY: I would like to suggest that along with the conference plan that they hold the inspector or supervisor absolutely responsible for what takes place in his district or wherever he happens to be working. We hold them to the accident of the operator. If there are five accidents in a district this week it is held entirely up to them and they have to explain. That works in with that conference plan of Mr. Eastham's.

I would like to open for discussion this Case No. 32 that Mr. McCarter mentioned. He probably has it diagnosed, as he calls it, but what method should be used to bring that man into the low-accident class? I will read it: "Take Case No. 32, for example. He was a young man with ability, all kinds of it, so much, in fact, that he didn't feel that it was necessary for him to take the ordinary precautions to avoid accidents. He had accident after accident, and still never sobered up, remaining just a carefree, happy-go-lucky motorman. Hadn't he completed an apprentice electrician's course and was therefore above the other men? It was finally necessary to shift him over to conductor and later to discharge him. He simply couldn't realize the seriousness of what he was doing."

On some railways they cannot transfer men over to conductor, and on other railways they can't get away with discharging. How would we go about reducing that man's accidents? That is a fair question for discussion because most companies have a different way of going about it. Mr. McCarter will you give us a little more on it so we can go on that basis.

Mr. McCARTER: As I stated in this case, we discharged the fellow. It happened that it was a young man who had between six months' and a year's experience and was on probation. After having several conferences with him and pointing out his difficulties and trying in every way that I knew how to change his personality, it got to the place where it couldn't be done, and we changed him to a conductor, thinking he was a type of fellow who made quite good contacts, with a nice personality. I liked him, thinking, "Here is a nice fellow," but he just couldn't take anything seriously. He was a very precarious creature, made good social contacts, and we thought he would make a conductor, but he was too much that way. We finally convinced him that he would be better off on another job. He was discharged, but I think when he left he felt we didn't do him a great injustice.

Mr. EASTHAM: Was he a married man?

Mr. McCARTER: No. As a matter of fact he was a fellow who didn't feel the responsibility on his job. He didn't care very much. He felt he was an apprentice electrician and a little too good for the job. Of course you probably haven't that type of personality in Boston.

Mr. TROY: Yes, we have.

Mr. McCARTER: I think if you have that kind of case and have to keep him, it is really a problem, if it cannot be handled by the ordinary layman, for the specialist, the psychiatrist, or the psychologist. The only thing that can be done is to change his personality. We have some cases of maladjustment that we haven't been able to solve. I have one case in mind right now that I am going to refer to a psychiatrist when I get back. In most instances we can handle them with common sense and use our knowledge of the man's life. I think this case might be handled the same way if we knew someone that was familiar with the man and knew his difficulties. We have a man 40 years of age who is an old man, with white hair, having the appearance of one of 70. He has a family of four children. His wife left him some five or six years ago and he took upon himself the very serious responsibility of

rearing that family and taking all the blame for the breaking up of his family. He thinks that is the greatest tragedy of human life, to have broken up a family, and that thing itself has caused him to be an old man. There is a case, as Dr. Hulbert said yesterday, of probably retrospective thinking, and it probably takes a psychiatrist to get the man over that situation. I haven't been able to do it. I don't know whether a psychiatrist can or not.

Dr. C. P. SEGARD (Assistant Secretary, Third Avenue Railway Co., New York, N. Y.): I might add a word there. Every summer we used to hire from 60 to 100 college students for conductors, but it is amazing how many college students, even though they are near B.A.'s or are B.A.'s are defeated by a small job. In other words, their superiority rose so high that they forgot all about doing the job decently and courteously. The man who invented the two names, inferiority and superiority, says this: that any feeling of superiority arises out of an inferiority complex. In other words, he knows he is so darned inferior that he is trying to make everybody else believe that he is superior.

One thing to do with that group is to try to teach them that they are being defeated by a very small job, and if they cannot do a small job they certainly cannot be promoted to a higher one. I have had a number of them come to me (and this also indicates that we should do away with some of our old intelligence tests) and say, "I have an I. Q., an intelligent quotient, of 140. What big job are you going to give me to do?" Those people are very, very hard to deal with and if you start them at the bottom of the ladder that is where they step off and out of your service.

CHAIRMAN SHAW: Thank you, Mr. Troy, for leading this discussion.

Next on the program is the election and installation of officers for the coming year. The Nominating Committee, of which Mr. Hellmuth is chairman, with Mr. Eastham and Mr. Bridges, as members of the committee will now make their report.

Report of the Nominating Committee

G. T. HELLMUTH (Chicago North Shore and Milwaukee Railroad Co., Chicago): The Nominating Committee has been controlled this year as in previous years by the determination of long service in the Section. The three members of the Nominating Committee are all ex-chairmen of the Section, and I can assure you that we like to see fresh faces, new personalities, come into the work of the Section.

The following are the nominations:

General Chairman—SAMUEL H. REID, Bureau of Safety, Chicago, Ill.

Vice-Chairmen—

T. G. BRABSTON, Birmingham Electric Company, Birmingham, Ala.

PAUL HOBSON, East St. Louis and Suburban Railway Co., East St. Louis, Ill.

RALPH C. BUSH, Transit Mutual Insurance Co., Boston, Mass.

Secretary—WALTER J. MCCARTER, The Cleveland Railway Co., Cleveland, Ohio.

News-Letter Editor and Publicity Committee Chairman—RAY A. FINCH, Bureau of Safety, Chicago, Ill.

Poster and Slides Committee Chairman—H. V. SCHREIBER, Capital Traction Company, Washington, D. C.

Program Committee Chairman—GEORGE R. WHITMORE, Illinois Power and Light Corporation, Peoria, Ill.

Membership Committee Chairman—C. P. RYAN, Indiana Electric Corporation, Indianapolis, Ind.

Statistics and Engineering Committee Chairman—A. A. OLDFIELD, Wisconsin Power and Light Company, Madison, Wis.

Health Committee Chairman—MELVIN W. BRIDGES, Chicago Rapid Transit Co., Chicago, Ill.

Members at large—

E. K. EASTHAM, St. Louis Public Service Co., St. Louis, Mo.

R. W. EMMERSON, The Cleveland Railway Co., Cleveland, Ohio.

G. T. HELLMUTH, Chicago North Shore and Milwaukee Railroad Co., Chicago, Ill.

GLENN H. SHAW, Ohio Edison Co., Akron, Ohio.

If there are no other nominations I move the nominations be closed and the secretary be instructed to cast the unanimous ballot for those named.

(The motion was seconded by Mr. Troy, put to a vote and carried.)

CHAIRMAN SHAW: The next paper is to be given by Mr. Reid, our new chairman. Mr. Reid.

Vehicle Collisions and Suggested Remedies

By SAMUEL H. REID

Vice-President, Bureau of Safety, Chicago

Ever since the automobile came into general use much earnest attention has been given to the hazard of collisions between electrically propelled cars and automobiles. It is therefore difficult to present any new or original suggestions on this subject, for most of the causes of collisions that prevailed in the earlier days of the automobile continue to exist and have already been given consideration. True, certain mechanical improvements have been made in the automobile and highways and streets have been widened and improved, but the increase in the number of automobiles has been so rapid that the collision problem is of ever-increasing importance.

There has also been an increase in the number of electrically propelled passenger cars, the car miles operated and the passengers carried. The latest figures available indicate that the Electric Railways of the United States have 80,000 electrically propelled cars which, in the course of a year carry approximately 17,000,000,000 passengers. These carriers operate over rights of way with a great many grade crossings and in cities and towns with all their attendant hazards by reason of automobile traffic.

In recent years, due in part to the influence of the National Safety Council with the cooperation of its many local councils and of highway and municipal authorities, there has been created in this country, to some extent, a sense of the necessity for more careful driving, and it would appear that there has been an improvement in the development of safe drivers and an appreciation of the responsibilities that rest on the public. However, this sense and appreciation of responsibility has by no means been developed to a point where constant attention is unnecessary in securing a more careful driving public, for notwithstanding the progress that has been made, many of the automobiles are still being operated by inefficient drivers. If any proof were needed for this assertion it may be found in the fact that during the year 1930 there were approximately 33,000 fatal accidents in connection with the operation of automotive equipment.

This being an audience of representatives of electric railway properties, it is fitting that the responsibility of the electric railway industry should be emphasized in this presentation because there is no question but that we have very definite responsibilities and duties in meeting this problem, which is a most serious one, both from the financial and the humane viewpoint. The latest figures available show that during 1929 of 1,504 fatal street car accidents 530 were caused by collisions between street cars and automobiles. It is not the intention in this short paper to enumerate all of the efforts which the industry may put forth to reduce the number of collisions but to briefly deal with two or three of the more important factors.

Drivers License Law

Only a few states, not more than eight, have taken any steps toward controlling the operators of motor vehicles. Any person of most any age who can raise enough money to make a down payment on an automobile is allowed to operate that vehicle on the streets and on the highways without any requirements other than a state license tag and in most of the cities a city vehicle tag. It is obvious that a great number of physically and mentally unfit drivers are thus allowed to operate motor vehicles. In many cases intoxicated persons operate such vehicles and in the event of an accident they are usually let off with a nominal fine or a reprimand and in many cases are later involved in similar accidents.

Such drivers have no more regard for a railway car than they have for an automobile. They claim the right of way regardless of consequences. If they are struck by or collide with a street or interurban car they think that the traction company should pay the damages. It is obvious therefore that the railway industry should lend its influence towards the passage of strict drivers' license laws in those states where such laws are not now on the statute books.

Grade Crossing Accidents

Not all accidents are due to incompetent and intoxicated drivers. This is particularly noticeable where interurban lines cross highways at grade. Many crossings are not properly protected, and there most certainly is a lack of uniformity of warning signs. Grade crossing accidents frequently result in one or more fatalities in addition to the damaged property. If only the careless and indifferent and sometimes intoxicated drivers were the sufferers, we might be able to view the situation with less concern; but when we remember that most of those injured and killed in automobile collisions are innocent victims we find ourselves confronted with a serious problem, one that demands the best thought of the Electric Railway industry. Constant and careful thought should therefore be given to proper and adequate protection at grade crossings for it is here that most of the disasters occur.

Every interurban company should have a complete grade crossing survey made. This should be compiled by competent engineers cooperating with the safety department. It should show by means of photographs the four or more approaches to each grade crossing. These should be noted. An average person riding the front end of an interurban car is apt to think that the view of the crossing is good from all directions. He does not have an opportunity to approach such a crossing in an automobile and view it from the standpoint of the motor vehicle driver. This survey would enable the superintendents and other operating heads to have constantly before them the exact situation at each crossing. A constant study should result in making improvements that would very materially minimize the danger of collisions. Such surveys should be checked up once or twice a year so as to keep them up to date. This is important for a crossing having clear visibility in the winter or spring may be totally obscured by weeds, etc. in the summer or fall.

Investigation of Accidents

It goes without saying that every accident involving a collision with a motor vehicle, particularly on interurban lines, should be formally and thoroughly investigated. It is not enough to secure written statements from witnesses. The most valuable investigation is one made by a committee of operating men including a representative of the safety department which meets formally for the purpose of questioning each person involved in the accident. By means of

intelligent questioning all the facts may be brought out. Special emphasis should be placed upon the question: "What could the operator of the train have done to prevent the accident?" Of course the investigation should be more or less informal and those questioned should be given to understand that its main purpose is to determine how the accident could have been prevented. The question of legal liability should be left to the Claim Department. Such investigation as is here discussed has to do entirely with the all important matter of prevention.

The Selection of Motormen

Probably the most important factor under the control of a company for reducing its collisions is that of proper selection, instruction, training and supervision of train operators. Much has been said with reference to the selection of operators but many companies have no definite procedure in this regard. Those who have gone into this subject thoroughly make their selections with the same care as a banking institution uses in the selection of its employees. It is obvious that only those physically and mentally fit should be employed for this service. Character is a qualification of equal importance. If an applicant is found to have a sound body, good eyesight and hearing and an active, well-balanced mind there is hope of his developing into an efficient and safe operator.

So far as the electric railway is concerned, there is no more important factor in the prevention of collisions than the motorman and those having control of the schedule and motion of the car. His responsibilities are ever-present, ever-changing, and require the highest degree of good judgment and alertness. Notwithstanding all that has been said about the mental qualifications of trainmen, too much emphasis cannot be given to the importance of taking the mental side into consideration in the selection of efficient motormen. After many years of experience in the prevention of accidents one cannot help but be convinced as to the extent to which mental attitudes and mental responses enter into the accident prevention problem generally and particularly in the operation of electric railways.

To illustrate, we have in mind an incident that occurred on a high speed interurban railway at a point where the railway crosses a heavily travelled paved highway. A west bound local train had stopped at the crossing to discharge some passengers. An east bound limited was approaching from the other direction and automobiles were lined up for hundreds of feet waiting for the crossing to be cleared. The flashing lights were operating properly but the operator of the local train knew that if he cleared the crossing the traffic would immediately start across the tracks and undoubtedly there would have been some serious collisions. He therefore did some quick thinking and held the crossing until the east bound had gone by. He then proceeded on his way feeling that he had done nothing extraordinary, but he had undoubtedly prevented some serious accidents.

If he had proceeded as he would normally after he had stopped at the crossing, no doubt the motorists would have concluded that his train was operating the flashing signals and would have failed to notice the limited train approaching. If an accident had occurred under these circumstances no doubt the operating company would have been held blameless, but this man by some clear and quick thinking prevented any such disaster.

In these days of high speed and congested traffic an entirely different mental make-up is required of the motorman who operates his car along the city streets, over the highways and cross-roads. There is perhaps no more important element required of a safe motorman than that of alertness and the ability to quickly grasp the unexpected situations which confront him. At such times, any delay in mental action or in the prompt exercise of good judgment may be disastrous. The slow thinking mind may be very properly useful in the many

lines of endeavor where the time limit is not important, but the slow thinking mind will not be able to cope with the sudden emergencies of electric railway operation. Do not make the mistake of thinking that an alert mind can be created by any method of instruction or training. It is necessary that the alert mind be inherent in the man.

Other qualifications besides physical make-up and alertness must be taken into account in the selection of a motorman. His disposition must not be of a controversial type. His efficiency will be seriously affected if he is the type of man who is complacently satisfied with his own ideas of his rights of the road and is inclined to always absolve himself of responsibility and place all of the blame upon the public driver. No doubt many collision accidents are caused by the rather egotistical idea of a motorman that his judgment is always good and that he has a right to exercise his own road rights and that the resulting accident is the penalty of the public driver who has encroached upon his rights. Such a spirit of vindication is entirely improper and should not be tolerated. It is the man who is willing to give up some of his own inherent rights and overlook the transgressions of the public who will make the best motorman.

Having found a man who is alert, not overly self-confident and duly appreciative of his responsibilities and the shortcomings of the public, there are still other mental qualifications that should be very carefully taken into account. He should be duly impressed with the seriousness of this country's accident problems in general and be sympathetic to the cause of safety, not only by word of mouth and attendance at safety meetings but also by constant interest while he is at work and by a consciousness of the toll indifference or lack of care may take. In these days of economic stress he should have an appreciation of the value of his job and the necessity for so performing his duties that his continuance in his job may be assured.

It would be tiresome and unwise to deal with all of the details of operation to which a motorman should give his attention; to point out to you the numerous precautions that should be taken in passing parked vehicles and in going over grade crossings. Such details are obvious to the competent and thoughtful motorman and our duty to him is not so much in telling him about these details as it is to get him to be ever alert and responsive to the hazards thus created. In other words, it is not so important to tell him what to do as it is to get him to do the things he already knows he should do. It would be difficult to determine the proportion of grade crossing accidents that could be avoided by the train operator, but be this proportion large or small it is the duty of every operating company to eliminate as far as possible all of these accidents.

Instruction and Training

Having selected trainmen with the foregoing qualifications the next thing in importance is instruction and training. A good deal has been said about this but up to the present time not a great deal has been done about it. A motorman's instruction should include some information with respect to the machinery and equipment which he is to operate. He should spend enough time in the shops to learn something about the motors, cut outs, controls, etc. Not long since I was on an interurban train and one of the motors burned out. The motorman who had been employed by that company for many years seemed to be a competent operator. He certainly was careful but did not know how to cut out the damaged motor and operate the train without it. Instead he had to stop on the main line, hold up traffic while he got in communication with the Shop Department and have a mechanic sent out to cut out the damaged motor. This is just one illustration of the need of a motorman having some knowledge of the equipment he is to operate.

His training should include a thorough knowledge of operating rules. Most

traction companies have a rule book but there are a few that have not. Every company should have an up to date rule book and every trainman should be examined at least once a year in order to be sure that he knows and understands the rules. This applies particularly to interurban trainmen.

Supervision

With the best possible selection, with adequate instruction and training, if the company is to operate its trains without accidents there must be constant supervision. The best of motormen may develop unsafe practices which are not discovered until after an accident happens. Then an investigation brings out the fact that these unsafe practices have been indulged in over a long period of time. Proper supervision would detect these unsafe practices and they could be corrected before an accident happens.

Everybody knows that the electric railways are going through a period of depression with all kinds of competition—private automobiles and other means of transportation which very materially affect the finances of the industry. The protection of crossings, the proper maintenance of equipment, the selection, training and instruction, and supervision of operators all cost money but in the final analysis it is better to spend some money to prevent accidents than to pay out large amounts in settlement of claims for damages.

CHAIRMAN SHAW: Thank you, Mr. Reid. This paper is open for discussion. There is one thought I would like to bring out. Do you have an examination for your employees annually on operating regulations, book of rules, and so forth. What is your practice, Mr. McCarter?

MR. MCCARTER: We do not.

CHAIRMAN SHAW: Are there any here who follow that procedure? (Some members indicated they did.)

P. M. BOWER (Safety Director, M. W. P. S. Co.): We use a combination written and oral examination. In fact we have been carrying on some such program as Mr. Eastham outlined this morning in the way of a conference, and into those conferences we carry the rule book and devote a certain amount of time to the study of the rules. We have found through that medium that some of our rules were not applicable and come to the conclusion that possibly rules should be more or less flexible to meet changed conditions. At the end of each year we have a written examination.

DR. SEGARD: Do you require short answers or have them written out.

MR. BOWER: We are asking them to write the entire answer out.

DR. SEGARD: I think you would find it is a good idea to experiment with the true and false rather than have them write fifty or sixty words in answer to the question. I am offering that as an experiment that is being used.

MR. BRABSTON: How many men are there on your property?

MR. BOWER: About 900.

CHAIRMAN SHAW: Is this examination given on company time?

MR. BOWER: Part on company time and part on the men's time. But the conferences are not. They are on the men's time.

M. W. BRIDGES (Safety Engineer, Chicago Rapid Transit Co., Chicago): There is another angle on crossing accidents. We have approximately 90 crossings and all but 19 are protected by gates. These 19 are protected by flagmen for 20 hours a day. In crossing accidents, as in some other accidents, we have found that it takes a little bit too long with some of our men for the mind and the finger, or the mind and the hand to coordinate. We have established, through Dr. Hart Fisher, a reaction test to see how long it takes our motormen to put into effect the necessary action that they see is necessary to prevent a crossing collision or any other kind of an accident.

We have had wonderful results. Many of our motormen and many of the old motormen (we have some motormen who have been with us 37 or 38 years) show an excellent reaction to any kind of a condition that comes up. It takes so long for others to put into execution what they see is necessary that the train may travel 100, 200, or 300 feet before they can actually get into action.

The training is further augmented in the Rapid Transit system by a yearly physical examination of all men operating motors. We examine tower men also. In these examinations we check high blood pressure before it gets to such a point that it is dangerous. If a man's physical condition is such that he is just able to operate now in safety, we don't wait for the year to go by, but he is brought in again in 60 or 90 days and given an examination, so that the mental reaction of the man has a great deal to do with the number of accidents. We have reduced ours very materially. On each of our 90 crossings we have approximately 450 train operations in 24 hours. Multiply the 450 by 90 and you see what we have in one day.

DR. SEGARD: What do you do with the 10 or 15-year service man who has a high blood pressure and cannot do anything about it?

MR. BRIDGES: We try to find some job for that particular man. Some of these men are placed as agents or given a job where they have no responsibility in running trains, operating gates or with moving equipment.

MR. BRANSTON: An observation in connection with what Dr. Segard said about the man with high blood pressure. We have a practice, which we follow where a man has high blood pressure, even though he may be a regular man and entitled to a regular run, is given what we call a minimum time assignment. In other words, he is put on a light line where he may work a triple run for an hour and a half in the morning and the same in the afternoon for which he is paid six hours a day. We have an established practice of a six-hour minimum for extra men in our service and these men are put in the same class as an extra man except that almost generally they are not required to work that full six hours. They only work it on a basis of a split for an hour or two in the morning and the same in the afternoon, where the opinion of the medical staff is that the burden imposed on them for that amount of duty is not absolutely serious in respect to what may happen with them. Of course if the blood pressure gets beyond control there isn't anything you can do.

Concerning Mr. Reid's paper, I want to make an observation that may sound a little bit revolutionary.

In this crossing accident proposition we have followed the plan and practice of doing an established thing for some time, when another method might be followed to better advantage. It just seems to me that we put too much paternal stress on the protection of the foot motorist in going over a crossing. A railroad track over an established crossing is something there is no mystery about, it is not hidden. Trains operate over it. We go to a lot of trouble (my folks do just as yours do) in attempting to throw every kind of precaution to put the burden on the railroad so that we must look out for the motorist all the time. I was glad to hear in a paper here yesterday an indication that seems to be a trend in the minds of the operating officials to make the motorist pay some attention to the street car. I am wondering if we don't overemphasize in the minds of the motorists that regardless of how careless or how indifferent they are to a crossing, the railroad company is going to assume the defensive and the apologetic attitude of letting them be protected at all cost. Our company has done something along that line to create in the minds of the public the idea that the railroad company is not a benevolent cashier handing out money because they have been involved in some accidental contact with the railroad.

In other words, in our town if a man has an accident with a street car he has to settle with the claim agent with the idea that the railroad company owes him money. Unless he is successful in doing that, it is just too bad, because they are a hard-

hearted crew, and they are hard to sell, and you must be a pretty good salesman to sell them. I think maybe that attitude has been valuable with us in reducing the amount of money that we spend for accidents. I don't mean that we are evading any just responsibility that is ours in an accident, but just because a man has an accident with a street car and is driving an automobile doesn't make it fair to assume that the street car in every instance is responsible.

DR. C. P. SEGARD (Assistant Secretary, Third Avenue Railway Co., New York, N. Y.): The public has always had the idea that the utility would pay because they have paid. A number of years ago there was a man that got the surprise of his life. The Boston & Maine sued him for running his automobile into a locomotive at a crossing, and the bill was somewhat expensive. From that idea our claim agent got the notion that perhaps it was just as well to go after these people, and in the last five years we have averaged between \$25,000 and \$30,000 a year of collected claims against automobilists for running into our trolley cars.

CHAIRMAN SHAW: Mr. Bridges is your company's physical examination compulsory with employees?

MR. BRIDGES: It is.

CHAIRMAN SHAW: On our property it is optional with old employees, and as a result very few take it.

W. H. BURKE (North Shore Line, Milwaukee, Wis.): It is compulsory annually on our line.

E. E. GROVER (Director of Safety, Columbus Railway Power and Light Co., Columbus, Ohio): The success of physical examination, compulsory or otherwise, depends on the attitude of your operating men. Two years ago we introduced the physical examination. We aimed first at our men in the operating department. Experience on the steam railroad in the same thing told me we could win those boys over if we went about it in the right way. Certain men in the operating department would take it voluntarily. We got some of the old men to take it. Nothing happened to them. Every one of our platform men have completed their first examination, and many of them have taken their second and third, depending altogether on their age and physical condition, how often they are examined. There is no physical order on the books, on the bulletin boards, that this is compulsory. That was our experience. The men have come to be eager for these examinations. If we get a man who is not in good physical condition we tell him to see his own family doctor and suggest that his doctor talk with our examining surgeon. That is done frequently. The two doctors are consulted. We may remove a man in bad physical condition from active service, to correct the condition. Conditions are found that are wrong, a record is made, and a check is made later to see if it is corrected. I feel that has had a very great bearing on our operation and our reduction in accidents.

CHAIRMAN SHAW: We have a plan whereby the old employees are entitled to an annual physical examination, and no report is made by the doctor. It is entirely confidential between the individual and the doctor. We established that plan, thinking that a great number would take advantage of it because it was confidential. The number is not great who take it. Under the optional arrangement I found that men who fear their physical condition is not good would hesitate to voluntarily take the examination, and in order to overcome that we assure them that it is entirely confidential and their jobs would not be jeopardized. We have not really gained our point. We would like to extend this service and have the men take advantage of it voluntarily, but it appears that in order to get the real result we will have to make it more or less compulsory.

CHAIRMAN SHAW: Gentlemen, I am going to turn the chair over to my successor, Mr. Samuel Reid. I appreciate the support given me during the past year. (Mr. Samuel Reid took the chair)

CHAIRMAN REID: I express my appreciation of the honor you have given me and want you to know the deep appreciation of the friendships that have been created

among you. My hope is to maintain the same high standard of this Section as has been done by those who have gone before. All I can ask for is that you give me the same support and cooperation as you have given my predecessors.

G. T. HELLMUTH (Chicago North Shore and Milwaukee Railroad Co., Chicago): Before we adjourn I should like to attempt to voice the sentiments of the Section for appreciation of the service that has been given it by the officers now going out, Glenn Shaw, our friend Brown of Nashville, particularly, and others who have served faithfully and at some considerable outlay of energy and thought on their part, all through the year. I move a rising vote of thanks to these men, to whom I personally feel very much beholden, simply in my capacity as a member of the Section. (The motion was seconded and carried by a rising vote.)

ADJOURNMENT

Wednesday Luncheon Session

October 14, 1931

Joint Meeting of the Electric Railway and Public Utilities Sections

E. S. BEAUMONT, Chairman

The Peoples Gas Light and Coke Company, Chicago, Ill.

The joint meeting of the Public Utilities and Electric Railway Sections was called to order by E. S. Beaumont, The Peoples Gas Light and Coke Co., Chicago, general chairman of the Public Utilities Section.

CHAIRMAN BEAUMONT: The joint luncheon of the two Sections is an occasion of pleasant anticipation because it is at this time that certain rewards are given winning companies for records established during the past year in the accident prevention contests of the National Safety Council.

Mr. E. J. Kreh, manager of the accident prevention department of the Philadelphia Company of Pittsburgh, will tell us about the accident statistics in the Public Utilities Section. He will also award the certificates to the winners in the several groups. It is a pleasure to present Mr. Kreh.

Discussion of Public Utilities Contest

By E. J. KREH

Manager, Accident Prevention, The Philadelphia Co., Pittsburgh, Pa.

The Public Utilities safety contest has been in operation for several years. It was originally a six months contest but last year it began on July first and ended June 30 of this year, making it a full year contest. The participants have been divided into three primary and three secondary groups.

The first group is composed of the combination gas and electric companies with more than 500 employees. The second is combination gas and electric companies with less than 500 employees. The third is electric light and power companies with more than 500 employees. The fourth is electric light and power companies with less than 500 employees. The fifth is gas companies with more than 500 employees and the sixth is gas companies with less than 500 employees.

It is always difficult to present statistics and for that reason I have prepared several slides to show the trends in frequency and severity rates in the public utility industry. These also compare the frequency rate of the entire public utility industry with the frequency of those companies entered in this contest. I hope to prove to you that these contests really have value, and to ask those not participating in these public utility contests to really consider entering. Our company does get considerable value out of them, principally because it inspires the active enthusiasm and interest of the management and the supervisory forces. If it is true that accident rates are a true measuring stick for men and management, then no management wants to see itself in the back row. If you can show your management that you are behind the average that would be a great stimulus to give them more interest in accident prevention.

(Mr. Kreh then showed several lantern slides and explained them, as follows.)

(Slide) This shows the comparative frequency rate by years, of the contest entries, and the entire public utility industry. The rates for companies reporting to the National Safety Council in 1928, 1929, and 1930 are: 25.97, 22.58, and 18.76. For contestants during the same years the rates are: 19.57, 16.40, and 14.41. The rate

for entries in the contest just closed was 11.7. Those figures are the average rates for the competing companies and also the average figures for the entire industry.

(Slide) This shows a comparison of the average frequency between the competing groups. There are six groups. For the contest just ended, group A of the combination gas and electric had a frequency rate of 11.5 while group B had a rate of 9.14. Electric light and power in group A show a frequency rate of 11.8 while group B averaged 15.0. The winner in the first group had a rate of 4.8. Gas companies had the highest frequency rate, group A averaging 12.0 and group B 9.88. The winner, in group A, had 1.1. In the smaller companies, with less than 500 employees, (group B) you will notice that the frequency rates were lower than the larger companies, with one exception, and that is the electric light and power group.

(Slide) This slide shows the frequency rates for the public utility industry from 1926 to 1930, in comparison with all industries reporting to the National Safety Council. For 1930 our rate was 18.76 while the average for all industries was 18.47. The cement industry had the lowest rate of any industry, 6.30, and the construction industry the highest with 51.57.

(Slide) This shows the severity rate trend, public utilities compared with all industries. For 1930 our rate was 2.95 while the rate for all industries was 1.98.

(Slide) This shows the frequency rate comparison of public utilities, split into different operations. You will notice that the manufactured gas operations have the highest frequency rate which is 24.93; natural gas comes next with 20.15; electric light and power with 18.40 and the combination companies with 18.36. The telephone and telegraph companies have the lowest frequency rate, 7.20. The average for all public utilities is 18.76. The average for all industries reporting to the Council is slightly less being 18.47.

(Slide) This shows that electric light and power companies have the highest severity, 3.78; gas and electric companies are next with 2.87; followed by natural gas with 2.14; then manufactured gas operation with 1.85. The telephone and telegraph have an exceptionally low rate of .98.

All this should encourage us to consult our industrial accident statistics and find just where we stand. Sometimes that booklet published by the National Safety Council and known as "Industrial Accident Statistics" is sadly neglected.

We should study those accident statistics.

The pleasant part of my job this afternoon is to award the certificates to the companies that have made splendid records during the past year in our sectional accident prevention contests. Certificates are to be awarded those companies which finished in second and third places in each of the groups. On Monday morning the first prize awards were presented to the winning companies by President Bergquist of the National Safety Council. The second and third prize awards will be presented here this afternoon.

That you may know the companies that have earned first, second and third prizes, I will read the names of the first, then the second and third, and also give you the frequency ratings of the companies. Unfortunately we cannot have the men and women of the organizations here who earned these recognitions, but we hope that every representative here will carry these certificates and awards back and that they will provide an additional stimulus for each of them to continue their splendid work. It is now my pleasure to present the certificates.

(Mr. Kreh then awarded certificates to the winning companies, as follows):

Combination Gas & Electric Group-A

1. Penn Central Light & Power Co., Altoona, Penn. (2,382,511 man-hours worked—9 lost time accidents—frequency rate 3.778.)
2. Southwestern Gas & Electric Co., Dallas, Tex. (2,503,280 hours worked, 12 lost time accidents with a frequency rate of 4.794.)

3. Wisconsin Public Service Corp., Milwaukee, Wis. (3,056,055 hours worked, 18 lost time accidents with a frequency rate of 5.890.)

Group-B

1. Lake Superior District Power Co., Ashland, Wis. (653,730 man-hours worked—1 lost time accident—frequency rate 1.530.)
2. Menominee & Marinette Light & Traction Co., Milwaukee, Wis. (367,455 hours worked, 1 lost time accident, 2.722 frequency rate.)
3. Blackstone Valley Gas & Electric Co., Pawtucket, R. I. (1,196,310 hours worked, 5 lost time accidents, with a frequency rate of 4.180.)

Electric Group-A

1. Duquesne Light Co., Pittsburgh, Penn. (7,367,890 man-hours worked—36 lost time accidents—frequency rate 4.886.)
2. Commonwealth Edison Co., Chicago, Ill. (24,673,251 hours worked, 124 lost time accidents with a frequency rate of 5.026.)
3. Indianapolis Power & Light Co., Indianapolis, Ind. (3,474,739 hours worked, 19 lost time accidents with a frequency rate of 5.468.)

Group-B

1. Fall River Electric Light Co., Fall River, Mass. (511,288 man-hours worked—no lost time accidents.)
2. Keystone Public Service Co., Oil City, Penn. (429,692 hours worked with no lost time accidents.)
3. Kaministiquia Power Co., Fort William, Ont., Can. (101,085 hours worked with no lost time accident.)

Gas Group-A

1. Hope Natural Gas Co., Pittsburgh, Penn. (4,428,432 man-hours worked—5 lost time accidents—frequency rate 1.129.)
2. The Peoples Natural Gas Co., Pittsburgh, Penn. (3,003,328 hours worked with 8 lost time accidents, with a frequency rate of 2.664.)
3. Equitable Gas Co., Pittsburgh, Penn. (2,466,017 hours worked with 10 lost time accidents with a frequency rate of 4.055.)

Group-B

1. Reserve Gas Co., Pittsburgh, Penn. (424,008 man-hours worked—1 lost time accident—frequency rate 2.358.)
2. Columbia Natural Gas Co., Pittsburgh, Penn. (777,128 hours worked, 3 lost time accidents with a frequency rate of 3.860.)
3. Pittsburgh & West Virginia Gas Co., Pittsburgh, Penn. (867,531 hours worked, 5 lost time accidents with a frequency rate of 5.763.)

CHAIRMAN BRAUMONT: We congratulate the winners and runners-up in the several divisions of this contest. This meeting is a fitting one in which to honor a worker who has passed on. You all know that Homer E. Niesz of the Commonwealth Edison Company of Chicago died in August of this year. Mr. Niesz was long a member of the Public Utilities Section, was always a faithful worker and a mighty good friend. It is fitting that we stand at this time in silent reverence to Mr. Homer E. Niesz.

(The audience stood as a tribute to Mr. Homer E. Niesz.)

CHAIRMAN BRAUMONT: When I met our next speaker I wasn't aware that he was formerly a pastor of one of the leading churches in Toledo. His experience in the line of saving souls, rather than saving life, should make him eminently qualified

to bring to us a message of interest. He now is interested in the public relations and safety work of the Toledo Edison Company. It is a pleasure to present Dr. Stephen K. Mahon, Assistant to the Vice President, The Toledo Edison Company, Toledo, Ohio.

Safety to Life

By STEPHEN K. MAHON

Assistant to the Vice-President, The Toledo Edison Company, Toledo, O.

I was reading this morning that H. G. Wells, who had reached New York, expected civilization to go on the rocks; that it would probably be worse than the fall of Rome and Greece because we are crazier than they were then. He said a few years ago that every age was a crisis, and as I tried to analyze that statement I found out that probably what he meant was that whenever you make progress you are always running into crises. The crisis is always out in the big world where there are a lot of progressive things being said and done. That is why we are gathered in this meeting. You must work mighty hard to keep ahead of the progress of the world today.

I remember a story about two boys raised in Ohio. One became a sea captain; the other a preacher. Each had a parrot, and the one parrot was raised on shipboard and learned the vernacular of the sea; the other was raised in the parsonage and learned the vernacular of the parsonage.

The sea captain went back to visit his old friend, and took his parrot with him. He put it on the roost with the other parrot. The preacher's parrot said, "What must we do to be saved?" The other one replied, "Pump like hell or we will go to the bottom."

Whenever you get into the midst of progress you have to do a lot of pumping. You have to pump and pump, just to stay even with the game.

The other day a group of men were talking and a young fellow asked, "How far can a dog run into the woods?" No one seemed to have an answer, so he said, "Well, a dog can run half-way into the woods; from then on he is running out."

While that can be applied to depression it can also be applied to an age that is a going age. You are running into problems, darkness, and you begin to get hold of things and then you begin to run out. That is the way of facing and working with problems.

I have observed in all our American history that emphasis has been placed on the development of the individual for the good of society. Observing the conditions under which we live today, we are reversing the process and attempting to develop society now for the good of the individual. I do not know of any better illustration of this than the National Safety Council. This great organization is working as a group for the safety of the individual. If you will take that in all its "slants" I think you will find it will work out in a very large section of your life.

May I call your attention to two factors that are working a change in this country? One is natural law, which never changes. Whenever my mother used to make bread it was always an adventure, she never knew how it was going to come out. If there were two cold potatoes she put them in; if there were five cold potatoes she put them in, and three cold potatoes make a difference. Nowadays it is always the same. In all bakings of bread it always comes out just alike. That is the scientific method, natural law, if you please. If we are going to make any progress we must find out what those natural laws and methods are and follow them. That is the beginning of the scientific age.

I once received a letter from Elbert Hubbard in which he said, "I am greater than Socrates, Plato or Paul." He followed that by saying, "Because I live after them." That is, he was living in a new era and in a greater age. It was the scientific age, the age of following the methods and laws and habits of nature.

It was in 1876 that the telephone was given to us. Now we have the telephone, wire and wireless, and we have our communication systems that have bound us so closely and quickly together that you actually know things that happen in this country before they take place. I had a friend in India who was taken sick, and they thought he was going to die. He got better. They cabled the family in England. They sent the cablegram on the fourteenth of March, and on the thirteenth day of March they knew he was better. We are living in an age like that.

We are thinking a good deal these days about Thomas A. Edison. One time he wanted to enter an engineering society in New York City and they asked him to write down his qualifications. He said, "I have built a machine shop and other things." We have in this era a lot of "other things."

I was impressed by one of the men from the General Electric Company talking about men getting a fever working with those high frequency tubes. They discovered they had something, something unusual, something powerful. Then they had to find a new unit of measurement, one hundred-billionth of an ampere. If you want to find out how small that is, think of Niagara Falls, and reduce that to one drop of water going over the falls in a year.

First of all I want to give you this idea of natural law we are now using, following, unfolding, discovering and using. It has led us into an accidental world: from birth until death we are accident in the main. We are living in an accidental world. There is the new speed, and there is the new power from the high tension wires all over the country to the enormous powerful things that we have around us. There is the new fatigue that we are encountering. When you go out in the automobile in the morning your eyes notice all the things, the speedometer, motor meter, oil gauge. Through the day, as fatigue comes upon you, you notice them less, and accidents may happen.

You remember the old fellow who was examining the buzz saw, and he put his finger against it. Somebody asked him how he lost his finger and he said, "Just this way," and put another finger against it and lost a second finger.

It is all new. We are living in an accidental world. Last year there were about 100,000 deaths from accidents. And there are all those lost-time accidents that we know about, where men are just out part of the time—not deaths. You know the tremendous toll they have taken. What is this tremendous factor, the human nature factor? There is something peculiar about it that I sort of admire. It never changes, fundamentally. It is always on the side of endeavor. It is eternally tearing down and building up. It is never satisfied with things as they are.

I remember they had a Chicago fire back here about 1872, and after weeping over the ashes a little while they rebuilt the city. It is a fact that this city has been rebuilt twice since then, without any Chicago fire. That is because the people are always striving, always going forward. We are not going back to the hand loom, we are going to keep the power loom, but we are going to keep the safety devices so that life itself may be safe in the use of it.

There are two facts that enter in here. One is self-preservation. We have the airplane but we put a parachute on the pilot so he will be more safe. Along with the coming of these powerful things that are around us, there has been the development of safeguards for self-preservation.

There is a second fact: in the final analysis we have always more or less appreciated the sacredness of human personality. Whenever it has been disregarded there has been collapse and failure of civilization. There have been nine civilizations that have gone the way of dust and ashes. All of them have resulted from a failure to appreciate human personality. If we move forward and forget the other fellow, there is certain failure and desolation and collapse of the system to follow. There is no other way for it.

We are faced with a safety effort that has gone out in three directions to solve these problems. The first one has been on the physical side. It has been an attempt

to solve the element of safety on the physical side. In other words, the forces of drive must equal the forces of control. That is, the force of control must equal the force of the drive. For all the power that you put in the back axle in driving forward you must have a braking power on the wheels so you can stop. Otherwise we would be involved only with the quick and the dead.

It was Dean Peterson of the Extension School who said only a few days ago that the problems of life are three. The first problem is making a living, the second is the problem of living together with others, and the third is living with yourself. This second problem of living together with others is the one that interests you in that subtle subconscious thought of your duty and responsibility toward others.

I was interested in some advertising of a great steam railroad recently, in which they told how their 70,000 employees were interested, consciously interested, in you as passengers. First of all for your safety, then for your comfort and your arrival on time. That is the idea, getting it into the consciousness of the people.

The Simonds Saw Company of Pittsfield, Massachusetts, have built a new factory without any windows. It is lighted, heated, and ventilated to make for the largest possible degree of safety. Mr. Swope comes with his plan for men and the employment of men to take away fear, to put into their lives and living the largest possible element of safety. Last spring I made an address before a company that was celebrating the eleven-hundred-and-forty-eighth day that had passed without a lost-time accident in their works. That is getting down to the consciousness of the men with the feeling of responsibility and duty. In the final analysis, the great test of life in all these things is the character test.

In that new book by James Truslow Adams, "The Epic of America," he remarks that the thing that enabled George Washington to make his accomplishments and that thing that made him independent was not his military genius but his character. That was the character test, that was the final test. By and large, the test of any age and every age is the character test. There is that something in human nature that makes a man willing to make sacrifices for the saving of life. In the final analysis that is the supreme challenge that comes to the National Safety Council, and that is something fine.

I remember seeing two pictures of the sinking of the Titanic. One showed the great iceberg and the Titanic, and underneath were the words, "The Supremacy of Nature: the Weakness of Man." Then there was a companion picture with the iceberg and the sinking Titanic. On the deck of the Titanic, as it sank, was a man by the name of William T. Stead, that great journalist of London. When they heard the screams of a woman who had been left, he gave orders to put back to the ship. He stepped back onto the deck of the vessel and gave his place in the lifeboat to this woman. Underneath that picture were the words, "The Weakness of Nature: the Supremacy of Man." That is, after all, the big appeal.

I am reminded of the policeman's little girl who found a pocketbook, and without opening it, ran to the nearest policeman and said, "I found it, it is not mine," and gave it to him. When we finally catch something of that slant and courage and esprit de corps and validity that makes us say, "It is not mine to take a life; it is not mine to endanger others; it is not mine to make life harder or harsher for others," then this thing will grip our hearts and minds and actions, and you will carry to greater success your national safety work.

A little girl in Evanston heard that her pastor was going to have a birthday, and she asked her mother if she couldn't send him a remembrance. Her mother said, "Yes, dear, surely. I will get you a card." The mother got the card and told the girl to write her own message. The little girl wrote: "My dear Dr. Stewart: I hope you live all your life."

I hope you do.

ADJOURNMENT

Thursday Morning Session October 15, 1931

SAMUEL H. REID, Chairman
The Bureau of Safety, Chicago, Ill.

The third session of the Electric Railway Section convened with General Chairman Samuel H. Reid, presiding:

CHAIRMAN REID: The first thing on the program this morning is an explanation of the Council's services to the Street Railway Section. I feel that all members are not taking advantage, full advantage, of the services that are available from the National Safety Council. I don't know that the man who is going to tell us about it needs any introduction. He is known to most of you. We will hear from Mr. Ferguson.

Council Service to the Street Railway Section

By R. H. FERGUSON
Safety Engineer, National Safety Council, Chicago

I am going to mention some portions of the Council service, and then discuss them because in that way we are going to discover facts about the National Safety Council that may not have been clear. You of course are acquainted with the organization set-up of the Council on a cooperative nonpartisan basis and its function as an instrumentality for an exchange of your experience in accident prevention methods and procedure. The Industrial Safety Division is organized into Sectional groups such as yours, the Electric Railway Section. There are twenty-two of these groups. On the Public Safety side we are also organized into such Sections as the Home Safety Section, the Street and Highway Traffic Section, etc. All of these Sections are served by volunteer officers.

Individually you are playing a vitally important part in the development of a broad national program of safety. Your companies are also identified as supporters of this movement which is influencing directly more than eight million workers, thousands of school children, municipalities, and public agencies everywhere for safety. Your encouragement and participation in this work, the pooling of your experience and membership dollars, makes possible the extension of life conserving activities which benefit many members, employees, and others not directly affiliated with the National Safety Council. You are willing and anxious that this pioneer work go forward until the ideal of "Universal Safety" is accomplished. You must, at the same time, continue to demonstrate, to all observers, the practical value of safety and its place in your own operating program.

Now just what can the Council give its members, in its capacity as a clearing house for safety information, and to help them in a practical way to prevent accidents? It is impossible to touch on all phases of this membership service, but I do want to mention some of them.

I am going to discuss two phases of the service and the first of these is the one we like to term "basic service." Basic service includes all of the things you get in return for your membership investment. First, the *National Safety News: The News* is the official publication of the Council and is a 96 page magazine bringing the latest available information on safety. It goes to approximately 18,000 safety engineers and industrial executives each month.

Second, the poster service: Approximately three million posters were used by Council members last year to arouse interest of their workers in accident prevention.

Sixty-three posters are issued each month picturing both specific and general hazards. They are made up in two sizes: 9 x 12 inches, and 17 x 23 inches, strikingly colored to get their messages across in a hurry. The members of this and other Sections furnish many excellent photographs and ideas to make these posters adaptable to your needs. Your own chairman of the Electric Railway Section poster committee has done splendid work. Many of the members use home made posters; that is, posters developed on their own properties. Of course these have a more or less limited use but many of them are sent directly to our attention and we are in a position to reproduce them, giving credit, in such a way that all members may use these ideas. Please never hesitate to send us ideas or suggestions for this portion of the service.

Third, let me call your attention to the Section's own publication—the Electric Railway Section News-Letter: This is issued each month under the direction of one of your officers and is the medium for an informal written discussion of your specific safety problems. More than 15,000 News-Letters are issued to members of the Council's industrial sections each month.

Fourth, one of the important services of the Council is the series of publications or pamphlets dealing with specific subjects. These are divided into three groups: A general series of Safe Practices Pamphlets covering more than one hundred specific subjects of interest to all industries; the Special Industry Pamphlets covering more than fifty subjects to date, and the Health Practices Pamphlets of which there are more than fourteen. These latter publications are the work of the Industrial Health Division. The former two classifications are prepared by the Industrial Division. These publications present the best condensed experience on engineering and administrative problems of safety. Years of research and the time and thought of hundreds of safety experts went into the compilation of these pamphlets. Their value can not be estimated in dollars and cents but their wide use for constant reference and study indicates their importance. Probably one of the best examples of these publications particularly in the Industrial Series is one which has just been published by your Section and is known as ER 1, "Safe Maintenance of Electric Railway Rolling Stock." I know you will be interested in this particular pamphlet.

The transactions of the Annual Congress, as you know, form one of the best informational services on practical accident prevention work available. Within the next sixty days the transactions of this Congress will be issued in printed form for your use. These are furnished to you as members of the Council. The transactions for individual Sections are printed separately.

Fifth, without industrial accident statistics or records of the work we have accomplished in preventing injuries we would be unable to determine our progress. To this end the National Safety Council annually collects, tabulates, and prints a special report on industrial and public accidents for the previous year. It is not necessary for me to discuss the value of such material as all of you use this great reference work continually.

Sixth, of course the consultation service is used extensively by all members. By this service the staff engineers are glad to advise with you on any problem which you care to discuss. In this connection you as a member of the National Safety Council have complete use of the million dollar library maintained in the headquarters offices for your benefit. This library contains the most up to date information on accident prevention work available in the world today. There are many other phases of this work but the time is so short I must pass on to another phase of Council service which has been developed to assist you in your work.

We like to term this "optional service." You will recall that I referred to the first group of material as being a portion of the "basic service." No doubt you wonder why I make such a distinction between the two. In many instances a number of the members of the Council request special publications on certain phases of accident prevention work. In such cases we endeavor to determine that there is a sufficient demand for such publications to warrant the amount of work needed for their development. If such are desired we then prepare the publications and present them to those mem-

bers particularly interested. Other members are also notified of the service and may optionally purchase material for their own use. You can easily see that it would not be fair to make a portion of your membership cost go toward such miscellaneous publications. You may have no use for them. Consequently this specialized service has been developed until today there are many such pieces of printed matter available. An example of one of these is the calendar; another is the Healthy Worker; the Safe Speaker; Safety Slogans; the Safe WORKER; the Safe DRIVER; Safety in Foremanship, and so on.

I do not wish to omit specific mention of the Industrial Health Service of the Council. This Division is interested in furnishing you with information concerning the health problems which involve your workers. They are willing and anxious to work with you at any time.

We want you to use the service of the Council. If at any time you have any questions do not hesitate to write us immediately.

CHAIRMAN REID: The next subject on the program is one of interest to everybody. It is the question of uniform accident statistics for electric railways. There is a considerable difference of opinion with reference to that matter and we find it everywhere. It would be a mighty helpful thing if we could arrive at some uniform method of keeping our particular statistics.

It is a pleasure to introduce this morning my friend, Mr. A. A. Oldfield.

Report on "Uniform Accident Statistics for Electric Railways"

By A. A. OLDFIELD

Safety Director, Wisconsin Power and Light Company, Madison, Wis.

Early this year our chairman appointed a special committee under the chairmanship of Melvin W. Bridges, to collect information and present a proposed uniform accident statistics form for electric railways. The result of that committee's work is presented here in the first form layout immediately below.

Your Engineering and Statistics Committee is pleased to commend this report, but suggests some slight changes, as outlined in the second form layout immediately following.

The committee further wishes to recognize the excellent work done by Mr. Bridges' sub-committee and hopes that this meeting will go on record as adopting the new form with the slight changes we now suggest to you. For many years the Electric Railway Section has discussed the necessity of such a uniform form and if the section now sees fit to adopt this form, it will represent the solution of a problem which has occupied the attention of the section for a considerable time.

ELECTRIC RAILWAY ACCIDENT STATISTICS

Name of Company.....

City..... State.....

NOTE—THE FULL NUMBER OF ACCIDENTS SHOULD BE REPORTED UNDER EACH HEADING. IT IS NOT THE INTENTION THAT THE QUESTION OF CHARGEABILITY OR NON-CHARGEABILITY OF ACCIDENTS SHALL BE TAKEN INTO CONSIDERATION IN THIS REPORT.

Analysis of Accidents

	1930	1931
1. Total Number of Accidents.....		
(a) Collisions with motor vehicles.....		
(b) Collisions with cars.....		
(c) Collisions with other vehicles on street.....		
(d) Collisions at Railroad crossings.....		
(e) Collisions with pedestrians.....		
(f) Boarding and alighting.....		
(g) Derailments.....		
(h) Accidents on cars (not in collisions).....		
(i) Misc. Transp. Accidents not covered in (a) to (h).....		
(j) All other accidents.....		

Injuries and Fatalities

2. Number of Accidents Resulting in Personal Injuries.....		
3. Total Number of Persons Injured.....		
(a) Passengers.....		
(b) Employees (All Departments).....		
(c) Pedestrians.....		
(d) Others.....		
4. Of the Number of Persons Injured, as Given Above, How Many Were Injured in Accidents Involving Automobiles.....		
5. Total Number of Fatalities.....		
(a) Passengers.....		
(b) Employees (All Departments).....		
(c) Pedestrians.....		
(d) Others.....		
6. Of the Number of Persons Killed, as Given Above, How Many Were Killed in Accidents Involving Automobiles.....		

Analysis of Accident Costs

7. Total Cost of Injuries and Damages.....		
(a) Amount paid in settlement of claims.....		
(1) For property damage.....		
(2) For personal injuries.....		
(b) Cost of claims department including medical service and private investigations.....		
(c) Legal expenses in connection with claims not included in (b).....		
(d) Cost of insurance.....		
(e) Any other expenses.....		
8. What Was the Cost of Safety Work, i.e., Salaries and Expenses of Safety Department, Safety Council Fees, Etc., Exclusive of Safety Devices.....		

Statistical Data

9. Earnings From All Sources.....		
10. Total Number of Man Hours Worked (All Employees).....		

	1930	1931
11. Total Number of Car Miles Operated.....		
12. Number of Revenue Passengers Carried.....		
13. Total Number of Passengers Carried.....		
14. Average Total Number of Trainmen.....		
15. Average Number of Cars Operated During Rush Hours.....		
16. Miles of Single Track Operated.....		
17. Miles of Single Track Operated on Private or Restricted Right of Way.....		
18. Are Any Motor Coach Statistics Included in This Questionnaire.....		

Date

Signed

Title

NOTE—This data sheet is sent you in duplicate form. Please fill in and return one copy to the.....
AT YOUR EARLIEST CONVENIENCE.

(Revised Report Form for)

UNIFORM ELECTRIC RAILWAY ACCIDENT STATISTICS

Name of Company

City State

NOTE—THE FULL NUMBER OF ACCIDENTS SHOULD BE REPORTED UNDER EACH HEADING. IT IS NOT THE INTENTION THAT THE QUESTION OF CHARGEABILITY OR NON-CHARGEABILITY OF ACCIDENTS SHALL BE TAKEN INTO CONSIDERATION IN THIS REPORT.

Analysis of Accidents

1. Total Number of Accidents.....		
(a) Collisions of cars.....		
(b) Collision—cars with motor vehicles.....		
(c) Collision—motor vehicles with cars.....		
(d) Collision with other vehicles.....		
(e) Collision with other vehicles at R. R. crossings.....		
(f) Collision with pedestrians.....		
(g) Boarding and alighting.....		
(h) Derailments.....		
(i) Accidents on cars (not in collisions).....		
(j) Miscellaneous transportation accidents.....		

Injuries and Fatalities

2. Number of Accidents Resulting in Personal Injuries.....		
3. Total Number of Persons Injured.....		
(a) Passengers.....		

	(b) Pedestrians	1930	1931
	(c) Others		
4.	Of the Number of Persons Injured, as Given Above, How Many Were Injured in Accidents Involving Automobiles		
5.	Total Number of Fatalities		
	(a) Passengers		
	(b) Pedestrians		
	(c) Others		
6.	Analysis of Employe Accidents		
	(a) Total average number of employes (All de- partments)		
	(b) Total number of accidents reported		
	(c) Number of non-disability accidents		
	(d) Number of disability accidents		
	(e) Number of fatal accidents		
	(f) Number of disability accidents per 1,000,000 hours worked		
	(g) Number of disability accidents per 100 employes		
7.	Of the Number of Persons Killed, as Given Above, How Many Were Killed in Accidents Involving Automobiles		
Analysis of Accident Costs			
8.	Total Cost of Injuries and Damages		
	(a) Amount paid in settlement of claims		
	(1) For property damage		
	(2) For personal injuries		
	(b) Cost of claims department including medical service and private investigations		
	(c) Legal expenses in connection with claims not included in (b)		
	(d) Cost of insurance		
	(e) Any other expenses		
9.	What Was the Cost of Safety Work, i.e., Salaries and Expenses of Safety Department, Safety Council Fees, Etc., Exclusive of Safety Devices		
Statistical Data			
10.	Earnings From All Sources		
11.	Total Number of Man Hours Worked (All Employes)		
12.	Total Number of Car Miles Operated		
13.	Number of Revenue Passengers Carried		
14.	Total Number of Passengers Carried		
15.	Average Total Number of Trainmen		
16.	Average Number of Cars Operated During Rush Hours		
17.	Miles of Single Track Operated		
18.	Miles of Single Track Operated on Private or Re- stricted Right of Way		
19.	Are Any Motor Coach Statistics Included in This Questionnaire		

Date

Signed

Title

NOTE—This data sheet is sent you in duplicate form. Please fill in and return one copy to the

AT YOUR EARLIEST CONVENIENCE.

CHAIRMAN REID: These reports are open for discussion.
PAUL HODSON (Safety Engineer, East St. Louis & Suburban Railway, St. Louis, Mo.): The claims departments of companies keep certain records and the Safety Council is asking for information which is not kept by a great many claims departments. For instance, some companies do not keep separated, collisions with vehicles as is suggested here. One says collisions with vehicles on streets, one on railway crossings. Some companies do not keep them separated, specifying whether it is an open crossing or whether it is a street intersection. It is just a motor vehicle collision. It is possibly the safety man's job to separate those as they come through.

This is a fine lay-out, the nearest we have ever come to anything near agreement, but when you get into costs of accidents, then you run into another big problem. We have difficulty, however, in getting people to dig out this data. It is because they haven't the time to work out these figures. Then it is necessary to segregate the amount of money the accounting department has paid for claim costs into the various costs, which means more digging back into records.

I think this is one of the finest and the nearest to a real statistical form that we have ever had. I have had forms sent me where I couldn't answer any of the questions. I like to see records and like to get them if they are available. But it is almost impossible in our organization to dig out the required statistics because we are short of help.

M. W. BAIRD (S. E., Chicago Rapid Transit Co., Chicago): We have had no difficulty in answering the questions of the A. E. R. A. as the A. E. R. A. questionnaire has been divided a number of times. First when it came out it was four sheets, legal size. I happened to be chairman of the safety committee of the A. E. R. A. for a number of years after that and it was our job to revise it and we revised it downward to one sheet. Later on there was enough added to make a second sheet.

On the items shown on this report, it requests the cooperation of the safety department, the claims and the auditing departments to answer it in almost every case, because as Mr. Hodson says, practically none of the safety departments keep a full statistical record as it would be duplicating records of other departments. Of the figures asked for by the A. E. R. A. from 618 railroads, about 340 answered the questionnaire complete, and 278 answered about four-fifths. About 175 answered one-half of it.

There are some questions in this report which the Chicago Rapid Transit Co. can't answer because we don't have anything of that kind. We do not believe that all the railroads are going to be able to answer all of these questions, but from the experience of the A. E. R. A., there are a certain number who are going to be able to answer all of them and another group can answer about four-fifths of the questions. It gives you more actual accident statistics than any other questionnaire that has been sent out and the A. E. R. A. has found that each year they have increased the number of answers to this questionnaire by 8 or 10 or 12 and we believe that eventually, if there is some way provided where a universal reporting can be made where the A. E. R. A. and the National Safety Council will have practically the same information, that a copy of your statistics sent to one can be sent to another and it will be universal.

As for the amount of money which comes under paragraph 7, "The Total Costs", I don't believe that the claim department on any railroad fails to keep the record of what their accidents and increased costs are. But there is no electric road that belongs to the National Safety Council whose records are so bad or has so many in-

juries and accidents, that that information can't be dug up in four or five hours' time.

Interstate railroads, electric and steam, report to the Interstate Commerce Commission, and part of the information asked for here is on the report to the Interstate Commerce Commission. The other information, we believe in almost every case, can be obtained from the claim department records.

Under statistical data, paragraph 9, "Earnings From All Sources", the auditing department, as a rule, will furnish that information, providing they know where it is going and providing they know it is going to be used without putting the firm's name after the figures. Of course all reports are coded and confidential.

We can't say that such and such a railroad company's earnings are such and such, and any information that is sent in on statistical forms of this kind is, and should be, considered confidential and not published for the information of the world at large. But it would enable us to say that out of 440 railroads, 330 have reported the following statistics and it would give us something to "shoot at" without putting the railroad up for somebody to "shoot at".

We have tried to give you something here that you can use for comparison and we have gone into details which are interesting to you in your particular operations. We have not gone into their chargeable and non-chargeable ability. There is more room for argument in that item than in any one item.

Mr. Oldfield: May I endeavor to answer in a few words Mr. Hodson's suggestions? You may not agree, but nevertheless I am a little different on my policy and let the claim department report through my office.

They don't itemize the various kinds of collisions and it does not seem to me that would be much of a job for any safety department to do, even though it wasn't kept on their regular routine form. I think it is important that we do know where those accidents occur. Therefore in the first paragraph there could hardly be any question that a safety department couldn't fill out in a year's time, without any trouble.

I agree with Mr. Bridges that any information should be held strictly confidential. We are going to get along by eliminating those things about chargeable and non-chargeable accidents and endeavoring through our auditing and other departments to get this filled in. In any case, you can send this in to the auditing department and get certain things filled in. We are in a position now where our reports don't mean a thing. One fellow is talking about one thing and another about another thing. After the first year there won't be any trouble in getting this information.

E. D. DOANE (City of Detroit, Dept. of Street Railways): Item 17, "Miles of Single Track Operated on Private or Restricted Right of Way." In filling out questionnaires where that has been asked, I wondered just how a private right of way might have been defined, but in justice to what I thought might be other property, in making it up I used some of our restricted right of way. For instance, we have very little track out of the city limits. In making my report I went to our engineering division and we called our private right of way all open track which had cross-overs less frequently than a fifth of a mile. Most of our stops are approximately a fifth of a mile apart, but there are some sections where we had to build cross-overs every sixteenth of a mile and in some cases about one-eighth of a mile. I don't know whether that meets with the ideas of other members, but perhaps that might clarify it.

Mr. Oldfield: Isn't it a fact that in your own commission or the Interstate Commerce Commission, in your annual report, you have to report how many miles of single track you are operating and how many miles of double? The same figures could be used.

Mr. Doane: Yes, but in distinguishing between the private right-of-way and other tracks, we really have less than a mile of private right-of-way, but we have several miles of open track where, from an accident point of view, you have probably the same conditions that you have on the private right-of-way.

E. I. HARRINGTON (Asst. Supt. of Accident Prevention, Cleveland Railway Co.,

Cleveland, Ohio): Mr. Doane, that track which is laid so close to the pavement that the vehicles are allowed to cross and recross and rub the sides of your car in passing, isn't that open construction rather than private right-of-way?

Mr. Doane: Well, they do that, but in a lot of those cases there is the usual space. I don't know just how many inches there are between the rail and the pavement; they were installed by the city. In some places that is open.

T. G. BRABSTON (Supt. Transportation, Birmingham Electric Co., Birmingham, Alabama): I think in this case, with this statistical report, we are among friends and if there is any timidity or actual resistance in prying figures loose from another department, that department hasn't caught the idea of the purpose for which these figures are used. We are nearer having a uniform report and the average company can furnish the greater part of the information requested on this report. It is very much simplified in the information that is required and I believe from my own experience and observance in this section, that we have discussed this subject with more or less perseverance every year for the past seven or eight years, and we have never come any nearer a solution and we have wasted a lot of oratory on the subject.

We have something here that this committee, or those that have been concerned in the preparation, would for a moment allege is one hundred per cent perfect. There may be too much information or unnecessary information that is asked for in this report. There may not be enough information of a type and character that is essential. I am not going to make any claims in either direction but it is certainly of such uniformity and certainly contains opportunity for comparative information and the comparisons are what we are all anxious to consider. We should approve this report. That we may get the report in at least a form where we can approve or disapprove it, I move, Mr. Chairman, that the report of the Statistical Committee be approved and that this form of reporting be adopted by this section.

CHAIRMAN REID: Is there a second to that motion?

GLENN H. SHAW (Safety Director, Ohio Edison Co., Akron, O.): Mr. Chairman, I second the motion. First I want to thank Mr. Bridges, Mr. Brabston, Mr. Eastham, Mr. Oldfield and all the gentlemen who have endeavored to bring this report to us. They have done a good job and we are getting nearer to a common ground whereby we can understand each other and be able in the future to listen to some report that we can compare with our own records.

Mr. Oldfield: All the work in that report was done by Mr. Bridges, Mr. Brabston and Mr. Eastham. I want to make an amendment that under paragraph number 3, "Total Number of Persons Injured," we should substitute and make a separate paragraph of that. I think that should be a separate paragraph.

CHAIRMAN REID: All in favor of the motion say aye. Opposed. The motion is carried.

G. T. HELLMUTH (General Claims Attorney, Chicago North Shore & Milwaukee R. R. and Chicago Rapid Transit Co., Chicago): Mr. Chairman, can't we arrange with the Headquarters staff to send a copy of that report to, say, the chief executive, the man in charge of the transportation department, the man in charge of the safety work and the man at the head of the claim department of each member company with the request that they submit their report for the calendar year 1931 and then write it up for the Congress for 1932?

M. W. BAINERS (S. E. Chicago Rapid Transit Co., Chicago): Mr. Chairman: That one thing was brought out in the final analysis of this report. We also sent copies to the A. E. R. A. who had answered every question that we asked during the time we were preparing the report. The A. E. R. A. know what we are doing and I believe the chairman should see that Mr. Gordon of the A. E. R. A. should be notified of what we are doing in this section, because he is interested in the matter.

R. C. BUSH (Mgr. Transit Mutual Insurance Co., Boston, Mass.): In looking over the questions to be answered, everything seems to be quite clear and easy to understand.

There is one question in regard to the employees. Does the committee have in mind

that the company should report every little incident where an employee scratches his finger or whatnot, or perhaps cases where the employee loses time? No doubt the committee had some discussion on that point and perhaps that would help us to fill this out later on.

Mr. BRUNGES: On the matter of the employee injury, there has always been an argument in electric railway work as to what should be considered an employee injury.

Railroads don't call an employee accident a disability injury until the man comes under compensation. Others don't count it a disability injury to an employee until an employee loses eight hours or one shift. Minor injuries or no time lost are not counted in many companies and others count them as employees' injuries. We count a disability injury as one where a man loses eight hours or more.

We have three headings: fatality, disability and minor injuries. Minor injuries are where an employee loses no time from his work. Those three classifications are what we have been using. We did not endeavor to classify just what should be called a disability or employee injury. Since you have opened that discussion, in making a paragraph for employees' injuries, according to this, there will be the total number of employees injured, the total number of employees' fatalities. Those are the two that come under this new paragraph. How are you going to classify them or rearrange your present classification?

I suggest that thing be made into three heads: fatalities, disabilities and minor injuries, and if possible let's have our disability injuries on the basis of a one-day loss, because gentlemen, a disability injury is a disability injury if he loses one day. If you don't count an accident a disability until he loses seven days, you are going to have a mighty good report because the greater number of your accidents on almost every railroad among your employees are where men lose less than the waiting period for compensation. You have a number of little accidents where a man loses one, two and three days and then goes back on the job and it would not be a fair method to compare with one who counts eight days as a lost time accident.

Mr. HELLMUTH: I ask this be added to the report: that in an employee's disability accident there should be more than eight hours' time lost to make it reportable, otherwise we won't have any other way of knowing whether an employee's accident should be reported or not. We must have a standard of definition. Say one shift instead of eight hours. Can't we add that?

CHAIRMAN REID: It has been moved and seconded that the suggestion made by Mr. Hellmuth be included in the report. Carried.

CHAIRMAN REID: The next subject on the program is one of vital importance. During this Congress a good deal has been said about executives and responsibility. A good deal has been said about the responsibility of superintendents and foremen, about the proper rules, about discipline, but it doesn't matter how much executive responsibility we may have, and we are all agreed that is necessary, it doesn't matter how much interest there may be on the part of the superintendent and foreman nor what may be done with reference to the enforcement of rules and what may be done in regard to discipline, unless the employees are sold on the safety program it will not be successful.

I take pleasure in introducing my friend, Henry Cordell, who will talk to us on that important subject of "Popularizing the Safety Program."

Popularizing The Safety Program

By H. CORDELL

Master Mechanic, Chicago, North Shore and Milwaukee Railroad Co.,
Highwood, Ill.

On a shelf in my office stand two cast replicas of animals, one of a deer and the other of a bull.

A traveling salesman, very observing, noticed them. You must be a hunter? Yes, I like to hunt, I replied. Ever shot any deer? Oh yes, quite a few. He looked up at the shelf, but said nothing. Evidently he felt quite at ease and started to tell me what he had to sell.

This salesman through his respect for my feelings left a lasting impression of being a diplomat, as well as a good salesman. I was thinking afterward, what a "wow" of a safety engineer he would make.

Putting me before a group of men like you, men holding positions paying 500 to 1000 dollars a month, and really underpaid at that, doing work which I am not even a freshman at, seems out of order, and my hunting proclivities will, no doubt, come in handy.

Looking out of the window, I see an endless chain of long eared mules and horses pulling wagons up to a steam shovel, each in turn getting a load to be deposited at some other location. The man driving the team uses very little energy and perhaps does very little thinking. The only one on the job who really works and thinks is the steam shovel operator.

The driver possessing 18,000,000 microscopic brain cells is using probably none, except those which automatically control sight, feeling, hearing and the stomach. I hope that I am not placed in a position of the steam shovel operator.

I need your attention, your interest, your full support, not by applause, but by the very fact that you remain in the hall until the pain is over.

It is interesting to watch the military precision, the perfect coordination of the job of excavation. Some master mind planned ahead.

If the undertaking, which in our case is safety work, is well planned, carrying with it a certain "It" which depends largely on the personality of those holding positions of heads of departments, safety engineers and chairmen of employees groups, the safety program can, and will become popular.

I don't mean that they must be clowns or qualified entertainers, but they must be the type of man that personifies good salesmanship. It may seem strange that one has to sell good health, good eyes, limbs, happiness and contentment to any individual, but we know that's true.

Some men will sit through a safety meeting contentedly pulling at a cigar, lost to the magnetism of the speaker, hypnotized by his wonderful gift of speech, ears wide open, both of them. Too bad, in one side and out the other. Maybe nothing there to stop it.

No impression, why?

Simple. The speaker failed to touch the chord which would have set up a vibration of such frequency as to become audible to the person in question.

It matters little in the average man's mind what happened to John Smith or Jim Jones, unless his position or work is of the same nature as that of the listener. Why? Because he feels that his work will not require him to climb poles or jack up cars, fly an aeroplane or swim the English Channel.

It is important to confine yourself to actual conditions encountered by the group of men you are talking to.

We learn and profit by the mistakes of others, and the more we know about them, the better. I know of no finer examples than those which affect our private walks of life.

I happened to be one of the audience, when a safety engineer of a certain company talked for a long time on everything except of the things that really affected the group. The reaction was good.

Somebody said after the meeting, why don't somebody shoot that fellow? Of course, that was not a nice thing to say, and the speaker had really done a splendid job, using fine grammar and a vocabulary such as would be expected of educated men who are so common in the profession of safety engineers.

I enjoyed his talk from that angle as well as the general information obtained. The point is, when you talk to college graduates, use long words, it does not matter

if they are not placed just right, probably only a few will know the difference; however, when you talk to the ordinary fellow, assume the language and manner they understand and use.

I am courting criticism and expect such, but I feel that I am right in my contentions.

Look at your program. See all the different groups holding meetings? Hazards, unsafe practices and remedies will be discussed pertaining to the work performed by men of that group or industry.

You won't find men engaged in mining attending the ice men's meeting or a railroad man in the meeting of pork packers and tanners. Still there are many meetings representing other industries than the one you are personally attached to, which you will find not only interesting, but a lot in common with your own problems. It will be of benefit to you to attend such meetings. However, I am getting away from my subject.

Some people are naturally funny. Others are educated to become so. The natural kind gains attention of the audience by the simple almost unconscious way they speak and act.

Men are born leaders. Men are born clowns, but some of us succeed in making fools of ourselves, individually and collectively. Somebody is nearly always to blame when things go wrong. No difference in our safety work.

Selection of leadership is most important. I am wondering if the election of chairman, from employees by employees for the group is the proper method for continuous interest in the safety meetings? Your opinion may differ from mine, however, let's be frank with each other. John Jones is elected chairman, he has never held such a position, don't know the way of conducting himself or a meeting, and further more he might be like warm in safety work.

The boys think it a lot of fun watching his feeble attempts and his embarrassment at this first meeting. I don't care how popular John Jones may be among his fellow men, he lost his hold and attendance drops off, and no wonder. You see the fallacy of such a procedure?

If the selection had been controlled by the company, or at least under the influence of a foreman in the group whom we, of course, will consider as none other than 100 per cent sold on the subject we are on, the result would have been a lot better.

Before I go any farther, I want to make my viewpoint clear. The responsibility is ours as leaders and we can popularize the safety program by attending our employees' meetings. Our men like to rub shoulders with us and know that we consider safety a personal matter and of such vital importance to us as we want them to consider it.

Many a time have I heard this expression. "I would like to see Mr. X. come to our meeting. I know he is a busy man, but if he was sick for an hour things would run along all right."

Interdepartmental attendance is very necessary. In most every line of business one department is closely related to the other and we must feel ourself a part of the whole. Therefore, the necessity of Chairmen and Department Heads sitting in on each other's meetings, studying the problems and, if solution is hard to reach, helping by participating in the discussion. I can see a greater need for this than ever before and the present time particularly, because of a certain stagnation which has crept into the safety work for two reasons.

First: Reduction in number of men employed. This no doubt affected many men who were interested heart and soul in safety work, and naturally weakened the incentive, so to speak, towards obtaining a perfect record of accident elimination, as well as meeting attendance.

Second: Inability on the part of the employers, due to curtailing of expenses, to promptly comply with safety recommendation.

We must, therefore, find ways and means to keep up the interest, not by spending dollars, but by spending cents, or better still spend nothing at all.

We must realize, that for many years on most of the properties represented here today, large sums have been spent to adjust, if you please, installations to conform with advanced safety ideas.

This should not be necessary now, and we should be able to see ahead on new work and prevent what we have paid so dearly in the past. Perhaps a loss of a life, a loss of an eye or a limb as well as loss of time and money.

I am firmly of the opinion that our men, if given an opportunity to become acquainted with what is contemplated, could give some concrete ideas along the safety angle of such project. This certainly should create interest and would do a great deal to popularize the safety programs. We are shouting from the house-tops about cooperation. Then why don't we let co-workers in on our projects? Why all the egotism?

We must not underestimate the intelligence of our workmen. Different men have different viewpoints and ideas. Personal experience of some 35 years, handling men, has taught me to converse with men down the rank and file about certain schemes I had in mind with the result that I have received some wonderful ideas where least expected. These ideas were not, however, capitalized as my own.

Plagiarism is a disease which finds ready victims in men engaged in safety work, as well as in other occupations.

How convenient it is to copy somebody's statement or idea and present it as your own.

Incurables are not rare.

I read an article not long ago where an employee suggested an improvement. The foreman took the credit. His superior in turn plagiarized. The general manager rewarded the superior officer, the officer rewarded the foreman and the originator, oh well, he was merely doing his duty as a worker, hence no particular need of remuneration. Such tactics, if really practiced, would kill all incentive.

The time of holding safety meetings plays a very important part in its popularity.

Of course, most men would just as well attend with pay, that is, on their working time. This I feel is a fallacy, and more so, if some group does and others don't on the same property. If meetings are arranged so that they can be attended after closing time of the day's work, and ample notice given, men will attend.

But what about the "bird" that never comes to a safety meeting? The fellow who always has a ready excuse why he cannot attend.

The bad part of it is, he is very apt to drag somebody else away with him, who otherwise would have attended.

There is only one way out. Safety must be considered as a part of the employee's position with the company, and unless the right spirit prevails, such an employee cannot expect the same consideration as the others. We are not going to jeopardize our safety work or the safety of our interested employees by the action of a traitor to the cause.

Too long drawn out meetings are not popular. Short, snappy and to the point which again rests with the chairman, are the kind. Arrange to have a committee of employees to present the suggestions which have been turned in to them.

Give time for discussion.

Don't prompt for safety suggestions.

A person who is a good safety man will come prepared to offer his suggestions. Don't use snap judgment as to action which should be taken.

Nothing destroys the morale or the desire to help as a rough, rude and insolent remark as a reward for a thought advanced. An employee who is made a laughing stock or held up before his fellow employees as an imbecile, cannot be expected to feel at home at your meetings, and if there, adds nothing.

If such a remark comes from a superior, irreparable damage is done.

Lack of tact closes and locks the door to opportunity and opens the dungeon to dismal failure. Commonplace, you say, yes you are right.

We are grownups, men with brains, why don't we control our impulses.

A reprimand should not be a public affair and certainly not at a safety meeting, if directed to an individual.

Do you believe in humor?

I invariably warn the men that while they may go to sleep during the meeting, they must not snore. It is always a comfort to know that the agony of listening to me has passed, when they have gone asleep.

A good story may enforce, illuminate and explain in a few minutes what a lengthy elaboration might not have done. It was the peg to hang the picture on.

Humor is a tonic and it should be clean.

Far be it from me to infer that obscene stories could be used at a safety meeting, knowing as I do the white lies which grace our meetings. So when we sum it all up safety is but a religion, and you know who draws the biggest crowd. Not the pessimist, not the man who blows out all the lights, but the fellow who polishes up the dark side when there is no bright one.

Unusual things always attract attention.

Illustrations either in the form of moving pictures or still pictures carrying with them the lesson we wish to put across do quite well.

However, I believe that simple pictures drawn in chalk on a black board by the speaker, showing the part of equipment which we want particularly to be checked, pointing out the defects, such as cracks, bending, leaning, or broken parts, will hold the men's attention and create discussion. Perhaps better still, draw the part and ask questions as to where defects are most apt to occur and why.

Thinking is necessary in safety work and the more the better. Ninety-nine per cent of our accidents are caused by lack of thinking before and too much thinking after they happen.

In conclusion, gentlemen, will you agree with me that to popularize the safety program we must have salesmanship, leadership, tact, friendship, appreciation, judgment, humor, and inventiveness, and last, all rolled into one, human understanding.

CHAIRMAN REID: Thank you Mr. Cordell, for your splendid paper.

I am sorry that we haven't time for a discussion. I just want to say a word or two before we adjourn.

These meetings have been exceedingly helpful to all of us. We developed more discussion and that is a good sign. Take this information home with you and make such use of it that your companies will feel that they were justified in the expense necessary to bring you here.

We have three vice presidents in this Section, and I want to offer a suggestion as to how they may be of material help during the twelve months to come. I am going to ask these three gentlemen, Messrs. Brabston, Bush and Hodson, each to contribute what would be equivalent to one page in the News Letter. Just items on interesting things that occur on your property or that you may be doing that will be helpful to the entire industry. Send those to Mr. Finch so that when he gets out the letter, he won't have to do it all himself. The help that those three vice presidents can give the editor this year will be of value to the entire industry. The other members of the section should do the same thing.

I want to express my appreciation of the honor you have shown me and trust you will give me the same support that you have given Mr. Shaw and the others who have preceded me.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Employees' Publication Section

Officers 1930-31

General Chairman—V. H. KUPFERER, The Studebaker Corporation, South Bend, Ind.
Vice-Chairman, Middle West—JOHN N. NOLAN, Jewel Tea Company, Barrington, Ill.

Vice-Chairman, East—WALTER E. PINGREE, Charles H. Tenney & Co., Boston, Mass.

Secretary—RUTH E. CADE, A. E. Staley Manufacturing Co., Decatur, Ill.

Program Committee—EUGENE T. WILKINS, General Electric Company, Schenectady, N. Y.

Membership Committee—C. T. FISH, National Safety Council, Chicago, Ill.

Service Committee—GRADY B. BELL, Standard Oil Co. (Ohio), Cleveland, Ohio.

Executive Committee—THE OFFICERS AND

CHARLES A. WARD, Pure Oil Co., Columbus, Ohio.

GILBERT F. CLOSE, General Steel Castings Corp., Granite City, Ill.

C. E. KANE, Illinois Central System, Chicago, Ill.

Tuesday Afternoon Session October 13, 1931

V. H. KUPFERER, Chairman
The Studebaker Corporation, South Bend, Ind.

The first session of the Employees' Publication Section convened with General Chairman V. H. Kupferer, The Studebaker Corporation, South Bend, Indiana, presiding.

CHAIRMAN KUPFERER: The meeting of the Employees' Publication Section will be opened this afternoon with a few remarks from J. W. Hicks, president of the Chicago Industrial Relations Editors' Association, who brings you greetings.

JOSEPH W. HICKS (President, Chicago Industrial Relations Editors' Association, Chicago): It is not necessary for you people to be welcomed to Chicago. At our last regional meeting, they got me up here for the purpose of welcoming the Employees' Magazine editors to Chicago. I tried to tell them we had an Art Institute and the Field Museum, Art Galleries and Stock Yards and places of interest that they should see. Before the evening was over some of them took me to places that I did not know existed in Chicago. They knew the town much better than I did.

Nevertheless, it is a pleasure to have you here and on behalf of the Industrial

Editors of Chicago, Mayor Cermak and George Gaw, our "greeter," Al Capone and other notables, it is a pleasure to welcome you. We have all come to exchange ideas and talk about employee magazines. I am going to quit talking about it now because when I get started I can not talk enough. Tonight the industrial editors are going to be hosts to you at a dinner at the Sherman, in the Crystal Ballroom. We have arranged a dinner, an orchestra and several vaudeville acts, and Pat Ward will help in the introducing.

Once again I want to say, "Welcome to Chicago."

CHAIRMAN KUPFERER: The next order of business is the report of your general chairman.

Chairman's Report of the Activities of the Section

By VICTOR H. KUPFERER

Editor, The Studebaker Accelerator, South Bend, Indiana

There is an old story of a certain backwoods preacher who was constantly appealing to the Church missionary board for financial assistance. The situation became rather chronic and the Board finally notified him they could consider no more of his appeals. Shortly afterward, the Board received a laconic communication somewhat like this, "This is not an appeal, it is a report: I have no parish."

There is little that can be said, in reporting the activities of our section, which has not been said before.

Magazine Contest

One accomplishment of this year's administration was the revision of the magazine contest judging basis. It is our belief that the changes which were made are constructive. Whether they are satisfactory to the entire membership can only be determined by the vehemence of the storm of protest, after the awards have been made.

We are indebted to Sterling Patterson, editorial director of the Western Electric Company, whose suggestions, with slight modification, were adopted as the measuring stick in this year's contest. The committee of judges consisted of Mr. Patterson, together with C. T. Fish, editor of the *National Safety News*, and J. L. Frazier, editor of the *Inland Printer*. We owe these gentlemen our heartiest appreciation for the time and effort they have expended in going over more than a hundred publications.

Regional Meetings

Your chairman was indeed disappointed at having to lose the services of two such able vice-chairmen as our good friends Herb Roth and John Nolan. Both had to resign due to a change in their lines of endeavor.

W. E. Pingree, of the Charles H. Tenney Company, Boston, after some persuasion, agreed to take on the eastern vice-chairmanship and took complete charge of the eastern regional meeting held in New York on April 24. Mr. Pingree set up a program based on the magazine contest features and I am sure a delightful and profitable time was had by all. The regional meeting at Chicago on March 5 was promoted largely by the Chicago Industrial Editors Association. Mr. Nolan assisted materially in setting up the program, prior to his resignation. I was present at the meeting and can say from experience that it was exceedingly worth while.

The News Letter

I have said before that the News Letter is the lifeblood of our section. Every member participates in its benefits inasmuch as it is mailed to each of us. Grady

Bell, Emil Vogel, and Hugh Wright have done a good job on the News Letter this year. My conviction is that more of us should contribute to the News Letter. John Brandt, editor of the *J. L. Clark Rouser*, suggests that we should run personal news concerning members of our section in the News Letter. It is an idea which might well be considered by the service committee for the ensuing year.

The National Safety Council

We are grateful to the National Safety Council for its service in mimeographing and mailing the News Letter to our members. A worth while innovation this year was the inclusion of the employees' publication safety service with each News Letter. I am sure we all appreciated this. The Council also assists our section in many other ways: making all arrangements for our annual meetings, handling the details of our magazine contest, printing our stationery, providing consultation service, etc., etc. Our ambassador at headquarters is Carman T. Fish and to him personally we are deeply indebted for his interest in and efforts on behalf of the Section.

Under the chairmanship of Ernest Augustus, Editor of *Mead Co-Operation*, Ohio editors held a meeting in connection with the Ohio Safety Congress. We believe more state and local organizations should be fostered at strategic locations and further effort along this line is recommended. An attempt was made to start such an organization on the Pacific Coast but we were unable to locate anyone who could give the time to inaugurate the program.

Program Committee

The results of this year's program committee's efforts will be evident during the next two days. Eugene T. Wilkins, of General Electric, Schenectady, is responsible for our set-up, together with Joe Hicks and his Chicago association, who made local arrangements. The program committee, which must line up its events so far in advance, in order to get them into the printed Congress program, has a real job and Gene has given us a menu with plenty of "stick-to-the-ribs" stuff in it.

I had no intention of making an extensive report. If I had my way it would stand as I gave it to you in the August News Letter. However, I bowed to custom in this respect. I would rather make an appeal than a report. That appeal would be for everyone of us to take to heart his responsibility as a member of the section. Help the News Letter editors, help the program committee, help the officers. Everybody helping will bring achievement which will make our section, our publications, and ourselves potent factors in the task of making employees of our companies safer, happier, and more prosperous.

The program calls for an item at this time, which it is the extreme pleasure for me to present. Grady Bell is rather inclined to pass the honor for this year's News Letter along to the Associate Service Committee, and perhaps this thought is quite well taken, because Grady hiked off to Europe after he had put out a few letters; incidentally that was before he was married, too, and I cannot quite figure that out yet, unless he thought he would have one more good trip; but Grady started off and gave us some very good work in connection with our News Letter.

The News Letter's Place in the Section

By GRADY B. BELL

Chairman, Service Committee

Fellow Editors, Mr. Kupferer was very good in introducing me. I do not believe that anybody here knows less than I do about the place for the News Letter in the section. I regard it almost as the section itself, so I do not have any message to deliver to this group. I come unprepared.

I doubt whether any of you have come to our meetings with a better excuse for making no preparation than I have. You have heard a lot about this trip to Europe of mine. I could not see that it should worry anybody, but what none of you do have straight is the fact of this getting married business.

I think it is something that might be included in the next News Letter, in the way of a safety lesson. Imagine a man coming to a National Safety Congress and getting married. As a matter of fact, this just happened Saturday, so that is part of the reason that I have no message to deliver here.

I am perfectly serious when I say I do not think it is appropriate to give me fifteen minutes to talk to you about the place of the News Letter in the section, because certainly you people know that the section itself, and the life of the section depends upon the News Letter. Without it, would there be a section? Of course, somebody at the headquarters of the National Safety Council could write you letters, apprising you of the dates of the meetings, and other information; but isn't 75 to 90 per cent of what we get out of our association with the National Safety Council gotten either directly or indirectly from the reading of the News Letter?

I got my first introduction to the National Safety Council through that reading of that News Letter. Since then, through the News Letter, I get all my benefits from this association, either in the way of information concerning meetings which in themselves are valuable, or other benefits which come directly from reading the News Letter.

I would like at this time, again, to express my pleasure first to our chairman, Mr. Kupferer and second to two men who are not here, the other members of our Service Committee, Hugh Wright and Emil Vogel, each of whom edited three of the news letters, a total of six, leaving but five for me to do. That was a lucky break for some of you readers.

Next I would like to thank all the contributors who have sent anything to the News Letter, directly or indirectly. Whether the letter has been good or bad, cannot be credited to the chairman of the Service Committee or any member of that committee. Its value will depend upon the contributors to it.

John Brandt has made a suggestion, alluded to in Mr. Kupferer's report, that if he were editor of the News Letter again he would find a way to get more personal news in about the editors who read that News Letter. Some of us regard personal news items in our own employee publications as an evil necessity. I do, personally. I do not confess to any such great interest in humanity that I care to read about the births or marriages of people whom I do not know. I think, likewise, those people here who do not know me, are bored with this business about my trip to Europe and my marriage. However, concerning those people whom we do know, we are interested in these things, and I would add one suggestion to that incorporation of personal news items in the news letter, and that is a few jokes. Anything that might be done to get more people personally interested in it, would be good, rather than the way it seems to be now. About 75 per cent of the editors of the country, over 400 editors, get this letter.

You have here a goodly number of those who are actively represented in the News Letter. About three or four dozen at the outside are contributing to and supporting it. I do not think there is any better suggestion than that Mr. Brandt offers, to improve its value by finding some way of getting those personal news items, and thereby getting the personal interest of say 400 editors who are now getting the letter and perhaps throwing it in the waste basket.

If I were editing the news letter again, I know what I would do. Mr. Brandt has told you what he would do. I would ask Mr. Fish for the names and addresses of those 400 editors who are getting the News Letter, and I would write each one a personal letter at some time during the year. There are eleven issues of the News Letter during the year. I would divide that total number by eleven, and write that

many letters each month. I would not try to write this form letter to any editor more than once during the year. Of course if he was interested, that should start it.

It would cost me a little money. It would cost my company a little money for me to write these letters; but it costs my company money to allow me to act as chairman of the committee, and I think the job is worth doing well. It would be better done if we could establish some connection between the headquarters and the chairman of the Service Committee and those who are supposed to read the News Letter.

Again, the place of the News Letter in the section: If you can justify the publication which you edit for your company, within your own organization, by that same reasoning you can justify the existence of the News Letter within this section. I think we have an advantage in this section; that we do not enjoy in our individual publications. Most of us edit publications that do not have so direct a business appeal. We earn our living by being editors. We find in the News Letter a great deal of material that directly contributes to our bulletin and helps us to do our job better. At least that is our avowed purpose; to better enable the editor to do his job, and where our bread and butter is concerned, we are more apt to read the publication.

I do not think many of the employees of the company which employs me are very conscious of the fact that they might be better equipped for the job by reading my publication. If it were not for the realization on the part of those who do read the news letter, I am afraid it would not be good at all.

Our only consideration in discussing the News Letter should be, "How to improve the News Letter and how to widen its circle of interest; how to make a direct and personal appeal to more readers." I would now like to open the general discussion on the News Letter, any phase of the News Letter which you wish to discuss.

C. E. KANE (Illinois Central Railroad Company, Chicago): I was a little bit discouraged at what Mr. Bell said about the News Letter, that perhaps 30 or 40 work on it, and take an active interest in it, and perhaps 400 throw it in the waste basket. I do not think that is quite true. I have always felt that we have a large number of people who get the News Letter and get a lot of benefit out of it, but do not contribute to it and seldom come to our meetings.

I know from personal experience there is a whole lot of difference between getting a News Letter and sitting down and writing a contribution to the next News Letter. There is an effort involved, and unless something really moves me to action, I do not do anything about it. You all know that volunteer workers are few and far between. I remember that in the army, when they wanted a detail to peel potatoes, they did not ask those boys who wanted to do it. They called off a list of names and those that were called went and peeled potatoes.

I am very much interested in having the News Letter conducted, allowing the editor each month to name the contributors, not to the exclusion of the volunteers who happen to show up, but in order to plan more or less the campaign that the letters should follow. I think if we have an editor who is fairly well acquainted with the section, as most of you are, he can pick out or assign topics for the coming News Letter, in addition to circularizing a certain number each month. I suggest, instead of attempting to rely on volunteer contributors, that we try to make a definite program, by calling each month on a certain number of selected contributors.

MR. BELL: That is an excellent suggestion. I did not state what I would like to put in those letters which would go to 400 each year, but it would be in the nature of an assignment. Last year I tried that, but it did not work. I did not put it in the paper. It is much easier for Joe Hicks or Emil Vogel to get out an assignment, if I ask him to as we leave here. Suppose I ask somebody in Chicago, as I did last year in Pittsburgh, to write me a story on this convention. I did that last year and it was laughed off and I had to write something myself.

I had to take my assignment, because I rather felt the Pittsburgh editors were too modest to do justice to that excellent meeting we had over there, and perhaps that

would be true of any Chicago man; but I believe the assignment basis of circularizing the membership would be the only sound way.

J. G. BRANDT (J. L. Clark Manufacturing Company, Rockford, Illinois): I think many of us who have passed through the fire will realize that we tackle a job in this section perhaps entirely uninstructed. Two years ago I was editor of the News Letter, and Mr. Kane who was chairman of the Section at the time did something that was of more help to me than anything that occurred. He revised the mailing list by sending out a coupon in the first News Letter, advising the readers that if that coupon was not returned their name would be taken from the mailing list; and he had those coupons sent to me, in order, as he stated, that I might become acquainted with the membership. I took advantage of that opportunity, by writing the members.

Now, in order to fill up the pages of my News Letter, I would select names of that mailing list as potentials, assigning subjects to some of them, and leaving others a free hand to do as they chose. It all worked out fine. That gave me something to stand on, and I think that if the same thing could be put into effect each year, each succeeding editor of the news letter would have gained several jumps on the job before he started.

C. T. FISH (National Safety Council, Chicago): Mr. Brandt spoke about that coupon to revise our mailing list. I might say that we did not make good on our threat to discontinue those who did not send in a coupon. If we had done so, we would have had a mailing list of less than one hundred. Several of our faithful members did not send in their coupons, and I knew if we yanked their cards out of the file, then three or four months later they would wake up and write in for back copies. I let the list ride, and revised it from time to time, by the postal returns.

RALPH W. LIDDLE (Commonwealth Edison Company, Chicago): The average editor as he picks up the News Letter is usually pretty busy. If he is given an assignment to prepare a discourse on a certain topic, he may be inclined to neglect or slight it if given the opportunity; but it is not difficult to supply a brief discussion of some idea that has been presented. I remember in some of the letters, a topic of discussion had been started, and in some succeeding News Letter, at least in one case, there was a note that the replies to this question were very small. I know that I, personally, made no reply to them, until one came along that I happened to have some interest in, and thinking of the job Grady was having, I said, "I will give you my turn for once, however bad it may be." It took about ten minutes, and it was sent along. I think that may be the point toward the solution. If the editor were to take upon himself to find out interesting topics, or topics that should be of interest to a number of members, and send out letters to a dozen members or more through the list through the year and ask them for a contribution to some thought, out of the group some would be found to have a definite interest on that subject or at least one have a pointed idea on that subject.

MR. BELL: We can not claim any credit for the round table to which Mr. Liddle refers, because it is a result of our failure at the last national convention in Pittsburgh, as mentioned, to conduct a round table at this session. We filibustered too much and had no time left for a round table, and the questions that had been submitted for round table were handed to me by Uncle Pat Ward at the conclusion of the session, and I thought it might be a good function of the news letter, to continue in its pages what we had failed to provide time for at the session. The result was a more or less continuous round table discussion. There was no direct solicitation in this, however, as questions were merely published one month, asking for discussion for the next month. The response was not very wide. We got some wonderful discussions, I believe, from the few people. However, there was not sufficient variety of discussion.

EUGENE TAYLOR WILKINS (General Electric Company, Schenectady, N. Y.): I want to add my endorsement to the News Letter. Since it has been published, I have saved every copy. I find it mighty interesting to look over those copies and I have culled

here eleven articles which I believe would save any editor one hundred dollars at least in the preparation of his magazine.

Those eleven items are mighty valuable and I cut them out and have saved them just for ready reference. If you men have not cut them out I advise you to look over your copies and I think you will find something there that you have overlooked that will help you out in your work.

I might add a suggestion that we restore the index on our News Letter. I found it very handy to look over the index, when looking for something that I had read in past issues.

Regarding the personals, I think it might be well to put in the names of the editors who have attended this conference. We have met them, but sometimes we have forgotten their names when we leave. I think if we put in little items to give a personal touch, I suggested to Mr. Bell that we put in the names of the members of our section, taking so many each month, so we know about who is included in our group. That seemed to be too much of a task and take up too much room, so that was passed by.

I also endorse this plan of sort of drafting these different editors in these different discussions. I would suggest we keep these discussions short.

MR. BELL: I think we should have a list of these eleven articles which provide a lesson in economy.

H. W. FITCH (The Delaware and Hudson Railway Corporation, Albany, N. Y.): How did this man save \$125.

MR. WILKINS: They were mailing weekly, and once in a while they wanted to add an extra four pages to an issue, and were deterred by the fact that it would cost extra printing and paper and also a cent more in mailing. They saved this extra cost by instructing the printers to trim an extra sixteenth of an inch on three sides of the magazine. There is where he saved \$125.

Another is on typing copy to fit your pages. Another is using the blue print on the photographs; another is helpful hints by Charlie Kane. He has about four items here. Another is about grade of paper to economize; here is another about home made cartoons. That is a valuable service. Another is an even basis of measure; another is the legibility of colors, showing the variety of colors. Here is this valuable list of books which any editor should have or refer to. There were about 25 appeared in one issue and about ten others added to them. There is a whole lot of valuable information that we have thrown into the scrap basket that would save you money.

MR. FITCH: May I ask over how long a period of time those were published?

MR. WILKINS: Two years.

LOGAN ANDERSON (R. R. Donnelley & Sons, Chicago): May I suggest that any trimming be done on the front tail only if you are going to have copies bound? If this issue was trimmed all around, you will have bad margins on top of the bound volume. If it is necessary to trim all around, instruct your binders to sew the books that much below the others, and your margin will come out all right.

CHAIRMAN KUPFERER: I have frequently referred to the News Letter as the life blood of our section, and I think it is. As chairman of the section last year, it was incumbent upon me to add a letter to each issue of the News Letter. It brought to me forcibly that I had a job and a section each month. I do not know, as I look back, whether the letters I wrote did very much in the way of adding to the News Letter, but the letters were simply my feeling at the particular time. I think the trouble with a lot of us is that we are too modest. Possibly some of us feel that this is our first meeting of the section, and that I should not talk here because there are too many old timers. Some of us feel that because we do not happen to be among the group that was at Pittsburgh last year and Chicago the year before, that we have not any right to talk. I think we should get over that idea.

There is not a one of us but what has some idea to suggest. In line with that thought, I had prepared a number of subjects here, on which we can all make suggestions. Before the day is over, I am going to have these papers distributed, so you will have

a chance to register your own opinion on any subjects in connection with the section. If it is not covered in the section, you can turn your sheet over and make your suggestions there. Our meetings are fairly brief, and in a day and a half we do not have a chance to get acquainted with fifty other people, as much as we would like; but I want to encourage the people, every one of you to feel this is as much your section as it is the chairman's, editor of the News Letter or any one else. Just because you have not been coming to these meetings five, six or ten years, as some of us have, you should not feel bashful about it, but you should register your opinions, each of you. We will get better acquainted with you if you will do that. Some excellent suggestions were made for the improvement of the News Letter; but I think we all should feel that it is our problem.

If we are just getting it month after month, soaking it up like a sponge, we are really not doing our part. If it is fine, if it is good, write in to the editor and tell him you think his line was good on a certain thing. If it is not good, write and tell him what your suggestions are for improving it. If we adopt that kind of policy, every one of us will be included as the contributors of the News Letter. We should all take active part, not feel that because you are not trained journalists you should not contribute to it. I think we all should. We should acknowledge a benefit or advantage we receive from it, and I think we ought to get our ideas registered, and leave it up to the chairman of the service committee or whoever happens to be handling the news letter whether they think the contributions worthy or not. At least you have had your bid.

R. B. INMAN (Philadelphia Gas Works Company, Philadelphia): I would like to ask Mr. Wilkins to refer to the file, to give us a little information as to how this \$125 was saved, whether he can give us the classification and the number of copies mailed.

MR. WILKINS: That was a contribution from *Armour Magazine*. S. P. Wild is the editor. He cut the margin off and put in four more pages.

MR. BELL: In concluding this discussion, I would like to include thanks for one group of members of our association, and that is Pete Murphy. Some of you may know him personally, and some may not, but I forgot and I apologize to Pete or such of him as may be present, and also to the absent members, for their contributions to this News Letter. To keep the mystery of Pete Murphy alive I do not think detracts from our interest in Pete Murphy's handling of your house organ. I think it is an advantage for us to have the viewpoint of some other editors on our particular magazines and newspapers.

Pete Murphy gets about among the other editors a great deal, more than most of us do, and his viewpoint is constantly freshened by his association with live wire organizations in one of our big cities, and Pete Murphy has very generously contributed to our News Letter for two years that I know of, and perhaps under a different name for previous years; so on behalf of the entire section I would like to thank Pete Murphy for his criticism and contributions.

CHAIRMAN KUPFERER: I believe we are already seeing the advantage of an open discussion rather than a prepared discussion. It was formerly the custom, as some of you may remember, to have the speaker present his paper, and then to have some one read a prepared discussion, which it seemed to me, rather detracted from the spontaneity of the discussion. I certainly have appreciated the way you have all jumped into this thing, and I hope this spirit is going to continue.

The next paper on our program is by F. Harvey Morse, editor of *Checkerlinks*, of the Ralston Purina Company, St. Louis. I understand Mr. Morse has changed his connection, and has gone to New York and it is impossible for him to be here. He has prepared a paper however, which will be read by Mr. H. W. Fitch, of the Delaware and Hudson Railway Railroad Corp., Albany, N. Y.

Hints on Handling the Reporter Staff

By F. HARVEY MORSE

Editor, "Checkerlinks", Ralston Purina Co., St. Louis, Mo.

The newness of an employees' magazine will depend very largely upon the cooperation received from those designated as reporters, or correspondents. Except in the case of a very small, compact organization, the employees' publication editor will need a group of reportorial assistants to keep him in touch with those intimate, spontaneous happenings that only one immediately on the ground can pick up. However, even in the case of the smaller publication—even though the editor can cover the ground—it may still be expedient to appoint several reporters from different departments, in order to stimulate interest and make the employees feel that it is their paper, rather than the editor's paper, or the management's paper.

The Job of the Reporter

The first job of house magazine reporter is to get the facts about what goes on in a particular reporter's jurisdiction, and get them into the editor's hands in time for publication. The man or woman selected as reporter should, first of all, have a "nose for news." Whether he can spell correctly, or write grammatically, is of less importance than that he have the ability to see an interesting happening when it occurs and the feeling of responsibility to take his job seriously, write up the happening, and send it in. Obviously, if with this "nose for news" there is also the ability to write effectively, so much the better. In the average shop, however, don't look for too much literary ability. In fact, you won't find much, even in the office.

Don't put the burden of getting material in on time on the shoulders of your reporters entirely. After all, they consider their house magazine work as a spare time, voluntary job; their major thinking is being put into the regular job. Don't expect them to remember that your closing date is the 15th. Several days before that closing date, send a memorandum to all reporters calling the date to their attention and asking that they have material from their departments in your hands not later than the date specified.

If you are organizing a new reportorial staff, you may, for a time, have to plan a final follow-up. Our *Checkerlinks* staff at the Purina Mills has not required such follow-up for several years. In fact, we have had so much material about the specific company activities coming through regular channels that we have had to discourage reporters from sending in trifling items that might ordinarily find a place in the magazine put out by a company not having such a thoroughly organized personnel program. At one time I thought I was running short of the personal items that are so much the life of a house magazine—so I sent a follow-up to the reporters. Each and every one received it as a personal distress signal. I was simply swamped with material, much of which I had to leave out because of budget limitations. Consequently, I haven't sent out any general follow-up since. We have found the competitive spirit between departments is almost a sufficient stimulant. One month, our ad-service department (the group which handles multigraphing, addressing, mailing, etc.) may have a large amount of space, and the traffic department not even a single item. When those traffic boys see that they have been left out, they jump on the reporter. One morning he will sneak into my office and remark that his department ought to have a page next issue—and he will see that it is produced.

This feeling of rivalry is particularly strong among our various branches. So is the spirit of cooperation among those branch reporters. As a rule, they have played the game 100 per cent. This may be due to the fact that the smaller branch groups do not have the contacts with the larger St. Louis headquarters group—do not have the advantages of frequent mass meetings and things of that sort.

Six years ago when I took over the editing of *Checkerlinks* I discovered that the reporters were waiting until they received my notice that material was due. Then they attempted to sit down and think of all the things that had happened since the last issue of the magazine. Naturally, they had forgotten many of the important happenings and all of the interesting little "wise-cracks" that make such good reading in employees' magazines. I therefore, secured enough small notebooks to supply each reporter—books costing four or five cents each. On the front of each book I pasted a few brief suggestions about the type of material we wanted for *Checkerlinks* and also threw out the thought that when something of interest happened—when someone sprung an original joke—that the reporter jot it down in the notebook immediately. Then when the call for news came, it would be a simple matter for the reporter to go over his notes and write up the happenings that are most worthy of being written up and discard the material which, after being allowed to cool off, was of little value.

A second function of the reporter is to write up this material in a form as usable as possible. I haven't forgotten that I said a few minutes ago, that the ability to recognize news is of first importance. It does not seem to me, though, that an editor need allow his reporters always to remain poor "preparers" of material. There are a lot of little suggestions that you can pass along to a reporter which will help him to turn in material in better form. You can, to a certain extent, teach him what is usable material, so that he will know it is of relatively little interest whether Jim Jones was seen at the picture show with Mary Smith, but of rather great importance to let the group know that by quick action Fred Martin prevented what might have been a disastrous fire, or that Joe Brown went out on his spare time and sold his neighborhood grocer the products made by his company.

So, too, we can gradually teach the reporters to give all the necessary facts—not only that we want to know that Louise Lawrence married Bill Barton—but when, and where. We can impress, also, the necessity for accuracy in the spelling of names, initials, dates, places, etc.

Then it is perfectly possible to give those reporters a few suggestions on the technique of writing a new story, for example—

How to write the lead.

Including all the W's—Who, What, When (and sometimes Why).

Relating the important facts first and the minor facts afterward.

Writing in short, simple, sentences, using simple words. Avoiding verbosity.

For the benefit of the *Checkerlinks* reportorial staff, we worked up a nine-page set of mimeographed suggestions covering the following ideas:

1. What kind of matter is suitable for our magazine.
2. How to write news material.
3. Humor, acceptable and not acceptable.
4. Feature articles—what to get and how to get it.
5. Writing the editorial.
6. Writing the book review.
7. Gathering the material.
8. The mechanical side of an editor's life: under this section, we asked the reporters who could use typewriters to type their material $3\frac{1}{4}$ inches wide (the typewriter character count equivalent to our magazine column width), and things of that sort.
9. How to take suitable pictures for reproduction.
10. Why material is sometimes omitted.

Some reporters profited materially from these sheets—others of course, were not particularly interested. You will find some of that sort in any group.

Much of the feature material the editor naturally has to "dig up" himself. I have

found it desirable, though, wherever possible, to work through reporters in order to get that material. For example, we ran a series of articles built around the various cities in which the Purina Mills have branches. It would have been very easy for me to write to the chambers of commerce in those cities for pictures and facts, and work up the story myself. It is better in a case of that sort that the branch reporter collect the material and work it up personally. I have been able to bring a number of interesting feature stories to light by working through branch and department reporters. Some reporters merely suggest that a certain man or woman in a department has a certain hobby, or has made a particular record, and expect the editor to get the story. Those reporters still feel a "part ownership" in the story for having suggested it.

Building the Reporter List

In a smaller organization it is possible for the editor to pick his reporters personally—he'll know most of the likely people in the firm. That isn't possible, however, in the larger companies. Ordinarily, I (or my assistant) consult with the various department heads and with the personnel directors to determine on the reportorial staff.

We have tried, as far as possible, to put reportorial appointments on the basis of being part of a particular employee's job—not a voluntary job to be done if there be time. It is usually best for the department head to lay that particular emphasis—as editor, I content myself with sending the new reporter a notice of his appointment, with a word of welcome to the staff, and a copy of our suggestions.

I have found it wise to make appointments for a definite period, usually six months or a year. It's a good idea to change the staff from time to time, in order to bring in new viewpoints and perhaps discover some good usable material. This definite time appointment makes it possible to make changes without hurting feelings.

Maintaining Enthusiasm

For some reason or other, there are firms committed to the policy of not running editors' names in their publications. I believe that policy is short-sighted. No matter how poorly one may write, deep down in almost every one's heart there is a longing to win a place among the great authors in some leading magazine. To a slight degree, this desire can be satisfied through the house magazine. The reporters should be given credit for what they do. We list our reportorial staff at the head of the editorial page. Other companies, particularly wide and scattered organizations, such as the big chain stores, include the reporter's name at the head of his particular column—a good plan, if there is considerable material coming from each reporter.

At times, I have felt pretty "mean" when some salesmanager or the "Big Chief" took a piece of copy which I considered perfect and messed it all up with changes and corrections. I have tried to keep some of those incidents in mind when dealing with copy supplied by our reporters. I try to run material as nearly as possible as written by the reporters. Then they can look on the paragraph with more pride and can say, "I wrote that." This can't always be done, of course. All too often someone will send in 500 words of minute detail about some little affair that isn't worth more than 30 words—and naturally, you have to cut. The ideal situation, I suppose, would be to return the material to the reporter and ask that he re-write it. When getting out a magazine under pressure, that isn't always feasible.

Again, I believe in keeping my office door open to *Checkerlinks* reporters. I'm glad to have them drop in to talk about the magazine at any time. I try to make them feel free to bring in suggestions—sometimes they make some good ones. At any rate, those personal chats give me the opportunity to explain the policies back of our publication and to bring the reporters into a more wholehearted sympathy

with those policies. Because of the large number of "trivial" engagements,—and a few hasty, unfortunate marriages—our executives ruled that *Checkerlinks* should make no mention of engagements. It is rather difficult to explain why, in a sheet of suggestions. Such a policy can be explained personally, however.

We have also put on occasional noon day reporters' luncheons. Personally, I believe, where a large percentage of the reporters can be brought together, that it pays the company to give such a complimentary luncheon or dinner at least twice a year as recognition of the work the reporters have done. Such a meeting also makes it possible for executives and department heads to explain policies and to emphasize the important place such a magazine plays in company growth.

I recall that at one of our luncheons our vice-president-treasurer emphasized strongly that every column in our magazine was costing a certain definite sum of money. "When you write an article for *Checkerlinks*, just ask yourselves," he said, "whether you'd be willing to pay that much of your own money—or of the company's money, if you were a stock holder—to put out that piece of news. That will be one basis on which you can judge its relative value." Such luncheon meetings are ideal places for open discussions as to how well the magazine is going over, possible improvements, and things of that sort.

CHAIRMAN KUPFERER: Is there any discussion on this matter of dealing with reporter staffs?

R. E. DAY (The Kellogg Company, Battle Creek, Mich.): I have been wondering how large an organization has to be before it becomes profitable from both time and effort to organize a reportorial staff? We have a weekly newspaper, and we have been considering the establishment of a reportorial staff through the plant and through our branch offices. If any one has any suggestions along that line, we would like to hear of them.

MISS MARGARET T. STEVENS (Baltimore and Ohio Railroad Company, Baltimore, Maryland): We have 135 or 140 correspondents or reporters on our magazine and they are scattered all over the country. Each month the editor sends out a letter four or five days ahead of the time when their notes are expected, and in this letter tells how to look out for news, the kind of notes we would like to have them get, and stresses campaigns such as safety and business getting, and also gives some idea about writing the notes; he tells them particularly what kind of notes we do not want, which is of considerable help.

In normal times we get these correspondents all together in an annual convention, and we usually have the president and other officers speak to them. In this way they can recognize the importance of their reportorial job. We give them a banquet and perhaps a theater party and take them to a football game or something like that. We give credit wherever credit is possible, and figuratively we get excellent tips on good stories from them, just through their notes. If we feel the correspondents are able to handle this story properly, we write them and ask them to outline the story as we would like to have it. If we feel they are perhaps not able to handle it, one of the members of the immediate staff goes after this story.

C. E. KANE (Illinois Central Railroad Company, Chicago): The thought that we just had is fine. It is practical, and I got a lot of good out of it myself. In response to this inquiry about the number of reporters—our organization is pretty well shot to pieces right now, but in normal times, on the Illinois Central, we have had approximately 200 to take care of 250,000 employees which makes about one reporter to 250 employees.

One other point in the paper that I liked was the importance of personal contact, getting to meet the reporters, and talking on the policy of the magazine. Miss Stevens referred to the meetings they hold on the Baltimore and Ohio. Due to the depression, we have abolished certain meetings that we held of our more important reporters, and I think it is one of the saddest things we have had to do. I do not know of a thing

I would recommend ahead of getting your reporters together, talking to them once a year, twice a year or every three months if you can, and thereby carrying on currently in their minds the policy of your publication and of the whole organization.

CHAIRMAN KUPFERER: As Mr. Kane has indicated, I do not think the size of your reportorial staff depends so much on the employees as it does on how large a publication you are getting out and how nearly you are filling your news pages. If you have quite a number of pages set aside for news, then you want to select your reporters in strategic positions so you will get at least that amount of news. I have also noted in some publications that each month where the reporter is from another city, a reporter's photograph is set in the copy. That is an idea that might work out once in a while; at least we could feature the photograph of some reporter each month or each week, so to speak, if you had quite a number of them, so that you would personalize the item by the reporter, too, and show the people in the particular district or group who the fellow was that was handling the news, and it might be an idea to have him submit articles to the reporter for news items.

MR. FITCH: I have just one other thought which is perhaps quite at variance with some of the suggestions here as to giving names. This is taken from our own experience. At one point, we had a reporter who was generally known among the men as being "the reporter." He could not come up to our expectations, however, and I made arrangements to have another reporter cover the assignment, and at his suggestion together with the supervisor in charge, he is doing it incognito, and a good many of the fellows are wondering where these items are coming from now, because they know very well the fellow they think is a reporter never did know about what appears in the paper; so that in some cases, perhaps, there is certain value in having your reporter unknown.

MR. WILKINS: If a publication is to be an employees' publication, it wants to have reflected in it the activities of the employees; whether large or small, I think you should have some designated individuals who are reporters.

In the paper just read, I see that he appoints them, possibly by conferring with superintendents or some one in the organization. That might look as if they were picked men from the company to do that particular work. In our company we have an election once a year, and votes are cast for reporters; it is entirely up to the employees to pick out their own reporters. If a man has not been doing a good job the past year, he knows he will not be re-elected. So in that way we get a class of reporters who are energetic and they feel a responsibility in reporting the news items.

Then at the head of each section we place their pictures, as Mr. Kupferer has stated, which gives them a little individual preference and a little dignity for the job; then once a year or two or three times a year, if it is possible, we will give them a dinner. My office is always open to the reporters, and they come in and bring their section notes, which gives me a contact with those reporters at least once a month.

GEORGE N. KAUFMAN (The Columbus Railway Power and Light Company, Columbus, Ohio): I wonder how some of the people handle their reporters' copy. I know some of the copy that comes to me would not be fit to print anywhere. We often get into some trouble there in rewriting, doctoring up some items. I wonder how some of you handle that.

C. A. WARD (The Pure Oil Company, Columbus, Ohio): Cut out anything that is doubtful.

EDWARD R. EGGER (Chicago Rapid Transit Company, Chicago): That question brings up the importance of diplomacy in dealing with correspondents. You have many correspondents who can not write English. That is unfortunate, but there is no doubt the correspondent gets you a contact with the employees that is invaluable; but you cannot be in touch with the employees all the time. You must inform the employees that they must feel the responsibility of not sending in anything that will hurt anybody. I know of cases in our own company that certain items we felt should be left out. We took a check on one with the superintendent of transportation, but he said of

this particular case of a razing item, "Let it go in. That will be good for that man. He cannot take a joke. He is kind of a sour apple in this division, and we want to teach him a lesson and try to make a good fellow out of him."

Now as to doctoring the copy, naturally it is the prerogative of the editor to correct the copy; but you must be careful not to butcher copy when it is not necessary. I have one case in mind, one of our correspondents is a woman who is a ticker agent, a university graduate; she writes excellent English, but she has the unhappy faculty of not saying the thing in few enough words. However, her copy is so good, I make it a point to see that it gets in just as she writes it, because she writes such good English and everything she writes is a pat on the back to somebody.

CHAIRMAN KUPFERER: Mr. Morse very kindly gave us a supply of his standard practice instructions to his staff. Those of you who are interested may secure this nine page leaflet of suggestions for the *Checkerlinks* staff. You may find it well worth while.

At this time I want to introduce John A. Lyons of the Mergenthaler Linotype Company, Chicago office, who will talk to us.

A Simple and Accurate Method of Copy Fitting

By JOHN A. LYONS
Mergenthaler Linotype Company, Chicago, Ill.

In the matter of copy-fitting there is one point that we all have to watch carefully because of the heavy cost of resetting matter. Before accurate copy-fitting charts were available matter was sometimes set the column width of a magazine page and then when dummies up the pages the cuts were marked in. You can readily see what a wasteful procedure this was.

Then there appeared charts of solid figures giving the number of words to the square inch, but these would not do us much good today. Further development produced charts with type faces keyed on the back and this one, consisting of one disc superimposed on the other, permitted us to readily determine the number of characters to the line, covering the faces indicated in the code.

Further, we find this chart based on the word, "the." There is a straight line to the left and one angling to the right. By placing the word, "the," between these two lines the figures to the right indicate the number of characters per pica, and then one can readily find the number of characters in the line from this point.

Many type specimen books and matrix specimen books give the lower case alphabet measurement of the various fonts. Occasionally the lower case alphabet width is found given in picas, which should be reduced to points, the reason for which will be stated later.

Ordinarily, and as a basis for calculation, the width of a line of type of the face selected should equal approximately one and one-half times the width of the alphabet, or, in other words, contain approximately 39 or 40 characters of the font selected, as this constitutes the most readable line.

When estimating typewritten copy the average typewriter writes 60 letters single space, 30 letters double space, and 20 letters triple space to the square inch.

With this information it is easy to ascertain the number of characters in a page, but we have known where this procedure in being used has gone to the extreme in drawing a line down the page on the right-hand side adjacent to the shortest line in the copy. Then all characters to the right of that line were counted in order to determine the exact number of characters on the page.

Despite all copy-fitting charts there remains one certain method of computing type faces, and that is to take the length of the lower case alphabet in points and if you do not have this available in a specimen book of matrices, assemble and cast these matrices and measure them, divide this alphabet measurement width by the 26 letters of the alphabet plus four spaces, or 30 characters, which will give you

the average width of a character. Then divide the points in the width of the line to be set by the average width of the character in points and you will obtain the number of characters to the line. By ascertaining the number of characters in the page to be set and the number of characters in the typewritten pages you can readily determine the number of lines the copy will make.

Dividing the depth of the page in points by the thickness of the line will give you the number of lines in the page.

One can readily ascertain the number of ems in a page by measuring its width and depth in picas and multiplying by coefficients, the latter being obtained by dividing the number of square points in a pica by the number of square points in an em in the type body under consideration.

For instance, in one pica em there are 144 square points. A 6-point em contains 36 square points and dividing the former by the latter we find the coefficient to be 4. Then if we have a page 38 x 53 picas and multiply it by 4 we get 8,056 ems in the page. If after obtaining your final figures in a certain point size and face you desire to change to another, this can be done by using coefficients, which will be supplied to anyone desiring them.

In writing copy if one will set the typewriter scale equaling the number of characters in the line copy will run close to line for line. Should the number of characters in the line written, say, be 75, while the number of type characters is but 50, then each manuscript line will set one type line and 25 characters over, which is equal to one and one-half type lines. Therefore, the total number of manuscript lines multiplied by $1\frac{1}{2}$ will give the number of type lines in the final composition.

Where matter must be fitted to irregular shapes, as in running around cuts, the layout may be prepared by using a page proof of the type, penciling out the rectangle or circle or whatever shape it is of correct dimensions in the produced type page and by laying over it a proof of the cut or cuts to be placed, the proof having been trimmed to leave proper white space, and counting the number of words left in the free spaces.

When type is being set while plates are made it is virtually impossible to make proper allowance for the cuts if the composition is to run around them. If the cuts are squared up, fairly good results may be expected from simultaneous composition and engraving. But where type runs around vignettes it is very difficult to make proper allowance for the edges of the vignettes. Under such conditions, when time permits, it is better to wait for the cuts before proceeding with composition. Otherwise a certain amount of revision will be inevitable.

A layout for a page containing numerous cuts with type run around should show each change of type-measure and the number of lines to be set in that measure (of course the lines will be spaced out full measure to await the dropping in of cuts). When a given piece of copy plus a given number of cuts are to be made to fill a printed page exactly, then the layout man is confronted with the most exacting problem of his craft, and all his skill, experience, and judgment will be required to determine the details of his layout.

When a book or catalog contains a few illustrations, or if the latter occupy definite units of space (full, half, or quarter pages, etc.), the copy for the body matter can go to the composing machines or compositors carrying specifications of type face, size, and measure. All details of style must be noted, but individual page layouts will not be needed. For make-up, a dummy can be pasted up with the galley proof and proofs of cuts.

Simple straight-matter jobs need none but general specifications, and can go through without a dummy, save perhaps a layout for cover, title page, or other special page.

The company by which I am employed has a very useful copy-fitting chart and folders relating to the setting of heads, make-up of newspaper pages, house organs, catalogs and books. Should you find any of this material would be helpful we should be glad to hear from you so we can send the folders selected.

ERNEST AUGUSTUS (Mead Corporation, Chillicothe, Ohio): I had intended bringing down from my room a little scheme we used for fitting copy to the space. We followed out one of the suggestions Mr. Lyons just made, counted number of characters to the line in ten point type, average them up, all of the copy is typed on a sheet, with margin on either side; simply put the type between those lines, and the sheet is made, some four of those sheets make exactly one full page of type in the magazine. If we want to make allowance for the head, or run-arounds, we have the printer make out a sheet, and if we are going to have a cut that is nine picas wide, fourteen long, we mark the position on the layout sheet, send that to the printer along with the copy, and he sees exactly what size cut is going in, where we want it, and in judging our copy, how much space we are going to take up, we make allowances for number of lines or spaces picas on this layout sheet, for the cut, and make allowances for it on so many lines of type on this regular copy sheet we make.

When it comes back from the printer, you will find that it does not run under or over more than a couple of lines. You can usually cut the last sentence to make the copy fit. It is a scheme we worked out with the printer and saved us a lot of money.

Our resetting of type before we started using this scheme cost 40 or 50 dollars a month. Now it runs one or two dollars.

CHAIRMAN KUPFERER: We certainly thank you, Mr. Lyons.

The election of officers is our next item of business at this time.

Report of The Nominating Committee

The Committee have nominated for 1931-32, the following officers:

The Nominating Committee is Charles A. Ward, Ralph W. Liddle and W. E. Pingree.

General Chairman, EDWARD R. EGGER, Chicago Rapid Transit Company, Chicago.

Vice-Chairman, West, RALPH W. LIDDLE, Commonwealth Edison Company, Chicago.

Vice-Chairman, East, H. W. FITCH, The Delaware and Hudson Railroad Corporation, Albany, N. Y.

Secretary, Miss RUTH E. CADE, Staley Manufacturing Company, Decatur, Illinois.

Chairman, Program Committee, THOMAS E. OWEN, Louisville and Nashville Railroad Company, Louisville, Kentucky.

Chairman, Membership Committee, C. T. FISH, National Safety Council, Chicago.

Chairman, Service Committee, EMIL J. VOGEL, Pennsylvania Railroad Company, Pittsburgh; G. N. KAUFMAN, Columbus Railway, Power and Light Company, Columbus, Ohio; LOUIS C. SEGERS, Columbia Gas and Electric Company, Cincinnati, Ohio.

The Executive Committee consists of the officers and the following: C. E. KANE of the Illinois Central Railroad Company, Chicago; C. A. WARD of the Pure Oil Company, Columbus, Ohio; V. H. KUPFERER, Studebaker Corporation, South Bend, Indiana. The retiring Chairman is usually made one of the Executive Committee for a year.

H. E. BONAR (Ohio Bell Telephone Company, Cleveland, Ohio): I move that the report of the Nominating Committee be accepted, and that they be declared elected.

(The motion was seconded and carried.)

CHAIRMAN KUPFERER: We will call on the general chairman for the ensuing year, Edward R. Egger.

MR. EGGER: You have just spoken about mistakes of the past. I hope that I will be able to prove that you have not made too big a mistake this year. I will have to step on it to come up to the record of the past administration and the administration preceding that, because since I have been taking a part in this organization, I certainly have formed a lot of helpful and interesting acquaintances, and think it has helped me in my feeble effort to get out a little house organ, so-called.

ADJOURNMENT

Wednesday Morning Session

October 14, 1931

V. H. KUPFERER, Chairman

The Studebaker Corporation, South Bend, Ind.

The second session of the Employees' Publication Section convened with General Chairman Kupferer presiding.

CHAIRMAN KUPFERER: This is an age of specialization and we all have certain titles which indicate the types of specialists we are. Personally, that doesn't apply to me. I have about 50 jobs and possibly one of the 50 is editing a plant publication. It takes about one-thirtieth of my time or possibly a little more. I have been quite discouraged at times, thinking of how many things I did and that I was out of touch with the age, that I wasn't a specialist, until the other day I saw something like this: "It is much better to be a little bit of everything than a whole lot of nothing." Being somewhat egotistical I got a little satisfaction out of that.

We have an individual with us this morning whom we are inclined to think of as a specialist. It is a very great pleasure to me at this time to introduce Dr. C. O. Sappington, who will speak to us on "Creating a Safety Consciousness."

Creating a Safety Consciousness

By C. O. SAPPINGTON, M. D., DR. P. H.

Director, Division of Industrial Health, National Safety Council, Chicago

A lawyer had become very famous for his ability to win favorable verdicts. When asked how he did it, he replied: "Well, I always make my juries understand the case. In the first place, I tell them what I am going to tell them. In the second place, I tell them. Then over and over again I tell them what I told them."

Since repetition is the backbone of modern advertising and a psychological essential for putting ideas across, I hope that you will bear with me if I find it necessary to repeat things which I think need emphasizing.

I have no quarrel with the subject nor with the persons who assigned it to me, but there is a close similarity and relationship between "consciousness" and "conscience"; I am not so sure that conscience is not as badly needed as consciousness in the matter of safety.

The Standard dictionary states that consciousness is an immediate awareness whether referring to an internal state or external things—an activity of mind that characterizes being awake as distinguished from being in a deep sleep or swoon. It might be remarked that it will be extremely difficult to create a safety consciousness in a great many of our people if we follow this definition.

Consciousness is, further, the accompaniment and condition of all mental life and for this reason is ultimately considered strictly indefinable. In the light of this definition, the statement that approximately 70 per cent of our people are only high-grade morons in their mental lives, now assumes additional and important significance.

William James, the noted and pioneer psychologist, has said that for practical purposes the sole organ of conscience in man is located in the cerebral cortex. Conscience is defined as a moral consciousness in general—an activity or faculty by which distinctions are made between right and wrong in conduct and character; the power of moral discrimination; ethical judgment or sensibility.

It is evident, then, that one should first be aware that there is such a thing as safety and second, that he should be capable of distinguishing between right and

wrong behavior with reference to safety. The first is useless without the last mentioned.

We can now understand why it is that some people being aware that there is such a thing as safety fail to carry out what they should. I am reminded of an experience with an elevator operator whom I had previously known as an inmate of a private sanitarium for mental and nervous diseases. This man had a definite psychosis from which he recovered entirely and was discharged from the sanitarium with a clean bill of mental health. Eventually he took to farming and chicken-raising and as a daily occupation ran the elevator in a large department store, where I was the physician. He asked me as a favor not to say anything about his previous experience and, having confidence in the staff of the sanitarium where he was treated and where I had been on the staff at the time, I thought it would be well to observe professional secrecy in this matter. This is a border-line case and illustrates fairly well what I mean by a "safety conscience." He had the awareness, but possibly didn't possess an acuteness of conscience which would help him to choose an occupation which would be less hazardous to himself and those whose lives were entrusted to his care. There was a definite margin of safety, however, because even under extraordinary circumstances, a relapse into his former condition was not a probability.

Another deterrent to the progress of safety is the attitude of certain equipment manufacturers who do not realize that they are in the business of saving lives primarily and that the business of making money is secondary to this principle. We are continually confronted with difficult and serious problems which arise because the manufacturer emphasizes volume-production and profit-making rather than the principles of safety.

Nor is this limited to manufacturers of equipment; regardless of how good equipment is, it must be maintained or else it will be a hazard instead of a help. I think in this instance of a truck driver who wrote the *Chicago Tribune* on one occasion describing his experiences in his and other organizations. Let me quote:

"Companies do not listen to the drivers' complaints, or else it is because our foremen do not inform the owners. Daily we are forced to take out patched up 10 and 15 and 20-year old trucks, with faulty brakes, hard to shift, and still harder to steer.

"As for loads, I have put a monster load of canned goods on one truck and hauled it through the city, praying all the time that no other vehicle would cut me off too close. Going at a speed of 10 miles an hour, I required 80 feet to stop, using both sets of brakes.

"The speed governors on our trucks are all out of order, and we are laid off if we do not make good time. It is the same if our chariots break down too often or if we have an accident, no matter how slight. It is only because we are expert drivers that we get by. I believe it really criminal to force men to drive some of the wrecks that are on the streets today."

These, then, are some of the problems which we must solve before we can create the accessory of a safety consciousness, a safety conscience. Let me repeat that these conceptions are mental and probably can only be given impetus through the actual loss of lives, or because of serious property damage. Prevention should be the keynote, but actually it happens all too frequently that results are obtainable only after disaster.

This may seem to be a pessimistic picture, but there really are certain constructive things that can be done to stimulate proper thought processes. I will mention and discuss four points which I consider important:

1. *"Sell" health and first aid.* Recently a psychological authority has said that more than 90 per cent of all accidents are caused by the improper working of the human mind. Results of accidents and injuries express themselves in terms of the human body and the human mind. It is paramount, therefore, that the experts on the human body and mind, the physician and the nurse, should be constant parties to all procedures bearing on the prevention, investigation and treatment of accidental

injuries. Perhaps it is not too much to say that the future progress of safety is dependent very largely on the raising of standards of physical and mental health in individuals and in groups. We have previously commented on the direct relationship between safety and health and the actual concrete ways in which poor mental and physical health can contribute to the causation of accidents. These details may be obtained elsewhere.

2. *Make cooperation and coordination possible.* One may well ask the question, keeping in mind the story of the truck driver whose experience I have previously detailed, how coordination and cooperation is possible in such an instance. Men are the most important industrial assets, regardless of the apparent importance of money, methods or materials. Conservation of men and man-power must become the dominant industrial conception.

3. *Drive out fear of authority.* Recent experience in a large public utility has shown that the so-called "bully-ragging" methods of supervision not only depress workers, but also their production; a distinct relationship is apparent between the emotional status of workers and the consistency of their output; a supervisor who can "listen" and not "talk" can in many instances almost completely compensate for outside depressing influences. The day of the "big stick" is indeed past. Perhaps it will be necessary for us to learn again some of the fundamental lessons of industrial relations, appreciating that the basis of cooperation is mutual understanding and that the avoidance of social conflicts is a fundamental necessity, if accidental injuries are to be prevented.

4. *Build on an advisory rather than supervisory basis.* It is tautologic to say that the most successful industrial relations programs depend rather upon advice than supervision. Whatever modest success has been achieved by the industrial health work of the Council is largely due to the adoption of and adherence to this principle. We need to be reminded that the power of simple and pleasant suggestion is greater than a hundred arguments. The expression "safety and health supervision" should be replaced by "safety and health *advison*." You will not find this word in the dictionary, but the use of this principle should add vision to your work in the creating of a safety consciousness and conscience.

In conclusion, the creation of a safety consciousness and conscience can be accomplished by the establishment of sound industrial relations policies emphasizing the primary importance of the conservation of man-power, and can be made possible through specific procedures expressing the inter-dependence of safety and health; making individual cooperation and coordination possible; driving out fear of authority, and building the entire program on a helpful advisory basis.

CHAIRMAN KUPFERER: I think most of us will agree with Dr. Sappington that the spread of education, the rapid methods of communication, radio, motion pictures, and the art of illustrating publications of various sorts have tended to improve the average intelligence a great deal. People have grown in years from the standpoint of intelligence. We must appeal rather to their intelligence than to the spirit in bulldozing them into doing things.

Most of us have to take orders at some time or other and I know it is a delight to me to have a superior who always presents an order as if I were doing him a favor, in such a way sometimes that it is almost embarrassing to me, and yet I know it is just as much an order as if it were accompanied by violent words or thumping a desk.

We have heard from time to time people say that the only way to get safety is to be absolutely hardboiled about it. I think the Doctor has made his point very well in that connection. Is there anyone who would like to ask any questions or raise any discussion on this paper?

MARGARET T. STEVENS (B. & O. Railroad, Baltimore): May I ask the Doctor what effect does strict enforcement of safety rules have upon the worker? I refer particularly to the worker who will not listen to reason ordinarily and needs to see some-

body killed before he will pay any attention to safety. For example, the first accident may mean a reprimand, a second one may give him time off, and the third one means that he will be fired. What effect would that have on the mind of a worker? Do you think that would really make him more careful? Would the strict enforcement of the rules do that?

CHAIRMAN KUPFERER: Dr. Sappington is make a mental note of these questions. Miss Stevens, and he will answer them all together.

H. C. WINFIELD (Olds Motor Co., Lansing, Mich.): The Doctor said that safety came ahead of production. I should like to know how he would have production if he had safety first?

JACK DEMPSTER (Canada Cement Co., Port Colborne, Ont.): I should like to ask the Doctor if he has ever had a case where in creating the safety consciousness he has stepped a little bit too far over on the other side. Perhaps I can illustrate it. Some years ago when we put on an intensive safety campaign to win a Portland cement trophy one of our foremen who was very intelligent came to my office and said, "This safety stuff has got on my nerves. I have got to the point where I am afraid to walk through the plant without tripping over a nail. I am afraid to climb a ladder for fear I will fall down."

It really had affected that man. He had too much safety-consciousness. We had to deal with him as an individual. I should like to ask the Doctor whether from his professional experience he has had any case like that or whether he could explain it.

DR. SAPPINGTON: On Miss Stevens' question about the strict enforcement of rules, particularly the mental effect: I don't think it will ever be possible for us to get entirely away from rules and regulations since most of our population, possibly 70 per cent of it, so far as the mental life is concerned, is on a moronic basis. These people must have formulae. Just as Coué interested a certain following and got them to repeat "Day by day, in every way, I am becoming better and better," (which incidentally is a very good psychological attitude), so must industrial workers have something on which to stand. They must have rules.

I abominate the word "rule," and always have. I dislike laws, but I know we must have them. We must have them for certain groups of people. I don't believe you can legislate safety any more than you could legislate morals. I believe that the creation of the safety conscience and safety consciousness is something entirely aside from force. On the other hand, we must compromise and give people a working basis. We must give people a group of principles on which they may work, something on which to stand. Even large national organizations have what they call policies. Sometimes it is a question as to whether they are good ones, but at least they must have a working basis.

Just how far you should go in the enforcement of these things is, of course, problematical. You must judge each case separately and on its merits. You can't do this sort of thing generally any more than you can take two different individuals who come to you for diagnosis, medically, and expect to get the same results by using exactly the same procedures on them.

We haven't realized that yet. The whole safety movement is full of stereotyped things that we think we can take and apply to one given case over there, and another given case here, and get exactly the same results from all cases, although the conditions are different. We need to get away from stereotyped business, and on the other hand we must have a working basis. It isn't easy. Every plant and every public safety situation demands discrimination and judgment, not merely the application of a set of printed rules which cannot apply to every situation or to every case. There are many extremes. On the one hand you have people who let their employees go wild and do anything they want to do; on the other hand you have people who clamp down very severely on them. Where it becomes a matter of economic necessity very often the control is apparently justified.

Mr. Winfield asked about safety being put ahead of production. I didn't think I

made exactly that statement. I do remember making this statement, which should be shouted from the housetops so that others will appreciate it: "Manpower is the greatest asset of industry." I can prove that statistically but I haven't got the figures with me here. You don't need to have it proved anyway. You know that a man's life is worth more than the material and the money and the methods in any given industry. You have to organize your industry and put it on a production basis. It has been constantly proved that your production is kept up by a good safety program. That is old stuff to a great many of us but it needs to be emphasized.

In this matter of production we have become accustomed to hearing about quantity production. More lately, we have heard about quality of production. But in the future you are going to hear more about the permanency of production. And there will be nothing that will put production on a permanent basis to a greater extent than the conservation of manpower, because your production will come exactly in direct ratio to the continuity of employment of your working force.

Try to get away from that, if you will, but you will always be confronted with it.

Mr. Dempster asked about a man having too much of a safety conscience and safety consciousness. Yes, that is possible, of course. We have had examples continuously of people who are too safe when they drive. They are so safe that they will hold up the rest of the parade, so to speak. They are so safe that they actually do have accidents happen to them. Their reaction time is stultified. You can have that of course in any given situation, either in industry or in public safety. As in everything else, the ideal situation is the middle of the road, not at either extreme where you are very careless or where you are too careful. It takes, of course, a certain mentality to appreciate this. Therefore, you shouldn't be discouraged entirely if there were some people that you can't put over the conception with at certain times.

A Common Mental Attitude

Just one more thing, after answering these questions. I ran across something the other day that is so expressive of the mental attitude of some of our people, and probably always will be, that I think it is worth discussion for just a minute or two. This comes out of a little booklet written by a good friend of mine.

A European health officer, responsible for effecting sanitary conditions in Damascus, asked these questions of a leading native official in Damascus:

"Question: What is your birth rate in Damascus?"

"I do not know. I was not present. I hesitate to inquire."

"Question: What is your population?"

"Answer: The people are many, but how many I do not know. They have never all been gathered together in one place at one time to be counted."

"Question: What is the death rate?"

"Answer: It is the will of Allah that all should die. Some die young, some die old."

"Question: How is your water supply?"

"Answer: From time immemorial no one in all Damascus has ever been known to die of thirst."

"Question: What complaints have you to make regarding sanitary conditions in your city?"

"Answer: A man should not bother himself or his neighbor with questions that concern only God."

This is an attitude that we now have well ensconced in the mentality of the American people—and others, for that matter—in regard to a safety conscience and this safety consciousness.

CHAIRMAN KUPFERER: The chairman of our Program Committee, Gene Wilkins, had a letter from Mr. Ensminger, in which he said that his wife was in a very critical condition. I will ask Mr. Wilkins to read this paper.

Filing and Indexing Systems for the Editor

By H. M. ENSMINGER

Editor, "Wingfoot Clan," Goodyear Tire and Rubber Company, Akron, O.

The filing problems of employee publication editors are similar enough that it should not be difficult to pick out one or two filing systems, which, with a few alterations to fit individual requirements, will be a real asset in the publishing of an intelligent magazine or newspaper and a time-saver as well.

N. W. Ayer and Son, Philadelphia, have in their files over 100,000 paintings, pictures, drawings, some as large as billboards. Yet they have devised a filing system which is so efficient that the location of any piece of art-work may be learned in a few moments.

It is obvious that the filing system of Ayer and Son must of necessity be different from the one used by a friend of mine whose hobby for many years has been the saving and filing of clippings on nearly every subject under the sun.

The material to be filed is the governing factor in every set of files, plus the ideas of the person in charge of the filing. This accounts for the fact that it is almost impossible to find two filing systems exactly alike in every detail.

There are two simple tests which editors should try out on their filing systems. First: go to your files and get all the available material on the president of your company. If you can do it in less than a minute your files are in good shape.

Second: get from your files the material on any of your organizations such as Relief Association, employees' clubs, etc., and from that material write a complete history of that organization from its inception to the present time. If you can do that your filing system is better than the average.

Every editor saves a few copies of each issue of his publication. Filing of them is no problem. We save 50 copies of each issue of the "Wingfoot Clan." They are placed in manila folders and filed according to date. At the end of the year five volumes of the year's issues are bound. After two years all but a few of the loose copies are discarded.

The filing of cuts is a thorn in the side of most editors. They take up so much space. They are in so many shapes and sizes. And they cost so much money you hesitate to throw them away.

If the cut filing problem of the employee publication editor was as simple as that of the editor of the daily newspaper there would be fewer gray hairs. Newspapers use unmounted cuts which they place in envelopes and file in the same drawer with photographs and clippings. But that cannot be done with mounted cuts and as a result they are filed in one cabinet, photographs in another. This is far from being an ideal system of filing.

My advice is, don't file any cuts at all. Let your printer take care of them. Shove the responsibility upon his shoulders and if he wants your business he'll be glad to carry it too. And the beauty of the plan is your cuts are right where your publication is printed when you want to use them.

Have your printer make for you at least two good proofs of each cut. File one with the photograph from which the cut was made. File the other in a folder in which all the cut proofs are filed in numerical order.

Filing of cut proofs with photographs adds efficiency and compactness to the filing system. Every bit of material on a subject should be filed together in the same drawer of the filing cabinet.

The filing of one set of cut proofs in a folder enables the editor to look over his entire cut supply in a few minutes. If any are obsolete, or too old, it is easy to pick out the ones that should be destroyed.

Each cut proof is numbered and the printer keeps a duplicate set. Now, when making up a dummy for the next issue all the editor has to do when he wants

to use one of the old cuts is to tell the printer the number of it, or better yet, just note the information on the dummy page.

Photographs, before filing, should be identified on the back and marked with the date of every issue in which they were used. Clippings should be dated with a date stamp.

Not many employee publication editors file clippings but it is a good idea to file some of them. Here's a rule that works out satisfactorily. If any individual is important enough that a biography of him should be kept on file, then clippings of stories published about him should be kept on file also.

News of less important individuals can be looked up readily enough by merely noting on the index card or filing envelope the date of the issue his photograph was published.

The employees' publication often carries articles which contain data and information which will be valuable in the future. These can be kept track of by a separate news index file. This is done by making out an index card, noting the date of issue the article was published, then filing the card alphabetically according to subject. Over a period of years, however, it will be more satisfactory if important articles are clipped, placed in envelopes and filed. Future articles on the same subject are filed in the same envelope. Hence all the materials ever published on a subject are assembled in one place.

After comparing numerous filing systems we recommend two to employee publication editors. They are the Compact Direct Filing System and the Compact Card Index Filing System.

The Compact Direct Filing System is one of the simplest and one of the best. All material to be filed is placed in envelopes which are identified and dated at the upper corner and then filed alphabetically.

For example, you have a photograph of the president of your company, Mr. Jones, a proof of the cut made from the photograph, a clipping of the story published with the cut, and a biography of him. Place the photograph and cut proof in one envelope, the clippings and biography in another. Some editors use two colors of envelopes, one for photographs and one for clippings.

Now, after properly identifying the envelopes at the upper corner, file them alphabetically, together, in the files. Nothing could be simpler than that. Now when anyone asks, "What do we have on President Jones?" you can get "all" by opening one drawer.

Some material to be filed will need cross reference cards. Suppose you have a photograph titled, "National Balloon Race Trophy." It could be filed under National or Balloon or Race or Trophy. Here's a rule to follow that will help in filing such photographs and in locating them again quickly. Always file under the word whose first letter is nearest the beginning of the alphabet. In this case the photograph should be filed under "Balloon."

Cross reference cards should be made out having the information that the photograph has been filed under Balloon. These cards should then be filed under National, Race and Trophy. All cross reference cards are the same size as the envelopes in the file.

In the filing of group photographs cross reference cards are also used. If Adams, Barnes and Clark were in a group picture the photograph would be filed under Adams, because A is nearest to the beginning of the alphabet. Cross reference cards would be filed under Barnes and Clark.

Clippings unaccompanied by photographs are placed in envelopes and filed alphabetically according to subject. An article stating that the Relief Association had placed into effect a new schedule of sickness and accident benefits would be filed under Relief Association. If filing is properly done that envelope will contain a complete history of the Relief Association from the time it was organized to the present.

Sometimes it is desirable to group photographs under one topical head such as

"Sports." An envelope containing a picture of Ferrell, star hurler on the baseball team, could be filed under Sports but a cross reference card would have to be filed under Ferrell.

Filing envelopes should be uniform in size. Those editors who use small photographs can use the 5x8 envelopes to advantage. We use 8x10 photographs mostly which are placed in 8½x11 envelopes and filed in regular correspondence filing cabinets.

That covers the Compact Direct System of Filing pretty completely, I believe. All material is filed in envelopes alphabetically, neatly, intelligently and compactly. To get everything on an individual, organization or subject, only one drawer of the filing cabinet has to be opened. For saving of time and ready reference this system is unequalled.

The other system of filing, the Card Index Filing System, is used more widely than any other. We use it in the "Wingfoot Clan" office, and probably most employee publication editors use it.

The method of filing material on President Jones by the Compact Card Index System is to write on an index card his name, his position, the date photograph or article was published, and the number of the filing envelopes.

Place photographs and cut proofs in one envelope which should be identified, "President Jones, photographs and cuts", and clippings and biography in another, identified, "President Jones, clippings." Be sure number of envelopes corresponds to that on the index card. Then file index card alphabetically in the card index file and the envelopes numerically in the envelope file.

When filing a photograph like, National Balloon Race Trophy, four index cards are made out and one filed under National, one under Balloon, one under Race and the other under Trophy. Each card carries the number of the envelope in which the photograph was filed.

In the case of group pictures an index card is made out for each individual in the group. These are then filed alphabetically in the card index.

Clippings unaccompanied by photographs are filed the same way. An article on the Relief Association is placed in a numbered envelope along with any other clippings on the same subject. Two index cards are made out, one filed under Relief and the other under Association.

The Card Index System has unusual flexibility when photographs are to be grouped under a topical head such as "Sports." Pictures of the baseball team in a group might be filed in Envelope 1. Individual pictures of the players might follow in Nos. 2, 3, 4, etc. Any kind of grouping which will help in ready reference can easily be carried out, without confusion as the index cards are always in alphabetical order regardless of arrangement of envelopes.

In the "Wingfoot Clan" files photographs of the Goodyear-Zeppelin airdock are in Envelope 100. Photographs of the U. S. Navy airship Akron are in 101. Photographs of Dr. Karl Arnstein, vice-president and chief engineer, are in 102. Other officials follow in order. So it is only necessary to look at one index card to find the location of every bit of material we have on the Goodyear-Zeppelin Corporation and its personnel.

Both the Compact Card Index System and the Compact Direct System, if properly kept up, will handle the employee publication editor's filing problems very easily. The Card Index System is just a little more flexible, but the Direct System, as its name implies, with only one file to take care of, is quicker and more direct. Frankly, if we were to install a new system it would be the Compact Direct System of Filing.

Every editor has filing problems more or less peculiar to his own publication. The "Wingfoot Clan," for example, is lithographed, eliminating the use of cuts entirely. At the same time we send out a weekly news service to the editors of 12 Goodyear subsidiary plant publications which involves cuts, electros, mats, photostats and photographs.

Judgment must be exercised in deciding what to file and what to throw away. A general habit is to file too much. A worse habit is to file too little. Photographs that today seem unimportant may have historical value 20 years from now.

The real measure of the value of any filing system is in the material it contains, and the accessibility of that material when it is needed.

Editorial files used to be called "morgues". Now they are called "reference libraries."

If from your files can be written a complete history of your company, subsidiaries, picture history of your company, then you have a "reference library" in fact as employee organizations and personnel, and if from your files can be assembled a well as in name.

CHAIRMAN KUPFERER: I am sorry Mr. Ensminger isn't here to answer any questions concerning this paper. Perhaps we can find somebody here to answer the questions. Is there anybody who has a question concerning filing and indexing methods, or is there anyone who has something to add to this paper?

LOUIS C. SEGERS (Columbia Gas & Electric Co., Cincinnati, Ohio): I have been trying for the last six months to set up some sort of index for the back numbers of our publications, due to the fact that the New York office and the various branches are constantly asking for material, cuts or photographs. In trying to set up this index I find myself so deeply involved in the intricacies of it that I am just lost in the wilderness. I have more or less depended upon my mind entirely to recall any particular thing they may ask for. If they want a picture or a cut of Mrs. Jones or whoever it may be, I just depend upon my memory to know where to get that particular cut. So far as cuts are concerned, we file those in our own office. The printer doesn't take care of them. I can say that the needed material was in the January issue of 1927. Nine times out of ten I am right. I can't find any satisfactory way of indexing everything without so many cross-references and files that it doesn't seem to be any help. It is more trouble looking up the index than it is to go through a couple of magazines.

H. W. FITCH (Delaware & Hudson Railroad Corp., Albany, N. Y.): With reference first to the paper that has been read, I should like to raise the question as to how much time must be involved in maintaining such a system of indexing and filing as was described here.

It would seem to me that it would require the service full-time of at least one person to handle that thing. That is more than many of us are able to give.

Referring to Mr. Segers' remarks about keeping in your mind the location of things, that is all very well if he has the retentive memory that he appears to have. Unfortunately, I have a vile memory and I can't tell now what happened six months ago. Besides, our sheet comes out twice a month, which makes it doubly complicated.

We do have an index which we keep up currently by cards, going through each issue as it comes out, and indexing and cross-indexing, which is vital to the success of the thing. You may have to index a thing in three or four different ways. Oftentimes the title under which it appears in the magazine will convey no idea of the actual subject matter or the point that you are seeking. You have to have it cross-indexed three or four ways, but that does not involve as great an amount of labor or time as it would seem. We have this index printed up and it is available for distribution on January 1 for the entire preceding year. It takes perhaps 16 pages the size of our sheet, which is 7½ by 10. It is very useful. Suppose Mr. Segers passes on. The next fellow won't remember.

CHAIRMAN KUPFERER: Harrington Emerson in his textbook on efficiency named twelve principles. I think the one that most so-called efficiency men overlook is the principle that he outlines as common sense, of which we have been frequently informed there isn't any such animal. I think that is the solution to the situation. We all have an individual problem. If we were to index the births and marriages

and so forth we would have an awful job. I think we can use a little common sense and find the point at which we should eliminate indexing.

For instance, there might be certain articles on the subject of expansion work in the particular company that we represent or have something to do with. It might have something to do with the thing the paper suggests here, the mutual benefit plan, as to when it was changed and where that was first announced. You might have an announcement of company policy regarding wages or hours or regulations. Those possibly should be indexed. I know in my own case we have certain things which appear officially in our publication as announcements. Frequently we are called upon to dig out those articles or those announcements so that the actual text may be before us and we see what was said. Sometimes those policies are forgotten.

I agree with both Mr. Segers and Mr. Fitch, that a scheme such as Mr. Ensminger suggests here would involve considerable detail. However, some of us are blessed with assistants who can give considerable time to it. But my assistants and I have other things to do, I must confess that I am quite largely in the class of Mr. Segers and my filing system is very, very simple. I do have a file for historical material concerning the executives and the company itself. I could meet with the measuring stick of Mr. Ensminger here in that I might be able to write a history and so on, but for certain articles or certain items I would just simply have to guess as to what time they appeared. If it is important enough to have usually it is important enough to take the time to go through two or three months' issues. If you can, I think it would help you to have a cross-reference set up in the matter of the time a certain article appeared.

ERNEST AUGUSTUS (The Mead Corporation, Chillicothe, Ohio): Has anybody worked out a system of what to throw away and what to keep? For 12 years I kept all my cuts. Then last month I shut my eyes, and started to throw away. About two weeks later I found I had discarded some cuts that I could have used. What rule are you going to follow?

MR. SEGERS: Here is the rule I follow. I keep the photograph and throw away the cut. You can always get a new cut if you have the photo.

I want to correct an impression I left with Mr. Fitch here about my superhuman memory. I lean on the publicity department for lots of things, but I do have a filing system to the extent of practically every article which contains the original copy or a duplicate and a photograph or the photographs pertaining to that particular article. They are filed with each issue or in groups of each issue. If a photograph or any material in there is called for by somebody in another district, we make a note of it on that particular envelope. It is a large 8½ by 11 envelope. There we keep our reference, our indexes.

What I meant was the setting up of an elaborate index or filing system that you would have printed or multigraphed to send out to your various correspondents and associate reporters throughout your districts or to the places where you serve.

We operate in eight or nine states. It is really no advantage to the man out in Podunk Corners to have this index and say, "Send me cut No. 4 of John Jones on Page 72 of so-and-so issue." If he wants a cut of John Jones which appeared in the March issue, we almost know where to get that immediately.

H. E. BONAR (The Ohio Bell, Cleveland, Ohio): In answer to Mr. Augustus' question about this, we follow this rule in general: Each month we throw away just as much as we feel sure it is possible to get rid of. Photographs of women employees are thrown away. The styles change too rapidly to pick them up one or two years later. Cuts of men employees are saved as a rule. On other photographs or cuts of groups or incidents or whatnot, if we have the photographs they are discarded. The chances are not one in a hundred that you will use them again anyhow. If it is some particular incident where we have made a cut from the photograph sent to us, on some occasions we will have our photographer make a copy of it and ditch the cut.

As an exception to that, as we go through we arbitrarily may save various cuts, both of women and particularly group pictures or cuts of various incidents that we figure some day may have some historical value. There is a very arbitrary rule followed, and to say which cut you will save and which cut you will discard is just simply a matter of personal selection. With that we have followed the rule or the suggestion made by Mr. Ensminger in this paper, to pass the buck to the printer, and it works very well. We are seldom called upon to furnish a cut through the printer where he hasn't been able to do it.

We made a further cleaning out of the files just about a year ago occasioned by moving from one printing establishment to another. When we arranged with the new printer to take over the printing of the magazine it was part of the agreement that he would file our cuts. When they started moving them over to him he sent out a S. O. S. because about a vanload of cuts in boxes was taken out of the old files. He didn't have enough room to put them away and to store paper on his floor.

We went through at that time and made an arbitrary cleanup. Everything prior to 1927 was sent to the furnaces. Incidentally, we get quite a bit of recovery from that scrap metal. Since that time we have adopted this system just outlined, of eliminating as many cuts as possible each month.

J. G. BLASER (J. L. Clark Manufacturing Company, Rockford, Ill.): In my work I have been traveling along the same lines as Mr. Augustus. I hang on to everything. I have shelves loaded with every cut that we have produced in the past fifteen years. I made a mental resolve, since hearing this discussion, to clean out when I get home. I take my own pictures, with the exception of the cover, and lately I have been going into portrait work. On a few occasions I took what I thought were some excellent pictures of girls in our employ. I showed them to those girls with pride in my heart, knowing I had accomplished something very good. Without a single exception they said, "Oh, my goodness, don't publish that." They were really good, good likenesses, but they didn't flatter any of them.

In regard to the future saving of cuts and photographs also, as I go along with my work, as soon as a later picture comes in of a particular individual the older one is discarded. There is no woman and no man who wants a picture published of themselves taken some years back when they have a later one. We see that in newspapers so much. They hold cuts for ten or fifteen years for people we know are 60 or 70 years old. When the pictures are published in the paper they show them at 35 or 40. Is isn't true. I personally would rather publish the story without a picture than to go to that extreme.

R. B. LEMMAN (Philadelphia Gas Works Co., Philadelphia, Pa.): I should like to get a slant from some of these editors as to just how they go about finding these cuts that they have had on file for ten or fifteen years. Just what is the actual cost so far as the time element is concerned? Is it cheaper to discard a cut after saving it for one year and have a new cut made? On the matter of the return of photographs where there is a request that they be sent back, if you keep a copy of the halftone from that cut there is no doubt that your engraver can make a very excellent reproduction from that halftone copy. Where you have cuts that are absolutely necessary to keep, you can do as was pointed out for the newspaper men. You can strip your cuts from the blocks and file them in an envelope. With a small instrument you can release the tacks in the block and the cut can then be filed away. You can give it a number and file it. That is much more economical than filing your whole cuts and then spending half a day trying to find one on the top shelf. It may have had a number pasted on the back which has since become damp and the number wiped off.

LOGAN ANDERSON (R. R. Donnelley & Sons Co., Chicago): As a representative of the printers I feel I must say something here. I am head of our house organ department and we keep our cuts five days and then throw them away, all except halftones or something of the plant that might be used by some other publication.

They are of no use to anybody else and we don't ever expect to use them again in our own magazine. Certainly if there were any economy in keeping them a printer would keep them. There is no reason for that because it is very seldom that anybody will use them again.

You change papers. You can get a good job of printing with a half-tone of 120-line screen and then change to a 133-line screen if you use the same kind of paper year after year. I venture that very few of you are. Furthermore, it is almost impossible to keep a halftone any length of time without getting scratches on it, no matter how careful you are. I had over \$2000 worth of halftones made for a year book of our training department. The publication of that year book was delayed about a year. When we went to look them over again we found that in spite of the greatest care there were scratches on halftones as large as seven by ten inches. The work in repairing a halftone plate by the engraver is almost as great as for the halftone itself.

If your printer is storing your halftones for you, you can bet he is charging you for it. When rents are as high as they are, especially here in Chicago, he isn't allowing one foot of floor space for your cuts without charging you for it.

EDWARD R. EGGER (Chicago Rapid Transit Co., Chicago): In this day of so-called depression anything that moves toward economy is something that we are all anxious to follow.

On this question of throwing all cuts away, I find that there is one way of making it possible for you to use cuts again, especially in the newspaper style of publication. That is by using a thumbnail inset cut in your stories. You use only the head. If change in style means anything to you, you don't have to worry about that because the clothes don't show. I have been able to use the same cut six, eight or ten times. You have a story about an individual who is promoted perhaps, and you go right on through carrying it as a news event until his death. We have used cuts as high as six and eight times. Finally, by taking the same little cut and putting a heavy border around it, we use it in the death notice and then retire it.

For those who can use the thumbnail inset, it is certainly something that will save you money. That is one cut that we never throw away.

As to the general run of events, we know that those cuts will never have any news value again. The individual portrait cuts and the historical cuts as to equipment and company activities, those that may have future historical value, are the things that we save. We file them in steel cabinets with an alphabetical index along the outside in the little niche that is provided for that purpose. By using a little common sense and reason we don't have any trouble at all in digging up these cuts, even though we have to use them for five or six years back.

MR. ANDERSON: What is the number of copies of each of your issue?

MR. EGGER: We run 6000 of one and 2000 of the other.

MR. ANDERSON: A halftone will last only so long. If the total number of impressions from that halftone goes up into the thousands it doesn't work so well. It would depend on the number of copies you print as to how many times you could use a halftone over again.

There was a question as to whether you could reproduce a halftone for later use. You could not get as good a result as you do in the first place, but it is possible to take a line-drawing of a halftone proof and get a pretty good halftone plate for use again. In an emergency it is quite feasible.

CHAIRMAN KUPFERER: You have received some questionnaires. I have indicated a half dozen questions or statements here on which we should like to have your comments at the close of this session. Will you look over these sheets as you have the opportunity and see if there is anything you would like to say there and go on record so that when we open the Question Box this afternoon we will have something to start the ball rolling.

Regarding the next item on the program, Mr. Fish has an announcement to make.

CHARLES T. FISH (National Safety Council): I am not here to pinch-hit but just

to explain that our esteemed cartoonist, Milt Youngren, is not here today because of illness. Milt is known to quite a few of us through the National Safety Council posters, also the cartoons for the Plant Publication Service which are issued with the News-Letter each month. Since he can't be here I would suggest that we have an open forum on the subject of cartoons.

CHAIRMAN KUPFERER: We will ask Mr. Fish to conduct the forum. Any questions?

EUGENE TAYLOR WILKINS (General Electric Co., Schenectady, N. Y.): How are the ideas for the Plant Publication Service cartoons created? I thought it would be a good idea to have Dr. Sappington and Mr. Youngren here so that members of our organization could meet them. Contact with members of the headquarters staff will strengthen our ties with the National Safety Council. I wanted to get Milt Youngren here to make his bow and show us how the work is being done. I think Mr. Fish also has a hand in the cartoon service. It would be interesting to see how those cartoons are originated and the ideas developed.

MR. FISH: In getting ideas for cartoons the plan I usually follow is to clip cartoons having a safety slant or the germ of an idea that might be adapted for our purpose. I put them in a file. Then in November I get them out and decide that most of those that looked good at the time don't seem so hot. So I spend a few days trying to grab ideas out of thin air. If eight out of the twelve ring the bell I think I have done a good job.

On rare occasions some person has sent in a usable idea. And once I got an idea from actual personal experience. My young daughter was four years old at the time and, as you might expect, she had received considerable instruction about the dangers of playing in the street. One evening she saw a dog playing in the middle of the street and became greatly alarmed. She called out: "Oh, doggie! you mustn't play out there; it's dangerous!" And the dog trotted back to the curb.

H. E. BOYAR (Ohio Bell Telephone Company, Cleveland, Ohio): The ideas for the cartoons, I think, are largely the brain children of the cartoonist. As a rule, all the man needs is a draft of the text of the subject. If you give that cartoonist permission to go through it and pick out the points which seem to him best adapted to cartooning, he is going to hit it about nine times out of ten. He may present a draft to you on which you can offer some suggestion for improvement, but the development of an idea is a part of the cartoonist's ability and practice.

We have been using cartoons for about a year and a half and are making a regular monthly feature of it. Of all the contents of the book I believe I would give up anything else rather than the cartoons.

Our cartoons are more than cartoons; they are characters. We have what we figure are very clever characters and the cartoonist builds a little sketch around individuals in the organization. I think you will agree that no matter how good or flattering a photograph may be, there is a bigger kick to a pen and ink sketch of an individual than there is to his photograph.

The man we have is not an employee of our company. He is a free lance artist. I send him through our entire territory each month. We map out a schedule. I pave the way for him by contacting with people at that point, asking them to take him in hand when he gets there. The department heads are requested to indicate the subject they want this man to sketch. It is required that with each subject they recount to him any peculiarities or traits or any unusual happenings that have occurred that he can build the plot of his sketch around. That has worked very well. We have run up to the present two pages of those, a double-page spread of these cartoons.

He comes in from a trip and outlines his plots. He has his sketches. We go over those. Some of those as a policy matter we will discard. On others perhaps, knowing the individual, I can give him another slant which will improve the work. In some cases when he has nothing definite and hasn't been able to get any definite material

to work on, he will go back to that point again. Then by correspondence or wire we will get them thinking further about it.

He usually comes in with a surplus of sketches so that we do have ample leeway to discard those which we can't develop or those which are not desirable.

So far as the appeal goes, the interest in that, I will say that it is very general and very marked, and decidedly worth while. The overall expense in our particular case is fortunately very low.

MR. GRAY LEVITT (North American Light & Power Co., Chicago): As to the cartoons, I think all editors agree that the cartoons are being used more than ever. For instance, they can be used where you want to bring out some point of safety that would be hard to illustrate otherwise. People hate to be preached to. A cartoon feature can bring out an idea much more clearly than it could be brought out otherwise.

I think that the magazines generally, at least those coming over my desk, don't use the cartoon feature as much as they could. They should put in more time to work out the idea. I know it is so in our case. I myself know of cases where especially the foremen have written in and complimented us on bringing out certain features that portrayed the safety idea. They were used in cartoon forms. They thought the men working under them grasped the idea more readily than if they had had a meeting and somebody told them the mistakes they were making.

I think that Mr. Fish ought to be complimented on the series of cartoons that he has sent out monthly. The men in our organization have really accepted them and we look forward to using them each month whenever possible.

ROBERT E. DAY (Kellogg Company, Battle Creek, Mich.): I think there is little doubt that the cartoon idea has its good points. Yesterday up in the Food Section we were having a discussion which was rather interesting. I think perhaps Vern Sutton can tell us some reactions which he got from a little study he made in the Postum plant regarding the effect of humorous material presenting the safety idea. Some of us, or most of us in fact, are limited in our expenditures for our publications. For that reason some of us can not get as good artists as we would want to present a cartoon definitely related to our local situation. For that reason we have a little personnel problem that has to be carefully handled.

VERN D. SUTTON (Postum Company, Battle Creek, Mich.): The whole proposition that Mr. Day refers to can be summed up in the statement that the employees of the Postum plant get all the safety humor required by merely looking at the face of the safety supervisor.

The discussion we had in the Food Section was regarding safety posters rather than cartoons in the magazine. However, humor is humor, whether it is in a magazine, on a poster or in the physiognomy. I like a little humor once in a while.

I occasionally was putting on the poster board a humorous safety poster. I got a reaction from it almost invariably. I might say invariably. They didn't like the humor. They didn't like the cartoons on the poster. They seemed to take personal offense at a great many of them. If a character representing a workman was a little grotesque, they seemed to think that just because the safety supervisor could sit up there on the hill with a white collar on he was trying to pose. He didn't want to come down and get his neck greasy when he worked. They resented it.

So I adopted the system of having my safety committee, composed of workmen and work girls, high-grade employees, very few of whom are foremen or foreladies, vote on this poster. Occasionally they favor a poster that is humorous. If 20 per cent of my committee votes against the poster I refuse to use it. That vote nearly always goes at least 20 per cent against the humorous poster.

To apply the suggestion to your magazine proposition, I suggest that if you can establish some way to get a census of your readers you should establish such a channel. Use your own ingenuity as to how that shall be done, but find out how your readers like the cartoons, whether there is any objection to them.

We have a high class of work people up there, no foreigners. Practically all of our people have had a grammar school education. Some of them have been through high school and we have even had college graduates working in our plant. That is the type of people we have. You find them very sensitive. Just because they have to wear what they call working clothes they think there is a line of demarcation between themselves and the people in the office, the white-collar job people. They seem to be constantly looking for occasion to be offended. In my work I am very careful not to offend them.

I suggest that you find out what the reaction of your readers is, the reaction of the people who work in your plants, as to all features of the magazine but especially with regard to humor.

H. W. FISH (Delaware & Hudson Railroad Corp., Albany, N. Y.): Can't we sum that all up in that one little line that has been used before: "Don't kid about safety. You may be the goat!"

I know our fellows all take this safety business very seriously and consequently a cartoon can be used that will convey a message and put over a point and yet it is not considered as kidding about safety.

H. C. ELZEUX (International Harvester Company): The question has occurred to me as to the advisability of using safety cartoons. Mr. Sutton has brought up the point and related the experience in his plant. I recall certain experts on safety have questioned the advisability of using any humor in connection with the presentation of the safety idea. I recall especially that book, "Mental Causes of Accidents," which was somewhat of a classic, and the author brings out the point that safety should not be presented by the cartoon. I imagine however that there is a happy medium between the two. I am just wondering if we can get an expression from Mr. Fish on that point.

MR. FISH: I remember that correspondence very well and I came to the conclusion that Vern Sutton was the only one in the Postum Company who had a sense of humor. As I recollect Dr. Sappington's remarks this morning, 70 per cent of our population were very little above the grade of moron. I am inclined to think that about 90 per cent of them have a defective sense of humor.

There is no doubt about it that cartoons have to be handled with discretion. Some of them carry an awful wallop. I remember about 25 or thirty or more years ago, when the insurance companies were smarting under the Armstrong investigation, there was a cartoon in *Collier's*. It published a cartoon featuring the Prudential's familiar Rock of Gibraltar. The cartoon showed the president, Dryden, caricatured against the rock, and under it was the caption, "The Drydenial has the strength of limberger."

That was a long time ago but that cartoon stuck in my mind. I don't think an agent of the Prudential could have sold me although the company has had a splendid record.

I don't think any of the safety cartoons carry such a kick. There is, of course, the danger of treading on the workers' toes. Most of them are rather class conscious. In our cartoons we have tried to avoid making them too broad. I don't think anybody could say we are kidding about safety. We are kidding about certain unsafe practices. There is quite a difference there.

MR. AUGUSTUS: Does a cartoon justify its expense and space unless made by a good artist? All of us probably have some aspiring artists in our organization. They get a happy thought, make a so-called cartoon, and want us to publish it. You don't want to hurt their feelings and still you don't want to use it because it isn't good enough to use.

MR. FISH: I feel rather reluctant to try to answer that question. We might think an artist was terrible but some of the men in the plant might think his work was great. But you must have certain minimum standards of quality. It requires considerable tact in dealing with artists and poets, and I can't offer any blanket rules.

ADJOURNMENT

Wednesday Luncheon Session
October 14, 1931

V. H. KUPFERER, Chairman
The Studebaker Corporation, South Bend, Ind.

The third session of the Employees' Publication Section convened with General Chairman Kupferer presiding.

CHAIRMAN KUPFERER: Mr. Wilkins did an excellent job on this program, however, in giving the next speaker his subject, it possibly was a bit of a misnomer. Dean Harrington is not quite an outsider. He has met with us a number of times and I think he is at least a member ex-officio of the profession.

Dean Harrington needs no introduction, to most of us. He is the director of the Medill School of Journalism of Northwestern University. It is part of his job to know something about employees' publications. In fact, in a recent book which I haven't seen and I don't know whether it is published or not, he has a chapter concerning employees' magazines, to which he asked some of us to contribute ideas. It is a great pleasure for me to present Professor Harrington.

An Outsider's View of Employee Publications

By PROF. H. F. HARRINGTON

Director, Medill School of Journalism, Northwestern University, Evanston, Ill.

Some of the things I say here may not be true, even though they may come in the guise of official preachment of a college professor—a man who has never been the editor of a shop organ or an employees' magazine. I have seen many of them and have analyzed many of them. I think I know, theoretically, how the ideal house organ or employees' magazine may be made.

I do not wish to say anything in criticism or to bring in a yardstick for measuring these publications. I have no magic formula at all. I am just going to suggest certain things and you can come to your own judgment on these things. They are things that interest me and I think they might interest you.

As I see it, there are five different types of these internal organs, these publications. The first we will call, for the sake of classifying it, the wall newspaper. Curiously enough, this thing we find in our plants has been taken up by Russia. I was talking to a man the other day who has just returned from a trip to Soviet Russia. He was very much interested in these wall newspapers which are arranged on the walls of the big shops. On them they would have announcements of the industrial policy and something about the ideals of the central Soviet government. They would have letters from employees about certain things that interested them, a great gist of personal items. You find small groups congregating around these wall newspapers in the plants. You find many pictures and many placards and a good deal of color used.

That is rather new to Russia. In Russia they are interested in Russia, so far as the Soviet part of it is concerned. They are interested in getting a morale established and in getting a common bond, anything that may be useful to the development of a certain idea, about industry and about capitalism.

It isn't so new, however, with us. As I passed down the corridors here I saw some suggestions of journalism on the wing, journalism as you walk, in all these placards that attract your attention. Probably you linger in front of these placards to see what the message is. It is a matter of big headlines, color and pictures. Nothing very thorough, just superficiality. It gets your attention and curiosity aroused, but it doesn't go very deep.

The wall newspapers you find in many establishments. I have found them that way. We come to a big bulletin board and there we have some company announcements, maybe some joke, maybe some bulletins and routine matter, all very carefully arranged. There may be an editorial staff or someone else in charge. I suggest it is a pretty good thing because it has a visual field at once. Even though you have a newspaper, you don't have the continuity and you don't have the constant attention that you would have if you also used bulletin boards where you can post certain things that have to do with the plant. With the employee it is particularly true about books, suggestions, articles that you would like to bring to their attention as they are on their way home. They can look at it during the lunch hour. That wall newspaper is one of the most valuable assets of the kind that you have. You may get your interest in the regular newspaper, but you might also get it in connection with these wall placards and announcements.

There are probably other things you would like to use very much, but if you don't have these other shop organs or shop media probably that is better than nothing at all. If you are in a situation where you haven't any budget for any printing, where you can't publish a paper or a magazine, you can at least do this. You can have a newspaper on the side of the wall, you can have a bulletin board. Get some color on the bulletin board and get something on there that unifies and brings these divergent groups together so that they are at least interested in one thing, interested in something very concrete. If it is conservative along those lines it should be quite useful in building up the family spirit.

The next thing is the mimeographed newspaper. Many of them come to my desk. You have a mimeographed newspaper sent out in connection with this organization. It was rather interesting to bring all divergent groups together. One man hears about another man through the medium of this clearing house, the mimeographed newspaper. The mimeographed newspaper is also quite a useful thing if you don't have anything else. It has the merit of being cheap.

It has certain demerits, in my opinion. The mere fact it is cheap gives you the idea that it isn't very valuable and may be dispensed with and thrown into the wastebasket. Sometimes the ink is very dim and there is no artistry in the preparation of it. So the whole thing is amateurish and ragged, and if you allow the amateur artist to try to draw a cartoon it becomes even worse, because it is very difficult, as you know, to trace a drawing and make it look like the real thing when it comes out in a mimeographed paper.

There you have all the disadvantages of the amateur work. It is the same stuff, I grant, that you may print, but it is the mere way you put it up, the way it comes to the reader. It is generally a very poor quality of paper. It is typewritten stuff, with perhaps a cartoon. Its physical appearance is bad, and even though it may have a frequency of issue, it should be used only when you have no other medium to take its place.

I would say, parenthetically, that I think even mimeographed newspapers could be improved. I think you could have a name for it. You could have a name for the paper and have that name printed on it somewhere in your job plant, printing it in regular type, rather larger, of course, than the typewritten script. Maybe you could rule the columns if you care to rule them. You could do a good many things in a print shop in order to give it some kind of appearance of craftsmanship or skill. Then you could use some devices a little different for the headlines. I am not speaking of drawing in the headlines but I know you can get a larger type face for headline purposes, which you can imprint in that stencil. We have done it in the things we get out at the university. In that way you get away from the regularity of the ordinary typewritten production. Color might very easily be brought in. You might use a little red ink, for instance. It is interesting to me to see the increase in circulation of the magazine *Time*. I consider one of the reasons is largely the use of red as the color. I think it is one of the things

to do if you are going into the magazine and certainly the newspaper. The *Tribune* has announced these new color presses. The time will come when you will have color illustrations in the regular newspaper columns, and headlines in color and color in the advertisements. Color is the thing that is attractive today. It makes interest, it attracts attention, and I would say that probably it ought to be used in more employees' publications, where it isn't so expensive and where it adds certainly to the charm.

In speaking of mimeographed newspapers and the things that might be improved, certainly the text of the copy could be improved. The looks of the copy can be improved. I think you could have the copy more like the newspaper style, which is my favorite of all these various types. It is the newspaper form. By newspaper form I do not mean six or eight columns of paper. I think that is rather unwieldy. I do think the newspaper itself can teach us a lot in regard to the preparation of these shop organs.

The tabloid newspapers use headline devices and pictures as much as possible. They use one strong story, for instance, for a good kick on the front page. You can emphasize something and make up the entire thing as the newspaper is made up. The advantage, of course, is that you have made one hurdle as soon as you have that. The people like it because they are used to the newspaper. Therefore they will take this medium. It has repetition, it has reader interest, at least for two days. It goes home, which is seldom true of the mimeographed newspapers. You can have a city editor, which is the department chief. You bring in certain things that have to do with the news of the day. The editorial department, in fact, every department that you find in an average newspaper, might be lifted over bodily into this tabloid newspaper, and through a new application of the text you use, through the form you use, send it to your own family of readers.

Then there is, of course, the magazine type. I think the magazine type is a little too expensive. It frequently has an attractive appearance but it is expensive, just as the large magazine format is also expensive. Really, I doubt very much whether it would be read by the employees. It is almost a thing to send out to other firms to indicate a very fine type of magazine and that you pay for the very best kind.

You can make a choice of any of those things. My own feeling is for the newspaper type. I think the organization and staff might be worked out in that particular way. I have talked to many editors and I have had many letters from them and they all agree on one thing, that probably the chief element in the employees' magazine is the personal items, at least reader participation. Many of these items at once give you a little glance into the lives and experiences of these employees. Many of these items, however, are very poorly written, if you examine them. I believe, of course, in as much humor in these days as possible. I think an editor ought to have a good many of rather funny stories, humorous stories and sketches in his paper. I think he ought to get many jokes, canned and otherwise, in his paper. I do think that it is not necessary to get too personal, when the sketches or stories play upon some weakness of an employee. I would rather get a more impersonal note and not poke fun unduly. It is not well to take a canned joke and apply it to a man because he knows it is a lie. He was never quoted or it never happened to him at all.

I believe there should be a certain dignity in even the personal items. I do think a little quotation would help, but I do think, if I were the editor of a magazine, that I wouldn't carry it too far. Some often call the man "mister," although some think probably a nickname would have a better appeal. I think there is such a thing as too much chubbiness, too much around the shop, one of the boys, not one of the establishment. I think we ought to get over the idea that they are the employees and the other group is the employer. There is a rather delightful story in the Old Testament about bringing the harvest home. The verse is like this: "Master and servant rejoiced together." Why shouldn't they? Why should this group

here say, "We are not interested in the employees at all. This employee is in a separate group entirely." Here is another one, an underling, inferior.

I am inclined to think we all belong to the same family, that these men who do the minor tasks are just as important in the establishment as the men who are on the board of trustees and who control the policies and at times get the dividends. I think we are all together, there is no such thing as an inferiority, we are all associates in the same job.

I should like to see a personal column, say with the vice-president in one item, then an employee next, then possibly something about the president of the company, then somebody else again. Have them all mixed together in that way, all the same family. Have it an employees' column and a column for the members of the plant official family. I would say that reader participation can be obtained by having an individual representative for each of these divisions of the work, holding him responsible for getting as many items as possible.

It may be a good idea every time the paper comes to you to go over it with a pencil and count the number of names mentioned. Then decide to get 50 more names next week and go out and get them, or 50 more items.

There are two ways of getting attention in the newspaper. One is by your heavy artillery, by mowing them down with sensations, with fireworks and displays of noise. You get attention that way, by having a big tragic story on the front page. The other way is the sharpshooter method, just picking off certain people. Every name is a sharpshooter. Bring him in. Every person has at least one hundred friends, and just as soon as you mention his name you at once enlist one hundred friends who are attracted to that name by reason of how it is used. You get that interest in connection with things you are doing, the things they are doing, little events that may have to do with safety. That all helps.

You get it by inference, by citing little adventures, things they have done, which connects up the incident with the name at once, a little quotation with the name.

Probably the secret of the *Boston Globe* is that once every year every important man in Boston is mentioned at least once. The telephone directory is used for that purpose. They absolutely go through the telephone book and pick out the men that they think have some official connection. Then they make it a point to see that the name is printed at least once during the year. It is rather hard sledding in December, I am told, because of the leftovers they haven't been able to get into print. They make a speciality of deliberately getting those names in.

If you read the *Boston Globe* you know at once that it is one of the best name newspapers in the country. It is a neighborhood paper and the people swear by it. It has been in certain families in Boston for many, many years. It is one of the institutions of Boston. It is a great thing, a great personal newspaper.

I took a census of some of the things that came next and this is the table of contents that makes good reading:

Up from the ranks interviews, how they started, what they think of that.

Good health articles; new sales methods, methods of operation of machines, prevention of accidents, planning operations and policies, old times and old-timers, cartoons and sketches, welfare work, competitive sports, business trends, feature stories on general subjects, prize awards with pictures, women's sections with photographs, double spreads or action photographs. For the mid-section, letters written by employees, savings and thrift, editorials on company policies, poetry written by employees, shop-made sketches, vacation itineraries, articles written by department heads and executive officers.

That is the kind of things you should try to put into these publications. Of course, the big job is to get the space. I have one criticism: There is too much propaganda and too much company talk in these employees' publications. I feel as I read them that the company is too much in control. I should like to see the employees' magazines made by the readers. If I can gage a newspaper reader, he

doesn't like to be preached to. If I can gage the employee and gage the employee interest, it is that he isn't a man who wants to be moralized to. I would think that a little object lesson, carrying out your propaganda and safety features, would be considerably better than a long broadside or editorial or a message from the president of the company. It would be better to get the interest and attention through the object lesson and through the news. You could mention it incidentally in the feature story that is only slightly propaganda.

I picked up an electric public service magazine the other day and found a delightful story entitled, "The Five-twenty-four." It was the story of a commuter going home from New York City on a suburban train. He described how the lights would come on from the building along the way, how he started, what he saw. It was a very vivid description of just the things he saw along the way. That was a magazine devoted to electricity and the electricity extension to home use. I am sure you would get more ideas out of that story as to what was going on than if someone had written an editorial urging that more electricity be used.

I think more photographs ought to be used in connection with this propaganda (at least it is a little propaganda) and more photographs should be used in connection with these stories, more descriptions, more letters from readers, from employees. Then a soft-pedaling of anything that sounds like a sermon or propaganda on policies or programs. Bring them all together through the news, the feature story. In those feature stories I think you should have them written with a humorous twist, with some color in what you say, some life, some vigor. That is what we want. I think we can do it if we are good editors.

When I think of success in any institution I sometimes think of it as due almost entirely to a man's assistants. I think the good executive is the man who knows how to delegate his work, how to recognize talent here and there, and how to get these people working. I think the shop organ has a pretty good name, "Shop Organ." You know what an organ is, how it works. The conductor or whoever he is sits down there and if he has something to play he knows what it is. He plays it. It is music and it represents a certain tool, certain harmonies. He knows he has to pull this stop and that stop. He keeps it going and lets other people make the harmony. That is music.

I think there are too many editors who want to do it all themselves and bow to the audience when they applaud. As a matter of fact, all things come into the picture, all the various talents and the various capabilities. So I would say that success in an organ of this sort comes almost entirely in the wise choice of assistants, the enthusiasm you can get. One can do this well; another can do that well. Combine all those talents into an organized pattern we call a newspaper or shop organ. You can't do it by sitting inside an office. Sometimes I have said the city editor is doing it the wrong way. He is called a city editor and that is exactly what he is. He stays in his office and expects to run the paper. He has to get out and be an editor-at-large, a sort of rambling reporter. The editor ought to get out among the shop people and talk to everybody and get their ideas and be friendly with them and suggest stories. He should see if he can make it more a medium of exchange and information than gossip.

Down here near the Auditorium there is a rather interesting exhibit. I was talking to the keeper down there and we were near one of the tanks. He said, "Do you see this tank here?" There were a lot of minnows in one side of the tank and a big bass on the other side. Why doesn't the bass go after the minnows? That is an interesting story. For a while when we had the aquarium here the bass would dash right in and get the minnows. He tried to get as close to the minnows as possible. He did get a lot of them. He lunged around in there and had a very good time. We couldn't keep enough minnows in there.

"Then we hit upon the idea of putting a glass partition down the middle of the tank. We put the minnows on one side and the bass on the other. The bass got busy right away. He would start after them and smash himself against the parti-

tion and then he would back off. Toward the end of the day he tried it again. He wondered what was the matter, why he wasn't so successful as he had been before. He would make a lunge and start forward just like a back on a football team. He hit this partition again, and back he would go once more. The minnows kept on swimming around and having a good time. He kept that up for two or three days. Then one day we took the partition out. The minnows were on one side and the bass on the other. My friend, the curious thing about it was that while there was no partition there the bass stayed on his side of the tank. He made no further effort to get to those minnows. He had learned his lesson."

The point of the story is this: There are a lot of glass partitions that don't exist at all between employees and employer. You may think you are pretty superior and the other people are rather inferior. You won't fraternize at all. Well, that is a sort of artificial division, it seems to me. What we editors have to learn is to overleap those artificial barriers and divisions and say, "We are with the large group of readers and employees. We want to get their point of view. We want to see what they are thinking about. We want to be one of them, to go to school with them, to learn the same ideas, to respond to the same points of view. We are in the same family so why not consider ourselves in the same family."

It is true of the editor, gentlemen, that he is in a place of authority, but he should also fraternize and get their spirit and carry out the institution's programs and policies by bringing to the attention of the readers the things that would be interesting to them and to him.

I would say what we need more than anything else is more of a human approach. Most of these shop organs are pretty small, rather poorly written, no sparkle. They lack color; they are standardized. I think we ought to have more a human approach to them, more whimsicality. We are inclined to take ourselves too seriously about them. We should make it a little more cordial and bright and happy, particularly happy, because we want to pick it up and find out what is being thought of and talked about in the shop itself. That is what it ought to be. It should be human, interesting, lively, successful, entertaining and thoroughly interesting, so that it becomes a rather good portrait as a shop organ of the shop or the institution that you are trying to serve.

ADJOURNMENT

Wednesday Afternoon Session
October 14, 1931

V. H. KUPFERER, Chairman
The Studebaker Corporation, South Bend, Ind.

The fourth session of the Employees' Publication Section convened with General Chairman Kupferer presiding.

CHAIRMAN KUPFERER: Being from South Bend, I should know a lot (or at least more than I do) about football. I don't know how good the Notre Dame football team is this year. I do know one thing that Notre Dame is going to miss and that is the Rockne spirit. I have had the opportunity to see Mr. Rockne in action a number of times. I have heard him give his men the locker-room pep talk. I think that after all, aside from being the caliber of football men they are and knowing the fundamentals of football as they are taught, a great advantage which the Notre Dame team has had has been the dynamic spirit of Rockne back of it all. We are all ready to admit that the spirit of anything gives us the extra effort, the extra power to put us over.

I am very happy to see that we have been getting a little more spirit into our group and into our sessions. After all, there are certain problems which are more or less cut and dried. You might get a little new angle on them, you may vary the thing a little bit, put a different colored coating on them each time, but the spirit of our Section, it seems to me, is the thing that stays with us and that is ever-fresh. I know it is that way with me and I feel sure it is that way with a great many of you.

So I hope we all catch this spirit of fraternity. I think we are a fraternity, though without any constitution or by-laws or forms or initiation. I am sure that you will all get a greater benefit from it, if my experience means anything, if you get into the spirit of this Section with an interchange of ideas and fellowship, friendship. You will get a great deal more dividends out of your contacts and out of your contributions to it than might otherwise be possible if we consider it as a routine thing.

Some of us have been connected with the Section for a number of years; others of us are new. I can only say that it has been a great deal of pleasure to me, a personal pleasure and a personal profit to be connected with this Section. I count among the members of this Section some of the best friends I have. I hope that each of you will find that same rich experience as the years go by.

We are fortunate to have with us as the first speaker of the afternoon, Miss Nan Carter, associate editor of the *Illinois Central Magazine*.

Creating Contacts With the Home Through Employees' Magazines

By NAN CARTER

Associate Editor, "The Illinois Central Magazine," Illinois Central System, Chicago.

Business and home are the dominant interests of men and women alike. It is inevitable, therefore, that their attention should be attracted by those things which are useful to and concerned with business and home.

Why do men and women join trade associations and parent-teacher clubs? It is not merely to satisfy the natural instinct to move in groups; it is because in such associations they find a community of interest with others who are engaged in the

same business or who are in pursuit of a similar ideal. For a like reason they seek magazines which will enlarge their view of the particular work in which they are engaged, and even in their leisure moments their interest is aroused by opportunities to participate in the social activities of their fellow-workers.

The man in business reads his trade journal or employees' magazine as a part of his job. But magazine editors are not content with winning his attention. Their aim is to reach not only the worker but also the members of his family. Now, the woman in the home is acutely interested in the family's means of livelihood; yet the home remains the peculiar sphere of her activities. Therefore, if we are to foster reader interest in the home, we must create contacts with the woman in the home, and we can do this successfully through the employees' magazine. When we create such contacts we assure ourselves that the magazine will be welcome in the home. Once it is there, the way to intrench its position is by enlarging the interest of the home reader and strengthening the publication's contacts in all possible ways.

Do all employees' publications create contacts with the home? A recent examination of a number of magazines showed that there are some which make no such attempt. Of these, two are published across the Atlantic; the others are American products. By far the greater number of employees' magazines published in the United States, however, make a conscious effort to reach the wife and mother and the younger members of the household. There is a sound reason for this effort. The home supplies a background which is distinctive. Long after the individual has passed through its portals into the wide world, the home atmosphere clings to him. Employers sense it when he applies for a position. It is summed up in personal appearance, poise, courteous approach.

Recognizing the value of creating contacts with the home, we may well consider how such contacts are successfully made. Woman prefers to be treated as an individual, and for that reason the setting aside of a section of the magazine for her special attention is bound to make an appeal. Departmentizing is also successful for the children's page. The youngsters are thus made to feel that, although small in stature, they occupy a large place as members of the employees' families.

Planning a woman's department in the employees' publication presents much the same problem in selection as that which confronts the magazine devoted exclusively to women and their interests. Among the points of successful contact are health, beauty, pride, style, maternal instinct, cleanliness, and economy. It is interesting to remark that, from the advertising point of view, a table of persuasiveness ranks healthfulness, cleanliness and time-saving devices close to the 100 per cent which represents the highest possible value of persuasive appeal.

Material for the woman's page is most advantageously put across by simple language. Always open to suggestions, the woman reader will invariably attempt to follow any honest, intelligent plan of action that is carefully presented and that appeals to her innate sense of refinement and harmony.

What should the woman's section of an employees' magazine contain? First of all, there should be baby pictures, and plenty of them. Where is the reader, man or woman, who is not interested in pictures of laughing, dimpled babies? Even those magazines which function without a woman's section grant a prominent place to the infant. The baby picture layout is an irresistible drawing card, and for that reason many employees' magazines feature a regular page of baby pictures. Here the home page editor may be absolutely certain of cooperation from the parents and continued reader interest.

Next, and by all means, there should be recipes. I have yet to find a woman who does not read the recipes in her favorite magazine. She usually clips and mounts them for her recipe card cabinet. New ways of preparing dishes always appeal to the housewife, and often a suggestion will fill a gap in the menu. The editor must carefully check all recipes to insure elimination of trade names, and if possible he should test them for correct proportions. It is also useful for the editor to

indicate the number of helpings which the recipe will yield, bearing in mind that the average family consists of five persons. Reader contributions to the recipe column are encouraged by printed exchanges between readers. Another stimulus is the prize contest for the best recipe.

In addition to recipes, it is advisable to carry a special article every month which will interest the housewife outside the kitchen. A useful program can be worked out in advance, with a selected subject for each month. For example, the arrival of the holiday bills in January suggests an article on the value of the budget plan of spending. In February, when department stores feature sales of household furniture, an article on home furnishing would be appropriate. Despite the shrill breezes which usher in the third month, the home gardener in March begins to plan for a future harvest. April readers cannot fail to enjoy an article on labor-saving methods of housecleaning indoors, which might be followed by a May article on improving and beautifying the home grounds, vacant lots and the community generally. An alternative for May, which brings Child Health Day, is an article on health and safety. Planning a trousseau or outfitting a small home would engage the attention of the June bride, who would also be interested in the July story about practical and economical methods of canning fruits and vegetables. In August the mother of the family would naturally become absorbed in an article on the preparation of the children's school wardrobe. For the cooler days of September, club or parent-teacher work would form a link of interest, with an article on the activities of women in club life and their accomplishments for better public health. For the long evenings while October's golden glint is in the air, an article on rug weaving or knitting is suggested. November, of course, calls for suggestions for Christmas shopping. December, the season of cheer, might elicit an article on Christmas cooking and a resumé of the ideals and attainments of the woman's department during the year.

Another forceful point of contact is through the fashion page. In spite of the contention of many home page editors that women do not seek current fashions in the employees' magazine, those editors who run a fashion page measure the success of their venture by the large response in pattern orders. Articles on stylish accessories are always of interest, as are articles on the correct way of discharging social duties.

While it is inadvisable to mention trade names in the columns of the woman's page, the editor must not lose sight of the fact that women buy or influence the buying of 80 per cent of the articles which go into the home, and it is possible to stimulate the consumption of commodities by intelligent suggestion. Through the editorial columns the truth or falsity of some doctrine, belief or statement can be explained. Woman in the home will observe with greater weight the statements which come to her through the columns of her husband's business paper or magazine. Forces detrimental to his job are harmful to her security and well-being, and she can be depended upon to defend her home and its members.

A personal-help column, termed perhaps "What to Do?", to which the reader can apply for temporal relief or spiritual consolation, has found ready response in our employees' magazine. An elderly woman wrote for help in obtaining employment and was put in touch with an employer who needed a housekeeper. A troubled mother sought advice as to the future of her daughter. A college professor offered assistance to a deserving student, the child of a deceased employee. Sometimes the letters ask for practical help; often they seek a few words of encouragement. Whatever the need, in the personal-help column we strive to fill it.

The woman's page may contain any or all of the features suggested, but, whatever it contains, it should be well written, well prepared and directed toward the satisfaction of some need or demand. The successful woman's page is the one that adopts for its key the word, "service."

No home is complete without children. Therefore, an article on creating contacts

with the home through the magazine would be deficient without some reference to the future members of the working ranks. As heretofore pointed out, the children enjoy and look for a page devoted to their particular interests. One of the chief points of appeal is the letter box, through which they correspond with the person in charge of the children's page and with one another. What a thrill those youngsters feel when the postman puts into their eager hands an envelope of goldenrod yellow with a line in maroon ink in the corner that identifies it as a message from the Juniors' Club—an ensemble of cheeriness and brightness!

All employees' children of school age are eligible to join the Juniors' Club, but they must make application to do so. When they are admitted to the membership roll, they are also supplied with pins which bear the club emblem. Of course, the club has definite rules, the principal rule being to practice safety first at street and railway crossings. Other rules exhort the members to try to prevent fires, to help at home, to spread a little sunshine every day, to be courteous at all times, to be considerate of others, particularly elderly persons, and to be attentive to studies. The organization of individual clubs at local points provides valuable contact through club meetings directed by a representative of the magazine.

Children's stories have a definite appeal and presuppose the writer's knowledge of children, dramatic feeling, sense of humor and sense of story-telling. A guide to what is an interesting story is a clear memory of the writer's childish likes. When such stories are illustrated by pictures or worked out in puzzle-pictorial form, they are immensely interesting and insure a demand for each issue. Stories of animals and travelogues can always be depended upon to reach young readers.

Proverb puzzles, crosswords and hidden-word contests all have an appeal for children. Birthday lists furnish a medium for getting the names in print, while competitive drawing or writing contests find universal favor.

The children's page provides an appropriate place for stories of scholastic accomplishments and excellence in sports and pastimes.

The foregoing suggestions attempt to tell you how it is done. In reviewing the mechanics, however, we must not lose sight of the fact that the making of influential contacts with the home through the magazine is primarily a question of presenting useful material so honestly and forcefully that we convince the reader that the magazine is sincerely concerned with home welfare and with serving the family unit.

RALPH W. LITTLE (Commonwealth Edison Company, Chicago): I can see that the women in small towns who read the railroad paper would be interested in what is in the paper because they do not always have access to as much material as the city readers. But what about magazines that circulate entirely to city families? Our magazine, *The Edison Round Table*, is small. At present, we have no woman's page and we have no children's page. We have told all the people who asked for that, along with the men who asked for a radio page or a home builder's page, and such things, fashions, and so on, that in those matters we don't feel that we should try to compete with the metropolitan dailies and with the magazines of general circulation, that we should be satisfied to do well our own job of telling employers what is going on in the company.

Is that the reasonable solution or would we profit by the installation of a woman's page?

MISS CARTER: Isn't the answer to that, Mr. Little, that the metropolitan dailies include a page for the women?

MR. LITTLE: We have felt that without going to a great deal of expense or without almost copying them, we couldn't compete with them, so to speak. We feel that our readers have ready access to as much of that information as they need and that our contribution to it would not be as high grade as we would want it to be.

Our general theory is that the employees' magazine deals primarily with the employee and his relations to the company, that is, his business life, and that it doesn't

need to go into his life outside company work to any great extent. We think that the girls who are in the company have their girl activities and we cover those from the news standpoint. They have their plans and their association and their part of the company work. They report their business just as the others do.

MISS CARTER: I think your problem is somewhat different from ours where we go out and reach the people in the small towns. I still think it would be a better magazine if you had just a little department devoted to your women.

H. W. FITCH (Delaware and Hudson Railroad Corp., Albany, N. Y.): May I offer a suggestion? We have with us here our guests who I believe should be much better able to answer these questions than any editor. Your readers should be able to tell you whether your stuff is going across, what they think their needs are, whether you are doing your work well. I should like to know if we can't hear from some of these ladies present.

MISS DELLONA M. LAARS (Seaman Body Corp., Milwaukee): That is a very good suggestion. In Milwaukee one of the big department stores publishes a magazine. The editor of the magazine puts in a fashion page, with suggestions that have come direct from Paris. She made up several cuts and had the stylist write up some articles on these little accessories to put them over to the Wisconsin group. She makes up the pages and we just borrow from her. Another group may be fortunate enough to have a story in there and the store is prevailed upon to go into it, too. It got so that we started panning each other's magazines. The fashions were the same in each of them. Then we decided to change certain parts.

MISS BARBARA M. ZENDEL (Alton Railroad, Chicago): I told Miss Carter that we get her *Illinois Central Magazine* in the office every month. While I read it through, the first thing I look for is Miss Carter's section. I always find something very interesting and of benefit. There is also something of interest in other parts of the publication.

MISS LAARS: I think Miss Carter appreciates that fact. Is there anyone else? How many of the editors run women's pages in their magazines? (Six) How many don't? (The balance) Why not?

LOUIS C. SEGERS (Columbia Gas & Electric Co., Cincinnati): I feel just like Mr. Liddle does about this matter, especially in the metropolitan areas. There you are competing with your daily newspapers and with your various magazines which can take care of those things so much better than we could in our own publications. We don't seem to have the space for it. We are limited to a number of pages and each issue is overcrowded.

May I ask Miss Carter if she has any direct way of telling the results obtained from a woman's page? Do you have more copies reaching the home because of that page in there? Do the employees get it at their offices or is it sent to their homes?

MISS CARTER: The employee gets it at the office and takes it home. As to the circulation before we had a woman's department in the magazine, my observation is that the magazine is taken home more by the employees now than it was before. Formerly it used to lie around the office but now you never see a copy there. After it has been read the employees always seem to take it home. I believe the women employees take it home, too, because of that woman's department.

MR. SEGERS: Do you really feel that the employee is a better workman and a better employee because he is jacked up at home by the boss of the family?

MISS CARTER: Undoubtedly.

MISS LAARS: In checking up on that, Mr. Segers, we ran a series of recipes. It happened that there were a lot of girls who had a basketball team. The girls from the office and from the factory were together. They had a banquet and several groups had dinners before. They used the recipes from the last issue of the magazine. At five or six dinners they all had to serve the same thing, so evidently it went over so far as the rest of the girls were concerned.

ERNEST AUGUSTUS (The Mead Corporation, Chillicothe, Ohio): I am just won-

dering if anyone else had the same experience I had. Out of our total number of employees, some 2500, there probably are not more than 50 women employees, and most of those are young ladies under 20 who haven't had much experience with home affairs and problems. I have tried several times to get some of the women in the organization to take the responsibility for getting out a woman's page and they don't want to do it. I don't feel competent to do it myself and I should like to ask Miss Carter what she would think of the advisability of getting the wives of some employees, who would be interested in that kind of work and who are competent to get out that page.

MISS CARTER: I think that would serve, but it would be much better if you could get the employees together and encourage them in some way to contribute to that page. If you take the responsibility for it, you should solicit contributions from the women employees.

MISS LAARS: Have someone responsible for that page and get some girl for that work.

CHAIRMAN KUNFERER: We will now have the report of the Judging Committee, and how and why.

PLANT PUBLICATION CONTEST AWARDS (The following list of awards was then read by Mr. Fish.)

Class I	
1. Louisville & Nashville Employees Magazine	92.0
2. Au Sable News	89.0
3. Mead Cooperation	88.0
Honorable Mention	
Southern Telephone News	87.3
Ohio Bell	87.0
Central Hudson Bulletin	87.0
Hail Columbia	86.0
Union Pacific Magazine	85.3
Class II	
1. Checkerlinks	85.3
2. Hercules Mixer	84.3
3. G. E. Works News (Schenectady)	84.0
Honorable Mention	
Warner American News	83
Midvale Safety Bulletin	82
Tenney Service	82
Kohler of Kohler News	82
G. E. Works News (Erie)	81
Tick Talk	81
The Voice	79
San Joaquin Power Magazine	78
House Dope	75
Crumbs	76
Bancroft Bulletin	75
Class III	
1. Pennsylvania News (Central Region)	85
2. The Highball	83
3. The High Line	82
Honorable Mention	
Snap Shots	82
The Standard Refiner	80
Armour Oval	76
The Circle	76
Delta	74

Why We Picked the Winners

By CARMAN T. FISH

Editor, National Safety News, National Safety Council, Chicago

Now that the winners have been announced and the awards made, I hope everybody is happy, but I am afraid that is too much to expect. We will never have a really perfect contest until we develop some system whereby everyone can gain some recognition.

The complaints of the smaller magazines which must necessarily operate on a limited budget and cover a limited field of interests has always been "what chance have we got against the more elaborate magazines?" The answer is "none at all." They have about as much chance of winning an award in one of these contests as you or I have of writing the great American novel, yet most of us are filling our own small niches in our respective organizations in a manner that is at least fairly satisfactory.

After serving as judge on several contests and helping to frame the rules, I am convinced that no set of rules can be drawn up which will be equitable in every case. I believe that our present basis of award is the most scientific yet developed. It forms a reasonably accurate basis for evaluating an employee magazine. The chief difficulty is in the classifications.

If we had 1000 magazines entered instead of 100, it would be possible to subdivide the classes still further, but that would be tough on the judges.

In every contest there are always several magazines which are just on the borderline between different classifications, particularly between Class 1 and Class 2. A magazine may belong in Class 1 by virtue of the number of pages but its quality might not justify our putting it in such fast company.

In a competition like this the editor of a magazine 6 x 9 inches or smaller is at a decided disadvantage in competing with those 8½ x 11 or 9 x 12. No matter how much money the editor has spent he cannot display his material as well as he can with the larger page size. There are, of course, a large number of extremely attractive magazines which use the smaller page size yet they would fare rather badly in competition with the larger magazines.

This difficulty cannot be solved by classifying the publications according to the editor's budget. Some editors are getting a great deal more for their money than others. Some have a great deal more time to spend in getting out the magazine. We must also remember that the functions of a magazine for a plant with 500 employees are not the same as those of a magazine published for 15,000 or 20,000. There is another thing we must face—editors may be born free but they are not equal.

The small four-page leaflet devoted to shop news or to safety propaganda is hopelessly handicapped at the start. Such a publication may fill a real need in an organization but it is not a complete and well rounded publication. There is another difficulty in the way of such a magazine achieving outstanding merit. The editor is frequently an editor in spite of himself, having had the job wished on to him and devoting to it as much time as he can spare from his bread and butter job.

It is true that we like to hand out as many honors as possible but we have certain standards that cannot be relaxed if the contest is to mean anything. It is quite an agreeable feeling to get a certificate to show the boss and hang up in the editorial sanctum but I do not feel that this is the most important part of the contest. The real value lies in the incentive for each editor to study his publication and try to find ways of improving it.

I must confess that I had a rather helpless feeling at times while I was grading the publications and I realized that the grades the judges assigned were not necessarily an accurate estimate of the publication's worth to the company and its employees. I do not know how the other two judges, Mr. Patterson and Mr. Frazier,

looked at the matter but I tried to put myself in the position of an employee of the company. Personally, I am more concerned at what John Smith, safety engineer for the Blurp Manufacturing Co., thinks of the NATIONAL SAFETY NEWS than what George Horace Lorimer thinks of it. Of course, we all appreciate praise from fellow editors who are supposed to be good judges of editorial merit, but our success or failure in the long run will depend upon what our own fellow readers think of the magazine. The late Edward Bok once remarked that he had never edited the *Ladies' Home Journal* to suit himself. If he had, he admitted, it would have had a much smaller circulation.

Now let us consider the magazines which walked off with the awards.

Leading the field in Class 1 was the *Louisville & Nashville Employee Magazine* three points ahead of its nearest competitor. I know that you will all agree with me that the award was deserved. The Louisville & Nashville Magazine has been consistently good for several years and it seems to have been improving. There are two outstanding things about this magazine—one of them is Mr. Owen's ability to get the money out of the management in these days when the railroads are so hard up, and the other is the number of good contributors he has dug up in his organization.

Since Brother Owen is chairman of the Program Committee for the coming year and I would suggest that he put himself down on the program to tell us all how he developed a staff of feature writers.

The editor of a railroad magazine has certain advantages over the editor of a magazine published by an organization whose activities are combined largely to within the factory walls. To those who are not working for the railroad, there is a great deal of romance connected with the iron horse, and I have always had the feeling that railroad employees felt the fascination of their occupation.

The L & N Magazine ranks high in the matter of reader interest, and an outsider will enjoy almost as much as an employee.

The pages look interesting and inviting. Considerable ingenuity has been displayed in presenting the heads and illustrations. Perhaps I am prejudiced in its favor because I like the Kabel type used for the heads. It happens to be the same type we use in the *National Safety News*. The editor has avoided any stereotyped form of page layout which adds interest and variety to the pages. In this connection I have one criticism to make. Some of the paragraphs are too long for easy reading and some of the pages are a trifle crowded.

There is plenty of educational material in this magazine, including safety, as might be expected in a railroad publication. Some good material is issued each month by the Safety Section of the American Railway Association, but the magazine does not depend on canned material alone to tell the safety story.

The Louisville & Nashville Magazine is not a cheap publication nor is it over elaborate. I do not know what the publication budget is but I would say that the railroad is getting excellent value for the money spent.

Second in Class 1 is the *An Sable News*. Last year this magazine received honorable mention. One of the advantages of having a change of judges each year is that there is less chance of the same winners repeating. However, it seems that in this instance the judges were unanimous in recognizing merit, since their scores for the three winners of Class 1 were very close together. Farther down the line there was a wide discrepancy.

An Sable News is a less elaborate and more conventional publication than the winner of first prize, which shows that it is not always necessary to make a big noise to gain recognition. This magazine is quite conservative in its make-up. Its pages are well balanced and inviting to the eye, and it has a good variety of interesting articles which would appeal to an employee of a public utility company. Plenty of material has been devoted to educational topics, including accident prevention.

Next in line comes *Mead Cooperation*, whose editor is one of the veterans of our Section. Once more the judges were unanimous in awarding a high rating. *Mead Cooperation* ranks high on all points in the schedule.

There were five magazines grouped within two points of each other in the Honorable Mention class—*Southern Telephone News*, *The Ohio Bell*, *Central Hudson Bulletin*, *Hail Columbia*, and *Union Pacific Magazine*. All five are outstanding, and there were half a dozen more that it hurt us to pass up. Following very closely behind the winners were *West Penn Life*, *Wisconsin Telephone News*, *The Express Messenger*, *Grady Bell's Sohioan*, and *Uncle Pat Ward's Pure Oil News*, and the *Norfolk and Western Magazine*. All of these had a grade of 82 or better.

Another magazine of unusual excellence is *Byllesby Management* which suffered in this contest because it apparently is edited more for the executive than for the man on the job.

Next we come to the great middle class—Class 2. Leading this group is *Checkertinks* with a grade of 85.3. This magazine used to belong in Class 1 but on account of hard times the pages shrank until it came within the limitations of Class 2. The covers are particularly striking and the contents have been reduced in quantity rather than in quality. The editor has divided the 24 pages in such a way as to give a good balance of employee interest without omitting the educational features.

The *Hercules Miter*, which ranks second, is another publication which finds itself in Class 2 owing to a reducing diet. This magazine is strongly institutional in character and it confines its contents largely to explosives and safety. That is quite appropriate since the workers make a living manufacturing T N T and they won't last very long at the job unless they observe the principles of safety.

Third on the list comes our old friend Eugene Taylor Wilkins with *General Electric Work News*, Schenectady edition. In producing employee magazines the General Electric Company has applied mass production methods. This has made it possible to produce an interesting magazine for each plant at a cost which would make the rest of us envious.

I do not know of any organization which would offer more interesting material for the editor to work on than the G. E. The company's laboratories are constantly turning out products to make our daily life more pleasant and comfortable and there is a fascination about scientific development very much like that which surrounds railroading. That doesn't detract a bit from the credit due to Comrade Wilkins who presents the story of doings at Schenectady Works in such an interesting fashion.

Among the honorable mentions is another General Electric Publication, the Erie edition of *G. E. Works News*. This magazine received a grade of 81, although I find it hard to explain the 3 points difference between the two editions. At any rate, that's the way it looked to me when I was grading them.

Space does not permit a detailed discussion of the honorable mentions in this class. *Warner American News* has quite a distinctive typography and a good variety of contents. *Midvale Safety Bulletin* is a midjet among publications devoted largely to safety but finding space for other items of employee interest. Its dress is distinctive and it uses a large number of artistic photographs of steel mill scenes. *Tenney Service*, one of the prize winners last year, is a rather conservative magazine with a good balance of editorial contents. *San Joaquin Power Magazine*, winner of first place in last year's contest, might be placed in the same classification. *Kohler of Kohler News* is a newcomer in our contests. It is not devoted entirely to employee interests but it is a good example of what can be done with a dual purpose magazine. Being edited and produced in the beautiful village of Kohler, Wis., by an institution which has helped to glorify the American bathroom, we expect it to be attractive in appearance, and we are not disappointed.

The Voice has been entered in several contests, and perseverance has at last been rewarded.

Now for Class 3. *Pennsylvania News*, Central Region, leads off with a grade of 85.

It is an excellent example of the slogan "It's smart to be thrifty." It is printed on newsprint paper but the pages are made up attractively in newspaper style and contains quite a wide variety of interesting information.

This year one of the judges was from the Western Electric Company, so he gracefully waived the privilege of entering any of the Western Electric publications, although we offered to let someone else sit in judgment on them. However, he preferred to avoid the appearance of evil. At any rate, the absence of *The Distributor* and *The Observer* gave someone else a chance. And the one who profits by the chance was our chairman for the coming year, Mr. Edward R. Egger of the Chicago Rapid Transit Company who won second and third place with *The Highball* and *The High Line* respectively. The first mentioned publication received 83 points and the latter 82.6. Actually, I do not think there is 2/5ths of one per cent difference in the two publications but the judges felt that they couldn't give two second prizes to one company and decided the difference on some minor point. Both of these publications are printed on a high grade of paper and are made up expertly in the newspaper style. The same might be said in a lesser degree of the five honorable mentions—*Snap Shots*, *Standard Refiner*, *Armour Oval*, *The Circle*, and *Delta*.

Lastly, we have Class 4 with only four entries. The winner of this class was *Wat-News*, published by the J. R. Watkins Company, Winona, Minn. All four publications in this class were made up with considerable ingenuity with hand lettering and sketches cut in the stencils. With such limited competition, the judges felt that it was straining a point to award each one certificates, and we doubt whether this classification should be continued.

The judges have felt that the basis of award used this year is the best yet devised. Segregating the publications into the various classes is a more difficult matter and arbitrary standards will not fit all cases. Comments and criticisms of this year's contest will be welcome by the officers of the section and the News-Letter will provide the medium for the carrying of opinions.

CHAIRMAN KUPFERER: I am sure we are grateful to Mr. Fish because he engineered this job of judging the magazines. I am sure it was some job.

EUGENE T. WILKINS (General Electric Co., Schenectady, N. Y.): I want to suggest that we give Mr. Fish and the other two judges a rising vote of thanks for their efforts.

(A rising vote of thanks was extended to Mr. Fish and the Judging Committee.)

CHAIRMAN KUPFERER: Some of us felt somewhat discouraged by the handicaps placed upon us in this contest. The suggestion has come at various times that we classify publications according to their cost, according to their per-copy cost, which is rather a complicated thing because, obviously, the magazine with a large circulation would get out something more elaborate with a much lower per-copy cost than is the case with a very small circulation magazine. Nevertheless, I don't think there is any record in the minutes that the contest rules as outlined this year are iron-bound, and while I do feel that considerable thought was given to them this year and that we should not hastily make any radical changes, we should consider them as set up and work toward that particular basis until we see something that is better.

One disadvantage in constantly changing any rating plan is the fact that you have a changed basis of comparison. I don't think, so far as I have been able to observe, that we are going to get a rating plan that is going to please everybody and fit everybody's publication, because after all, we have a problem that is peculiar to each of us.

That is not an alibi for my not winning a prize but it is simply a statement of what I think is the fact.

We have on our program this afternoon as the last feature the introduction of the incoming officers. I was a little disappointed that some left before we had the election of officers, feeling that probably it was a steam-roller affair and didn't make any difference anyway. I want to have the officers who are here and who were elected for

the coming year stand at this time so that we can all see them again. Perhaps some of us were not here when they were introduced before.

Will all of our officers please stand up? Now let me introduce them.

MR. EDWARD R. EGGER, Chairman.

MR. H. W. FITCH, Vice Chairman for the East.

MR. RALPH W. LIDDLE, Vice Chairman for the West.

Our new Secretary, Miss Cade. I think she says she has been secretary for ten years.

MR. WILKINS: Just at this time I should like to make a suggestion. I have been talking the situation over as to what is done in other Sections. I think that it is something that the Employees' Publication Section should follow. We have a number of chairmen who have practically dropped out of the life of the organization. It seems to me we should try to keep them in our organization to give us the benefit of their experience. It seems proper, from what I understand, that instead of having three members on our Executive Committee, we should automatically add to the Executive Committee the Chairman who has served each year.

I think it would be right and proper that we add to our Executive Committee membership these various past Chairmen, putting their names down according to the year they have served. I make this as a motion.

(The motion was regularly seconded.)

CHAIRMAN KUPFERER: You have heard the motion as stated. The motion is that all past chairmen of this Section be made permanent members of the Executive Committee, which means that the Executive Committee will be enlarged by one member each year.

RALPH W. LIDDLE (Commonwealth Edison Co., Chicago): I should like to make an amendment. The Employees' Publication Section will go on for many years. Every committee that I have been on seemed to lose its per capita efficiency as it was increased in size. I would not speak against the motion but I wonder if it wouldn't be expedient to limit the number of previous past chairmen who were on the Executive Committee so that we can retain the thing that Mr. Wilkins recommends and still have an Executive Committee of fixed membership. In that way each time a past chairman is added to the committee someone, a number of years back, will leave it.

MR. WILKINS: May I add that I think some of the former chairmen have dropped out of existence. I would possibly limit them to say five years. That will include our present membership because I think their services are undoubtedly valuable to the organization.

CHAIRMAN KUPFERER: The suggestion as it is now is that each retiring chairman be elected to membership on the Executive Committee for five years. Is that right?

MR. WILKINS: This has been worked out from the Medical Section. They do likewise. Even in our Council organization, the chairman automatically becomes a member of the Executive Committee.

LOUIS C. SEGERS (Columbia Gas & Electric Co., Cincinnati, Ohio): I move that we amend the motion and put the names of the past five Chairmen on the Executive Committee.

(The motion was regularly seconded and carried.)

CHARLES A. WARD (Pure Oil Co., Chicago): I don't know whether at this morning's meeting any motion was passed extending a cordial vote of thanks to the Chicago editors. If not, I should like to make such a motion.

MR. WILKINS: I second the motion.

MR. WARD: I have been attending these meetings for about ten years, and while I have attended a much larger meeting than this I have never attended a nicer one. We owe a great deal to the Chicago editors who are, I think, the liveliest bunch of the kind in the country, at least in point of size and enthusiasm. We owe them much for the fine entertainment they have given us while we are here in Chicago. It is almost an

imposition to ask them to do it because we come here so often, but they seem to always be willing to do it, and they do it in a friendly, cordial spirit.

(The motion was put to a vote and was carried.)

EDWARD R. EGGER (Chicago Rapid Transit Co.): May I ask for the floor for a second? Before we finish with these final moves, I want to take this opportunity to express the appreciation of all of us for the fine work that our retiring administration has accomplished. After all is said and done, we couldn't entertain you folks in Chicago if you didn't come here, and your being here indicates your continued interest in our organization.

To save the retiring chairman the embarrassment of putting this question, I should like to hear somebody make a motion expressing the appreciation of our Section for the fine work of the retiring chairman and his staff.

LOUIS C. SEGERS (Columbia Gas & Electric Co., Cincinnati, Ohio): Let's give him a rising vote of thanks.

(A rising vote of thanks was extended to Chairman Kupferer and his administration.)

CHAIRMAN KUPFERER: I want to tell you fellows and girls and I don't know when I have enjoyed a year so much as I have this last year of working with you. With the letters that I have received, the personal visits I have had with many of you, our meetings, it has been a year of real enrichment in my life. I personally am selfishly glad to see the motion which went through a short time ago, which had no inception on my part, because the idea was simply Gene's. It will give me a great deal of pleasure to know that I am at least to be associated in name with the Section officially for a few years.

So far as taking any credit for the work of the Section is concerned, the most work I have done has been in the last day or two. I like to play hooky. I haven't been able to do that very much. My time has been rather filled up. It is hard for me to be tied down. So far as the work during the year is concerned, all I did was send you a hello letter each month. The News-Letter Committee took the work on that. The Program Committee got up the program. There was very little effort on my part, and the Regional Committees functioned perfectly. I did this year just what I said I was going to do at the Pittsburgh meeting. When I wanted somebody to do anything, I was simply going to address a letter to So-and-so, with a carbon copy to So-and-so. That is exactly what I did. They all responded like real soldiers and deserve a great majority of the credit.

So far as recognition is concerned, I was very happily surprised not long ago at something I didn't know was coming. I received a nice little certificate from the National Safety Council, all framed up and everything, stating that I had served as chairman and had served the cause of safety for a year. It was very delightful.

Now we have the Question Box. I am turning it over to Gene Wilkins.

The Question Box

CHAIRMAN WILKINS: Has everyone a slip showing the subjects for discussion? But don't be limited by the slip. This is one of the most important parts of our program because everybody has some problem.

ERNEST AUGUSTUS (The Mead Corporation, Chillicothe, Ohio): I should like to hear someone else discuss No. 15: "Explaining the firm's business to the workers."

I ask for that because I had a lot of cold water thrown on the idea sometime ago. I had intended writing a series of articles showing where our products go, where they are used, how they are used, and so on. It was a sort of a series of romance stories describing the romance of our paper. I had gone into it to the extent of getting a number of cuts and a lot of data. In fact, I even had the first story in the series written and was told not to go ahead. It was all right if only our employees were going to read it, but when we started putting out that information to the outsiders, to our competitors and so forth, it wouldn't be good for us. My series of articles ended. I should like to get someone else's reaction on that.

H. E. BOYAR (Ohio Bell Telephone Co., Cleveland, Ohio): Our experience has been with that problem but it is not the same experience. While we consider that our magazine is primarily for our employees, we have also felt that the things that are published in that magazine are not to be hushed up. I may say that it is not published for our customers, but our customers may read it if they wish. They are welcome to anything they may find in there. We have not held anything out of the magazine because of the effect it would have on our customers. It may be because something of that nature has never arisen.

It is rather hard to express just what I mean. In editing the magazine, we have borne in mind that it will be read and we are perfectly willing that it shall be read by any customer of our company. On our own operating practices, methods of operation, any angle of that which has been stated in the magazine, there has never been any question that there would be anything that would react unfavorably on our customers; that is, to have an adverse effect on public opinion, our public relations, which we strive for at all times.

So far as any matter of company policies or practices are concerned, I don't see how anything that could be said about those would have that adverse effect. So far as the service goes, where you are putting out a product, like this paper company here, I can see where that would be disadvantageous. It would perhaps be putting information into the hands of a competitor that he could use to his advantage.

So far as the public utility goes and its public relations, it seems to me that is a horse of another color.

LOUIS C. SEGERS (Columbia Gas & Electric Co., Cincinnati): This problem is one of the big things that confronts us now. It is going to get more and more into our publications than we have had it heretofore. Of course, this is peculiar to the public service companies. We are serving the public, and if we can sell our business, our firm, our organization, to our employees, we believe that they in turn will serve the public better. They will have a better idea and a better understanding of what the company is trying to do. So far as giving out any secrets is concerned, I don't think there are any secrets that the employees and the competitors should not know. In fact, we want to make the employees better employees by explaining the intricacies of our business and its many ramifications so that they won't be totally ignorant of what they are doing. An employee when he comes in contact with the public is the representative of the company. In fact, he is the company, and he can do more good by answering questions and explaining to the public and our customers his business and his company, and the more he knows about his company the better he is going to be able to explain it to the customer.

CHAIRMAN WILKINS: I think that point is very well taken. The General Electric Company, I believe, is trying to do that very same thing. We try to enlist our workers. We interpret the magazine so that the employees may be acquainted with the facts of the case, as to earnings, for instance. We even give graphs showing how our earnings are going along. We try in every way to give our employees every opportunity to know as much as they can about the business, because we feel they have that right. I believe it is a step in the right direction.

In the editing of the employees' magazine and the advancement of human relations, the closer we get the employee to the employer the better off we will be. That is the link that we build up through our magazines. That link is going to become tighter the more we are willing to give out that information and stop the men from being skeptical of our organization. They think we are hiding something from them, something that we are afraid to give them.

I think Mr. Augustus had the idea of explaining processes and certain factory comparisons and things like that.

MR. AUGUSTUS: It is where our products go. In our plants we make a great deal of paper for five nationally known publications that go all over the world. A lot of our employees don't know that. They read those magazines but they don't know that

we make the paper for them. A lot of them do but some do not. My idea was that if they could pick up these magazines and read them, knowing that we and they had had a hand in the making of that paper, they would take a certain pride in that fact. That was the purpose. The objection came up right away. The first article happened to be on one of the smaller publications. The management said, "If you print that story the Crowell Publishing Company will come down on us very strongly and ask how we picked this other paper first." Or they said, "The Lakeside Press is going to say something," and so forth and so on.

CHAIRMAN WILKINS: It is surprising how much your competitors know about something when you think they don't know anything. Let's go on to some other subject.

REGINALD S. LEISTER (Kellogg Co., Battle Creek, Mich.): Question No. 5. The Kellogg News will be celebrating its first anniversary in a few months. We are, of course, now going through that period where we are profiting by the experience of other publications. I wonder if any of the editors of these publications could give us any information about methods they have used in distributing their papers. At the present time we are mailing all of the copies of the Kellogg News to our entire mailing list. That includes the people in the Battle Creek plant as well as the plants in London, Ontario, and Sydney, Australia. Of course, it involves quite a bit of expense to mail it to that number but we felt when we first decided to publish a magazine that if it was worth publishing at all it was worth mailing to the individual at his home.

The question of expense involves the possibility that we might change to a plan of handing it out to the employees at the plant or through their foremen. I wonder if any of the editors here have had any experience where they have changed from one type of distribution to the other and what the effect has been.

MR. SEGERS: We have had a similar experience. In the distribution of the last issue, instead of distributing the publication to the different department heads and letting them distribute it to the employees in their sections, we placed the magazines in several district locations. The employees were asked to come and get them, to get them as they passed out or as they came in. We put them out liberally in other places. As a result, we found that about 75 per cent of the employees took the magazines.

GEORGE N. KAUFMAN (Columbus Railway, Power & Light Co., Columbus, Ohio): We found in our first issues that mailing them to the homes was a little more expensive than the budget would allow. We tried a method which wasn't new or novel. We thought we would send them to the department heads and let them decide as to just how the magazines were going to reach the employees. When we were sending the magazines out by mail we had a surplus of about 120. After we began sending them to department heads and foremen we found we hadn't nearly enough and we had to order more magazines, which brought us to the conclusion that they liked to get the magazine and they were anxious to read it.

CHAIRMAN WILKINS: We might have a showing of hands here just for information on that. How many mail the employees' magazine to the employees? (Two) Apparently all the rest hand them out. We distribute 21,000 copies each month to our employees by sending them through to the various department heads. We check up on that to see that they are handed out.

MR. LEISTER: I might add a word here because the gentleman in front of me was telling our friend that he would never get this problem of distribution settled. As different methods have been spoken of I have thought of our own, which is a combination of all of them. You may say it is an individual problem. We try to hand our papers to our employees and get them into the hands of our readers as best we can. To do that we use U. S. mail, company mail, distribution by boys around the building, bulk distribution to the outlying parts of the city, and in some cases redistribution by company

mail in the departments themselves. It is just a system that has grown up with us in the effort to do the thing in the best way.

CHAIRMAN WILKINS: That is fine. Is there anybody else on that? What is the next question? If we all get into this discussion we are all going to get something out of it. Don't be afraid to get up three or four times. We are here to help you if you want help.

MR. KAUFMAN: I should like to ask a question that is not down here. It refers to the women's pages in reaching the home. The lady who talked on the woman's page in the home section was from a railroad. Her problem is altogether different from ours. Our organization is a utility. I just thought possibly I could get a rise out of some of these fellows here from utilities, whether it is a holding company or not, to see how they handle the home section.

H. W. FITCH (D. & H. Railroad, Albany, N. Y.): I want to take exception to the general statement that is being made here that our problems are different. Regardless of whether it is a railroad or utility or a factory contained within four walls, our fundamental problem is the same.

We are supposed to be interesting and instructive to our readers. I don't think that we pay quite enough attention to our fundamental purpose sometimes. We get too far away from it in consideration of the details of how we are going to achieve the result.

For example, when the paper on the woman's page was being discussed and methods of attracting interest were spoken of, I was reminded of an incident that happened in our publication. We injected a one-page article on the home use of concrete. That is going a long way from railroading. That has very little to do with and it isn't connected very closely with the idea of the public relations of the public utility. But that thing had more of a comeback than you can imagine. More people told me that they had clipped it and filed it away than one would think, which shows that it did a lot to get the magazine into the home.

I think that we should give a little more consideration to such items of general home interest and not stick to a straight line on a great or smaller thing.

MR. KAUFMAN: Maybe I had better correct that impression. I don't want Mr. Fitch to misunderstand me. I don't mean that our problem in trying to make our magazine interesting is any different from that of a railroad organization. What I meant was that in a utility our product naturally goes into the home; it is used in the home, whether it is gas or electricity. Then too we sell appliances. We try to correlate in our own case electric appliances and the use of them in conjunction with our home section. For instance, the editor of one of our women's pages talks about cooking. She deals with it in degrees and fairly technical language. If you had no electric stove you wouldn't understand what she was talking about. If you have only a gas stove you are likely not to get all of what she is saying. In that way we have sold a number of stoves to our own employees.

In the same way she deals with refrigeration, or about the electric sewing machine as against the automatic or whatever it is. It is in that light that our problems are somewhat different from those of the railroads.

CHAIRMAN WILKINS: If we are going to encourage the men to carry the magazine home (if we do not mail it) we ought to have in it something of interest for the wife, or something that the little boy or girl at home can look over. This is a round table discussion and we can talk personalities without any idea of having to explain. We devote one page in here to the children and one to the women. I have met several of the wives at our foremen's banquet and they have told me that they look to the woman's page for the recipes and various information regarding electrical appliances. As for the children, I think it is a plan that is far-reaching. The boys and girls that you are directing, or having a little fun with by putting in puzzles, pictures of their pets, little poems that they write and contribute, may some day (who can tell) be your future employees. Who can tell that they are not going to take your job? What you remember as a little boy or girl grows up with you. If he has impressed on his

mind your individual concern, he is going to make a better employee when he grows up. That is loyalty to the organization. That is what I think is back of every employees' magazine that conducts a junior page. It is mighty interesting to receive the letters coming from these youngsters. We get from 75 to 100 letters from every issue, addressed to Aunt Polly, concerning the problems and puzzles that we put in there.

Those children look for the *IForks News* every time it is issued, and if Dad doesn't bring it home he has to give a good reason for it. It is the same with his wife.

I think if we can encourage the wife to look over the employees' magazine, to know the concern that her husband is working for, we are going to make more loyal employees. That is the way I look at it.

MR. AUGUSTUS: If we are putting out an employees' magazine and putting it out properly, as we should, the primary purpose of the employees' magazine is to get the interest of the employee and his family. Now, then, if your magazine is sufficiently interesting, with the things in there that you want them to read, why do you have to sugar-coat it with a woman's page? We mail our magazine out. I have had numerous employees come in and tell me, a day after the magazine comes out, "Hell, I haven't had a chance to read it. The wife and kids got it and I can't get hold of it."

We don't have any woman's page. My contention is that if your magazine has the right type of material in it, it will appeal to the women and the other members of the family without having a woman's page. I don't think you need it. Your children's page may be a little bit different. You may fill it with puzzles and that sort of thing, for they are not interested in reading the other things in the magazine. By getting them interested in those puzzles, later on when they grow a little older, they will have an incentive to read your magazine. I believe, so far as the women or the older members of the family are concerned, that if you have the right type of material in it they are going to read it, without addresses on how to make pie and homebrew and so forth. If they don't read the other articles they are not going to read the woman's page.

I think the comment was made here a while ago that you have all the news-stand magazines to compete with, you have the columns of the local papers, you have a number of department stores and merchants putting out little house organs, with lots of suggestions on decorating, style, and so forth. What is the use of going out and trying to compete with those people? Put something else in that interests those whom you want to reach. Let them get their health hints and advice on how to take care of the baby from other sources.

CHAIRMAN WILKINS: It is a matter of opinion. Our magazine is being read. I wouldn't call it sugar-coated. I think there is no sugar-coating in our woman's page. It is put in there to make a well-rounded proposition to present to them. We cater to men usually. We talk about big machinery. There is very little in that machinery to interest the women, so therefore we feel that she would be interested in the use of electrical appliances. The local newspaper doesn't publish that information like we do. The other information she can get in other ways.

MR. KAUFMAN: Let's try No. 12, "Working the joke—how far should it go?"

MISS DELONA M. LAABS (Seaman Body Corp., Milwaukee): If you want to pull it on yourself, it is all right. Otherwise, it doesn't go.

CHAIRMAN WILKINS: I think that is really the basis of it. We can't allow offense or jeopardize the personal interest of somebody else. If it is a shop joke, it should be considered as a shop joke and should not be published.

MR. KAUFMAN: This speaker we had at noon suggested that we use jokes. I wonder if somebody agrees with him.

CHAIRMAN WILKINS: We can't advocate a thing of that kind that anybody has to use. We can make suggestions.

H. E. BONAR (Ohio Bell Telephone Co., Cleveland, Ohio): Right along that line, we use a joke page. We think it is worth while. We believe that any device that will

get an employee to read any page in our magazine is fair and square. If we have an employee whose reading tastes are such that he reads nothing but the joke page, we can bring him to the Bell consciousness, and we believe, to some degree anyhow, we have accomplished our purpose with that employee.

There is one thing on the employees' magazine that I have always contested. It is this: You do not have a selected group of readers; that is, no appeal to a selected group or class of readers. Take any national publication. The *Saturday Evening Post* has a cosmopolitan reader circulation. The articles and stories are prepared for a certain reader group, to appeal to a certain reader interest. To fill the requirements of reader interest, the average household will take several different publications of different classes.

The best of those publications has a very small percentage of reader interest compared with the reading population. Take an employees' publication for a group of employees. They have a common interest in their employment, but the reading tastes throughout that group, from your supervisors or executives down to your track men and what not, vary just as much as the readers of the *Saturday Evening Post* and *Romances* or what not. You can't hope in any large degree whatever to get a magazine that will be read from cover to cover by all employees. Therefore, we say if we can put something in each issue that this group or that group of people or employees will be interested in, we have accomplished our purpose.

CHAIRMAN WILKINS: Another good idea that I have been trying is this: Run one new experiment each year in your magazine. See how it works out. I think if you don't change, if you are going along in the same rut, making the same statements that you made five years ago, you ought to quit. I believe that you should make a difference in the make-up of your magazine. You should be adding something to it. Otherwise you are just getting into a rut and going stale. I think you want to freshen up your magazine by changing your type, by putting in new features. Put in a page of jokes, if you want to. Try them out and see how they go. Put in one page and try it out. If it doesn't go, drop it. There is no disgrace in trying a junior page. Try to get shop equipment ideas. Get your employees or shop foremen to thinking on how they do their work. Get them to write short articles on it. Try the Employees' Opportunity stunt. I think our magazine carries more classified advertising than any magazine in the United States—free. We have four or five pages of classified advertising in the back here, free to employees. It has been a big help to employees who want to get rid of their second-hand things.

MR. EGGER: You exercise a censorship on that to be sure you are not carrying outside lines through your publication, don't you?

CHAIRMAN WILKINS: Yes. That is a valuable help. The employee feels that his management is carrying his advertising for nothing. Otherwise it would cost him 30 cents a line in the paper. We don't try to compete with the papers uptown. People even try to get their advertisements into our paper through our employees. We make them put their names and their connections and building and full information on the application. Then we go through the telephone directory to see if the number corresponds with the name. We accept advertisements only from our own employees.

MR. AUGUSTUS: How about some discussion on No. 4? "How to obtain the cooperation of the management and factory officials in getting articles dealing with company policies."

MR. EGGER: Mr. Chairman, I should like to add something to that question. Is it advisable or is it beneficial to your publication to get an article from the management as it is from some employee based on his own experience? For instance, in this issue of our Rapid Transit publication I had a voluntary contribution from an employee on how employees can help get business stuck back on page three. There was an item on a half-million dollar industrial project located on our line ahead of it.

The vice president on looking over the page proofs said, "Move that article from this employee up to Page 1."

I find in our organization that they don't want the management played up. They would rather have something from the employee. I was told by the general manager once, "I wish you hadn't put my picture on the front page. Move me back further. Put the employees up there."

MR. AUGUSTUS: I don't think there is any question but that the quality of an article from the average employee is in most cases probably greater than that from some executive. There are times, there are conditions, and there are certain subjects which should be discussed in your magazine which are better discussed and presented by some member of your management than anyone else. Our management agrees with that, but the problem is to get them to write. They want us to do the ghost writing for them and they don't want to be responsible for it. "Go ahead and write something. Put my name on it," they say. It is a darned hard job to be the ghost writer for about half a dozen people with different personalities, with different styles of writing. You have to be half a dozen different people. I have tried it. I have had fellows come in and say, "We know you wrote this. We can tell from the style." How are you going to get these fellows sold on the idea that you have to write it yourself? I have a vice president who insists on having a page every month. He wants that page in there, but he doesn't worry about writing it. I dash down about two days before the dead-line date. "Have you got your copy?"

"Oh, hell, don't bother me with that."

Still he wants it in there. How are you going to get these fellows sold on the idea that they must do it?

MR. SEGARS: I have a particular instance which I believe may throw some light on this subject. Just recently the president of one of our companies addressed the employees in that district on a subject of vital interest to all. The title of his talk was "Our Company."

It was an excellent talk and it was taken down by one of the stenographers there that evening. I finally got it and whipped it into shape, not changing much of it, but making it into a nice flowing article rather than just an extemporaneous talk. After I did that I submitted it to him for his approval. It will be published practically as I made it, but, however, it will be under his name. He will be given full credit for the article. That is the way we handle it. This particular article is applicable to our entire list of 12,000 or 14,000 employees. About 500 heard that talk and there were about 13,500 who didn't hear it. We want to get that message to them because it is a worthwhile message. We believe that it is absolutely essential to get articles from your executives because they speak with authority, and when an article from them is in your publication many employees are a little bit more ready to read it.

MR. FITCH: I might say in that connection that it has been our practice to get speeches of a more or less technical nature, dealing with the problems of the different phases of railroad operation, which are delivered before various meetings and, when properly edited, insert them in the bulletin. These are so comparatively few, coming as they do once every five or six issues, that it does not give the effect of being official propaganda or anything of that sort. I feel certain that the employees read them with a good deal of interest, knowing that the writers are authorities on the subjects which are treated.

ROBERT E. DAY (Kellogg Company, Battle Creek, Mich.): I am very much interested in a recommendation that Dean Harrington made this noon. It was about giving our stuff the news slant. In the case of this president's address, it occurred to me while the gentleman was talking that it might be handled from the standpoint of news. You could say the president gave such and such an address at such and such a place with so many people present. The people reading that would be interested in that particular event as something in the company's activity. Then you could elaborate on it by quoting the president, handling it like our daily newspapers handle such things. I think that would probably lead to a great deal more interest on the part of the readers than reading a statement which is enclosed in quotes and bearing the signature of the president.

They are naturally interested in human events and incidents in their own organization. We have tried that in the Kellogg News and in many cases it worked out very successfully. We have been able to put across a thing which I am sure would have been rather dry reading had we just used the statement with the signature. The thing is to relate the statement to an event which transpired. For instance, we are preparing right now an article regarding some new equipment we have in the plant. It has a safety feature which we play up as part of this new installation. The story of its installation is news, but the safety feature of it will be included in the article.

Suppose that your welfare association extends help to someone whose home is burned down. Play up the burning of the home as news. People will read it quickly. Let them get the company's policy in regard to those matters incidentally as part of the news story, rather than some cold, formal report from the welfare association.

Mr. SEGERS: We play that article as a news item. In fact, we play it up as a major article. We probably would head it that vice president So-and-so, addressed the first meeting of the employees' educational association. So many were in attendance. This was the first seasonal educational meeting. The other meetings will be held later, and so on. Then it would be followed up with that address.

I would start out with the local lead.

Mr. BONAR: Would you give that over the president's name? Would you use a by-line on that?

Mr. SEGERS: No, it goes in as a regular news article, and then we quote below.

Mr. KAUFMAN: I think it might be of interest to tell of an experience that we had. Our company has been in business since about 1847. It was the first time in the history of our company that the president talked to all the employees. Naturally, that was an important event for us. The employees didn't realize it as such. They didn't care much whether he talked or not. That was one reason we figured on using this in building up an esprit de corps which was fast lagging. This is the way we covered that story. We offered it first as a news item. In a couple of pages we included a few high lights of the talk, of course, in quotes, and then in another section of the magazine we gave his speech in full. We headed it in a box: "Following is the text of President Myers' talk to the employees at his first meeting."

In that way we played it up both from the news angle and the other side and we still were able to give them the word-for-word text of the president's talk. It wasn't all an exact word-for-word text. It was edited some, but we got him to O. K. and it was all right.

Mr. AUGUSTUS: I got hold of a copy of a book that might be helpful and interesting to some of these other editors. It is "The Magazine Article," by Crawford, published by McGraw-Hill. It gives some excellent information on writing up articles. One of the heads concerns writing your own paragraphs, and some of the conclusions are very good.

(Mr. EGGER took the chair).

CHAIRMAN EGGER: We are primarily interested now in the sectional meetings which will be held early next spring. I hope that we can fix some cities that won't be too far away for all of you. I think Chicago has been getting an edge here on the meetings recently. It behooves us to take away from Chicago the regional meeting of this Western Section next spring. We will announce that as soon as possible in the News Letter. I hope you will all point to those regional meetings and then at the next national convention we will have you all back again wherever we go. I am sure that our new Program Chairman will have a job on his hands to do as good as Mr. Wilkins has done this year. I hope that he will prove equal to the occasion. I look forward to seeing you all at either of the regional meetings. I look forward to seeing all of you at the Western regional meeting and at the next annual meeting. Good-bye and good luck.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Food Section

Officers 1930-31

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Vice-Chairman Membership—HENRY J. MINER, The Borden Company, New York City.

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Chairman Committee on Slides and Safety Kinks—J. T. JOHNSON, The Quaker Oats Co., St. Joseph, Mo.

Executive Committee—THE OFFICERS AND
ERNEST D. FOWLER, Americus Hotel, Allentown, Pa.
ALBERT W. PELL, Lamont Corliss & Company, New York City.
R. W. URSHAW, Anheuser-Busch, Inc., St. Louis, Mo.

Tuesday Morning Session October 13, 1931

WILL COOPER, Chairman
The Stevens Hotel, Chicago, Ill.

The first session of the Food Section convened with General Chairman Will Cooper, Executive Offices, Stevens Hotel, Chicago, presiding.

Resumé of Year's Activities

By WILL COOPER
General Chairman

This is the twentieth annual safety congress.

We have just passed through one of the tightest years that the United States has ever known. If none of us are old enough to make that statement from our own experience, I think that at least we can make it as far as the range of our own lives.

Last year in Pittsburgh I made a particular appeal to you not to let your Council memberships suffer by the retrenchments that so many industries were engaging in. At that time I shared the optimism of a great many people that we were past the lowest point of the depression.

If I had known at that time what we know now, that the worst was yet to come, I would have made my remarks stronger than I did. It seems inevitable that when people are called upon to reduce expenses they will eliminate those items that produce the quickest results. For that reason I was afraid that in the average plant safety work would be one of the first activities to be curtailed: but my fears were not realized.

The Food Section has had an actual gain in membership since the last Congress. We started with 198 and ended with 201. A good deal of this has been due to the activity of our vice-chairman, Henry Mineur, who has had charge of membership work for this Section; but the Council as a whole has not suffered nearly as much as it did during the depression of 1921 and 1922. As a whole, there was a slight loss but the net income from membership dues in 1931 has been only seventeen thousand dollars less than it was at the peak in 1929, and that is not a very big shrinkage on an item that amounts to nearly half a million dollars.

I don't know whether all of you read the same judgment between the lines of that statement that I do, but to me it is plain that safety work is now considered one of the essentials of industry. Economists tell us that when a depression hits a community the last things to show the effect of it are the staple foods. The things that feel it the quickest are the luxuries and whims. The last two years have shown that safety work is a staple food of industry, it is not a whim. As insurance is considered an essential, so is safety work which is a complement of it and of equal importance.

Now, we have a very good program and I don't want to take up a lot of the time that belongs to it, as I necessarily must if I continue to talk, because anything that I say is outside the schedule—sort of what a good press-agent would call "an extra added attraction", although I think I can see a suggestion of a sardonic grin on the faces of most of you when I call it that. But it is the general chairman's privilege to inflict his remarks upon the audience without a fear of retaliation unless he goes too far or has failed to take precautions, and so I want to take this opportunity to again stress the importance of your being active in Council affairs.

The National Safety Council is not like an insurance company where your money is received and a group of paid employees looks after the business and sees that you carry out your part of the contract because their livelihood depends upon it. The National Safety Council is a cooperative organization and it is a non-profit organization. It is also a research organization and while there is a paid staff, the staff is engaged mostly in research work. They are engaged in working up the data and statistics from material sent in by the members and getting it in shape to send back to the members in a form that will permit them to profit by the experience of others as well as themselves. This staff is not a staff that is large enough to carry on all the work of management and administration in such a large corporation. Most of that devolves upon the volunteer workers among the members.

As long as you have a Council membership, get the full value out of it by taking an active part in the management and the activities of your Section! By this I mean contribute to the News Letter and help to carry on the work in any other way you may be asked to, as far as your abilities will permit without material injury to yourself. As I said before, the Council is a cooperative body. The closer you work in with it the more you will get out of it.

I want to lay particular stress on this point because it seems so hard to get men to take office. At the beginning of this year I appointed a committee of past general chairmen to act as a Nominating Committee for a set of officers for 1932. While they have prepared a very satisfactory slate, it took personal solicitation to get most of the nominees to accept. This is due primarily to lack of understanding of just what

the Council is and how it functions. Even among those resident in Chicago there was very little definite knowledge of the Council's structure and even fewer had ever visited the office and seen the sort of a place it was. None of you should leave this Congress without going over there. The headquarters office is located on the ninth floor of the Civic Opera Building at 20 North Wacker Drive, and while most of the staff are over here this week, there will be some one there to show you around and it will be an eye-opener and inspiration to you to see what sort of an organization you belong to. The National Safety Council is attracting more favorable comment today than any other similar institution, not excepting the Red Cross, and if you are asked to serve on the Section's Executive Committee you will find it worth your while to do it.

You should consider that I have served as chairman of the Food Section for two years and it has not been an easy job, but I have gotten a great deal of safety education out of it.

CHAIRMAN COOPER: Several years ago, so far back I don't like to think how long ago it was, I got out of college. The first job I had was with the Santa Fe Railroad in New York. I used to sign bills of lading for many companies, and one of these companies was Lamont, Corliss and Co. I did not suppose at that time that my path would ever cross with an officer's of Lamont Corliss and Co., but we have with us today Mr. Pell, the treasurer of that company, who is going to talk to us. I do not know whether Mr. Pell is going to tell you anything about his company, but I will say that they operate a chocolate plant and rubber heel plant and I do not know how many other industries, so that he gets a pretty good slant on safety work in different kinds of plants.

ALBERT W. PELL (Lamont, Corliss and Co., New York City): The statement "How We Interest Our Employees in Safety" as it shows in the program, might convey the impression that it is by persuasion or penalties or rewards. That was the original form that the question occurred to me, and I hope that this paper I am submitting will result in discussion, for I would like to learn something as well as you undoubtedly will. Might I say that as a preliminary, our chocolate plant on the ninth of this month completed 549 days without a lost-time accident, so we feel that we have accomplished something. There is a considerable increase of interest among the employees and as a result we are hoping to complete the second year, at which time we will hold a celebration and may do some slight rewarding.

How Shall We Interest Our Employees in Safety?

By ALBERT W. PELL

Treasurer, Lamont Corliss & Co., New York City

Before starting this discussion I wish to acknowledge indebtedness to Mr. C. W. Hill, Vice-President of the Peter Cailler Kohler Swiss Chocolates Co., Inc., for valuable hints culled from his own experience in the management of many hundreds of men, these hints having been passed on to me in discussion of this subject.

Perhaps the most difficult problem which faces the safety director or employer, who is honestly interested in safety, is that of awakening an equal interest on the part of the employees themselves. It might naturally be supposed that the individual who is exposed to possibility of personal injury would have the greatest interest in preventing this result, but experience has shown this not to be the case.

The employer, of course, has this personal interest anyway, though from two different angles—one selfish and the other unselfish—namely, possible saving of premium on his compensation insurance, and a real desire for the welfare of his employees.

It is fairly simple to provide proper guards, but it is not possible to so guard all

machinery that it will be impossible for an injury to take place—either through carelessness on the part of the operator or at such times as the mind wanders for a few seconds on account of the monotony of the job. In addition to this there are numerous ways through which injuries may occur that are not preventable, except by the exercise of caution on the part of the individual; such as, stumbling over objects carelessly left in passageways, falling on slippery floors, having the hands caught between cases being moved, and other ways too numerous to mention, with which you are all familiar.

The crucial point in accident prevention, according to my experience, lies with the individual employee and strange to say, this is the most difficult problem faced by the employer. The subject may be sub-divided into several headings, such as—education, reminders, persuasion, penalties, and rewards.

It will not be well in this discussion to attempt to select one of these divisions and consider that the sole basis for safety effort, but on the contrary all should be applied as circumstances show to be desirable.

Education—This is necessary as a preliminary step. It can be done by posters, clock notices, pay envelope enclosures, safety committees, nurses and foremen. Education should include:

1. Instructions on what to do in case of accident.
2. Rules on Safety which the Company enforces, such as—
 - (a) No cleaning of machines in motion.
 - (b) No climbing up on machines whether in motion or not.
 - (c) No reaching into moving machines.
 - (d) Stopping motor instead of clutch.
 - (e) Prompt reporting of accidents.
 - (f) No running, horseplay, or loud talking.
 - (g) Proper clothing and shoes.
 - (h) Clean floors around machines.
 - (i) Removal of guards.
3. Necessity of prompt attention to cuts and scratches.
4. How to do each job safely.
5. Hazards of various jobs.
6. The foreman should catch all unsafe practices and see that they are stopped. If he sees one man doing something unsafely, he should use it as a text, without giving the man's name, for a talk to his men to avoid others doing it. It does not do to talk only to the one man whom he detects in an unsafe act.

Education should be continuous.

Reminders—At the immediate time of the occurrence of an accident there is excitement and everyone is wide awake but it is surprising how quickly they forget and fall again into careless practices. It is, therefore, necessary to take some means to keep their memories awake. This may take various forms:

1. Thermometers at gates.
2. Exhibit of safety prizes at gates.
3. A safety message on each time clock every Monday morning.
4. Special safety stunts at intervals; such as, celebration by small prizes, or a plant safety parade.
5. Foremen should be asked to select one source of accidents each month and go over their department to remove such sources be they equipment or methods of work.

Persuasion—It is in my mind that there is a wide opportunity for thought in the three divisions—persuasion, penalties, and rewards. While these probably should all be discreetly used, yet it may be that circumstances will be such in some plant that emphasis should be placed more upon one than upon another.

The attitude of the great body of employees will influence this question considerably. There may be groups that are attentive to suggestions of the foremen, or other heads,

and are of naturally intelligent and thoughtful dispositions. To such groups persuasion is bound to be very effective.

At the chocolate plant previously mentioned, every man who has an infection has to report to the manager, who explains infections to him and asks him to promise not only to go to "first aid" promptly, but to use his influence to get others to do the same.

Some pressure is exerted in a manner that might be called "back-handed" persuasion, in that analyses of accidents are posted; and if John Doe is hurt as a result of carelessness or violation of rules, the fact is posted on the bulletin board. The result is some kidding of John Doe by the other employees, and he also realizes that it is a black mark on his employment record.

Also, at every example of unsafe practice in any department the foreman talks to the employee, showing him the danger of such a practice, and endeavors to persuade him to be more careful in the future—this without regard to whether or not any accident has occurred.

We also have a system which causes amusement among the employees, but at the same time makes them anxious to improve their department's record. We have a brown derby which is awarded to the department which has the last lost-time accident, and you may be sure that no one wants to be responsible for bringing it to his department.

Penalties—These should never be applied without careful consideration but only used for serious infractions of rules, causing accidental injuries of some kind. Too strenuous use of penalties is more apt to cause a feeling of sullenness on the part of the employees than it is to awaken them to their individual responsibility. In general penalties should be given only for infringement of rules, such as cleaning a moving machine, or failure to report an accident.

There should not be, as a rule, any penalty applied simply because an accident has occurred. On the other hand, the frequent occurrence of accidents to or because of a certain employee or certain employees, should result in penalties. If a warning is not effective, discharge should follow.

Perhaps under this heading should be mentioned that it is sometimes found that the physical condition of an employee is an accident breeder. Unless such an employee can be shifted to a safer position, he should be dropped—not as a penalty but because he is a hazard to the others on account of his physical condition.

Rewards—It is questionable if large rewards are as effective as small ones, as after all, the purpose of the reward is to attract attention on the part of the individual rewarded, as well as his co-employees, to the fact that there has been good work, and to create sufficient pleasant feeling to more or less drive home the thought, rather than to provide something of great intrinsic value, which might attract more attention to itself than to the deed for which it was awarded.

We use minor rewards, such as a package of cigarets or some candy, only to intensify a reminder. Larger rewards have been made only once. That was at the end of our first year of no lost-time accidents. It may be that if we succeed in completing another year, we shall increase the reward somewhat.

At any event, we regard rewards as reminders and publicity stunts. We find that it is poor psychology to pay people for doing what is right and what they should do. Safety carries its own rewards. Anyone who can't work safely without having a reward is too dumb to have around.

Again there is no way of tying up the saving on the monetary value of a safety record with a reward. You might give a reward this year, and have such a had record next year that the saving this year would be lost in comparison.

The individual reward must be small and as the employee does not realize all the facts, he may imagine that the company has saved a pile of money and pocketed most of it. However, small rewards cause comment and we have found that they are fine reminders.

If we were convinced that rewards were necessary, or especially desirable, we should be inclined to handle them in connection with the wage rate. In our own experience, we have not felt that rewards are the best way. In fact, we have the notion that it is the wrong way around.

Another objection to rewards is that you probably get the best safety records when business is the poorest, partly because jobs are hard to get. A company might find it hard, if not impossible, to pay out any sizable reward when they might be running in the red.

To sum up then, we should say that some of the thoughts which we have offered for this discussion are:

1. That it is necessary to interest the individual worker in safety if any satisfactory result is to be expected.
2. That the normal attitude of the worker is passive.
3. That there are many ways that may be tried but that no one way is a complete answer.
4. That a method which is effective in one plant may not be sufficient for another.
5. That the safety director must keep himself posted as to the various possible systems, carefully weigh each in its application to his own plant and adopt those which are found to work best with his group, at the same time keeping an open mind and being prepared to make such changes as time and varying conditions show to be desirable.

CHAIRMAN COOPER: Mr. Pell's remarks have given us something to think about. I would like to hear from some of these present as to what they think of the value of those different methods of stimulating interest.

VERN D. SUTTON (Postum Company, Inc., Battle Creek, Mich.): I thoroughly agree with all Mr. Pell has said. Especially was I impressed with what he had to say about not giving rewards of great intrinsic value but merely some little token that reminded them of their success. I have observed that in giving rewards, whether for safety or anything else, and in the matter of contests of any sort where rewards are given, that the greater the reward the more dissatisfaction there is on the part of those who didn't win, especially among factory employees where large rewards are given.

W. A. SULLIVAN (Loose-Wiles Biscuit Co., Kansas City, Mo.): I was hoping that somebody would take issue on this disciplinary item. I have always been heartily in favor of that particular method of dealing with accidents to employees, but occasionally we run into trouble especially with workmen's compensation commissions. That is particularly true in Missouri. You don't dare to discharge a man on account of having an accident. We do get rid of them, all right, but we do not get all the benefit of the discharge as we would if we could broadcast and give a lot of publicity about discharging for that purpose. We have to find some other reason usually. But I am not as familiar with other states as with Missouri, and I am wondering if somebody else will argue on that subject.

MR. PELL: Don't make any mistake. We discharge a man not because he has had an accident, but because he has disobeyed orders. He has direct orders that he must not attempt to fix moving machinery and must not do certain things. If he deliberately disobeys orders, he gets discharged.

MR. SULLIVAN: We still don't get around not discharging for accidents.

MR. PELL: What is the law on that subject?

MR. SULLIVAN: I cannot quote the exact law. You can discharge a man, if he hasn't been hurt, for disobeying rules. If a man violated a rule by attempting to clean a moving machine or removing guards from the machine, and wasn't hurt, you can discharge him; that is within your power and privilege. But if he should become injured, you have to put him back to work and let things go along. My argument is that it loses a lot of effect. If you could let it be known throughout the department and entire plant that the man is being discharged for that sole purpose, the psycho-

logical effect on the employees would be far better than it is to ease them out and so get rid of them. We cannot correct each accident by individually handling that accident. We want to prevent a recurrence; we want to create a better spirit in a blanket form, you might say.

ROBERT E. DAY (Kellogg Company, Battle Creek, Michigan): We have had a little experience along that line. We have had some trouble with our machinists about wearing goggles when chipping cement, etc. We have quite a mechanical department and we found that temporary lay-off is pretty effective. It means that he is going to be off, maybe a week, without pay and you can broadcast that thing, and when he gets back, it is going to be all over the department. After we did that in two cases the same day, we didn't have trouble with a single man about wearing goggles for a period of two or three months. In the case of a man who has been seriously injured, sometimes we do have to discharge him later but we usually try to check up on the man to see if he had a serious set back.

CHAIRMAN COOPER: Mr. Sullivan, do you mean that under the Compensation Law in Missouri, if you have a man who deliberately takes a guard off a machine, for example, violates the instructions, and gets hurt, you cannot discharge him for that?

MR. SULLIVAN: Perhaps if you could prove that he deliberately did so, you might get away with it. But we had a meeting over a month ago of the Associated Industries of Missouri, rather an informal affair. We were seeking to get their reaction and their attitude on certain types of safety work. That question was put to them point blank, and while they did not want to answer it because it might become a matter of record, they told us that the thing to do is to find some other reason to discharge the man, unless he had some obvious self-inflicted wound or accident caused by self inflection.

CHAIRMAN COOPER: Then they did not say that you cannot discharge a man for deliberately wounding himself?

MR. SULLIVAN: They evaded the question, but there have been two or three points brought up where they have caused the employers a lot of trouble.

MR. PELL: Suppose you say John Smith was discharged for violating such and such a rule and not as a result of injury?

MR. SULLIVAN: I am afraid it would kick back on you.

CHAIRMAN COOPER: You know, an accident often is the result of a little love of the dramatic, especially among younger employees when they are at the impressionable age. I have in mind the case of a girl who was injured in a department where there are many young girls who are just beginning to think about bleaching their hair, rouging their lips and fixing themselves up to attract attention. Often times, a frame of mind is created where they would do anything to draw a little attention to themselves. This girl caught her hand in the rolls of a machine. We had to take an axe and break the guard off the machine to get her hand out. She deliberately stuck her finger through this guard. There was no question about its being deliberate because we tried afterward and it was too great an effort to get a hand in there for anyone to have done it carelessly.

There is one feature in Mr. Pell's talk that I think is a very good way to compel employees to avoid accidents, and that is to make the accident result in a little bit of humiliation or undesirable publicity. They do not like to be laughed at or sneered at by fellow employees. I think that is one very effective way. We use here in the hotel a set of posters. There are two posters gotten out by the National Safety Council. One of them is a picture of a dog all bandaged up and it says, "Believe Me, It Hurts to Get Hurt." Then there is another one that reads, "Not a Lost Time Accident in This Department Since—How Long Can We Keep It Up?" You fill in the date. We have a large bulletin board in the service entrance where all employees pass twice a day and we have one of those posters "Not a Lost Time Accident in This Department Since—" with the date, on that board for each

department in the hotel. When any of those departments has an accident, that poster comes down and one of these with the bandaged dog goes up. The employees do not leave that dog up there very long. After the first or second day it is all covered with pencil notations somebody has put on, for instance, "They must have been out late the night before." After three or four days it frequently disappears, the reason being that the employee comes around when nobody is looking and takes it down. But we put it right back up again. I don't care how many posters they take down. I have had them come to me privately and say, "Please don't stick my name up there." I think that is a very good way.

We have a gentleman in here, Mr. E. D. Taylor, from whom I would like to hear. For the reason that I started my mechanical apprenticeship in a packing house, and I would like to hear the different kinds of work he has to contend with.

E. D. TAYLOR (Assistant Master Mechanic, Omaha Packing Co., Chicago): Our accidents are getting fewer. We are getting our machines pretty well guarded, and while we have not had any penalty attached to these accidents (or anything like that) we have done considerable talking to employees and have tried to impress on their minds that the breaking of a rule, such as working on machines in motion or removing guards from a moving machine, would be the cause of their losing their jobs. We have broadcast that considerably. I think it has had some effect because I have noticed that guards are not removed as much as they used to be and accidents are getting fewer and fewer.

CHAIRMAN COOPER: How do you reach the foreign employees? You must have a great number that do not understand English any too well.

Mr. TAYLOR: We have an assembly system. What we call an assembly is a certain number of employees and so many management representatives, and they meet every month. Each department has a representative, and when we hire a new employee, it is one of the duties of the representatives to explain all these different things—the working of the plant, the dressing room, the safety problems, and all such things. We have quite a variety of representatives who talk several languages, so they are able to explain to the others.

F. A. HASSE (Corn Products Refining Co., Chicago): What is to be gained by firing a man after he is injured, even if it was his own fault? Personally, I have always taken the opposite view. By removing the guard and being injured he has been penalized enough. By keeping that man, you have probably a better safety man. We fire very few men in our plants because of accidents. The only time we fire them is when they have been the cause of some other man's injury.

CHAIRMAN COOPER: It seems to me that the story of the negro is something like firing a man for having an accident. This negro was going to be hung and he was asked if he had anything to say. He answered, "Well, no; but it is going to be an awfully good lesson to me." You don't care whether it improves that man or not. It is an example to the rest of the employees.

Mr. HASSE: It seems to me that having a man in a plant, if he loses a finger, is more of an object lesson to those surrounding him than it is not to have him in the plant whatsoever.

Mr. PELL: There is something to what Mr. Hasse just said, but our view-point is different. We have a good many hundred men whose safety depends upon themselves and upon the others working with them. The rules we have established are rigid rules. We can't relax on one man because he has been injured. Don't misunderstand me, we don't discharge because of injuries; we discharge because he has violated a very important rule: if we should overlook his case, we feel that others will overlook the rules. While it may be unfortunate for him, the result to the general factory would be extremely serious if we kept on a man who deliberately violated the rules.

Mr. TAYLOR: For a long time we had safety talks around the plant for a few minutes. At noon we would gather the men of a department together and sometimes

our doctor or our superintendent or some other person would talk to them and explain how they should be careful, how an accident leads to much suffering to themselves, suffering for their families, and so on. I think that has had a lot of effect on employees and has brought it home to each one in the department.

Mr. SULLIVAN: We do not fire men for having accidents. It is the violation of the rule that causes the accident. For example, one of our plants was having innumerable cases of falling down stairs, falling over things, falling on slippery floors. We made a study to see why there were so many falls. We found that our talks were of no avail because of one man who was continually running back and forth to the elevator, to the time clock, etc. He was cautioned two or three times. We found that he was more or less a leader in all activities. Eventually that man slipped (he was running over some wet floor) and broke his collar bone. He was off for about three weeks, but nevertheless, he was not back two weeks until he did the same thing again. He was discharged. We got by it very nicely that time because we took him back the first time. He violated the same rule twice and it was for that reason that we discharged him. We made an example out of that and I don't think we have had accidents of that character again.

CHAIRMAN COOPER: I think a very good example of discharging employees for deliberate infraction of rules is shown by the discipline carried on by a certain railroad. A trainman who causes a wreck by deliberate infraction of the rules is permanently discharged. His own brotherhood will not back him up simply because they know that in the operation of trains there must be discipline. He is made an example to the others.

ALEXANDER DIENST (The National Sugar Refining Co., Long Island City, N. Y.): I think a very delicate question has been aroused here. None of us want it put on record that we discharge a man because he is hurt. I do not think anyone would discharge a man for being hurt. If there is a reason for getting rid of him, naturally a way would be found later on, but not for the fact of his getting hurt; because that is entirely up to them to see that they do not have any chance for getting hurt.

In respect to the prizes. We had a plan in which the five leading departments, i. e., the foremen and subforemen of these departments, who are entirely responsible for accidents, received cash prizes. There was dissatisfaction on the part of the other departments who had not had any accidents. We are contemplating a plan now whereby every department that does not have an accident, will receive a prize. We believe this will work out more satisfactorily. We think that when a man runs along for six months with no accidents, he is entitled to a prize.

CHAIRMAN COOPER: I think we are all agreed that we do not discharge a man for accidents, but just infraction of rules.

Mr. PELL: I have had this part of the work in my company for twenty or thirty years. When I first started in, it was necessary for me to go over every newly purchased machine from top to bottom and guard it; find every moving part, see whether there was a possibility of danger to the operator, and if so see that it was put in a safe condition. As an actual fact, now when you buy machines, they are so thoroughly guarded by the manufacturer that in most cases there is nothing for us to do. Safety work is having some effect.

Mr. SUTTON: There is one other phase of the situation to look at. Mr. Pell said in his speech that we should not overdo the matter of penalties. I doubt very much the wisdom of doing as Mr. Sullivan suggests, broadcast^g the fact that John Doe has been discharged for receiving an injury due to his own violation of the rule.

Mr. SULLIVAN: I did not say I did it; I said I'd like to.

Mr. SUTTON: I doubt the wisdom of it if you would like to and could do it. As Mr. Hasse says, he will probably be a much safer man.

HENRY J. MINNEN (The Borden Co., New York City): This is a subject rather close to my heart. Frankly, I cannot see why the failures that usually result in accidents should be treated in any way different from the failure of a man to properly

discharge his duties. Where is the difference; where is the line of demarcation? I think one of the greatest difficulties we get into in our discussion is the confusion of the result with the cause of an accident. We talk a great deal about after the man is injured. Frankly, we are not interested. We cannot control the degree of the injury. God alone knows, when a man has an injury, just how badly he is going to be injured, but it causes something we can deal with and that is what we are interested in. My good friend, Vern, says if a man violates a rule and doesn't get injured, he should be discharged, but if another man violates a rule and is injured, we are not to discharge him. I cannot see the consistency there. Just why should the man who is not injured derive the penalty or be shown the partiality? Or why is the man who suffered the injury entitled to any special consideration? Frankly, I do not think that any safety organization can accomplish its purpose without a definite policy. We consider the accident as an operating problem and as such we have to handle the failures that result in accidents exactly the same way.

CHAIRMAN COOPER: You have got to have rules. If you have a man who persistently violates your operating rules, you have got to get rid of him and it is all the more important if the violation involves injury of somebody else.

Gentlemen, we will have the report of the nominating committee. Mr. Vern Sutton, as chairman of the nominating committee, will now make his report.

Report of the Nominating Committee

By VERNE D. SUTTON

Chairman

Your committee appointed to select and present for your approval a list of officers to serve the Food Section during the ensuing year 1931-1932, has selected the following:

General Chairman—W. A. SULLIVAN, Loose-Wiles Biscuit Company, Kansas City, Missouri.

Vice-Chairman—HENRY MINEUR, The Borden Company, New York, New York.

Secretary and Editor of News Letter—M. E. HOUSE, B/G Sandwich Shops, Inc., 174 W. Randolph Street, Chicago, Illinois.

Chairman, Poster and Illustrations Committee—THOMAS STROMBER, Wagner-Taylor Company, Philadelphia, Pa.

Chairman, Program Committee—R. E. PROUTY, Aetna Life Insurance Company, New York, New York.

Chairman, Engineering and Publicity Committee—J. J. LYONS, John F. Jelke Company, 759 S. Washtenaw Avenue, Chicago, Illinois.

Chairman, Statistics Committee—JESSE J. ZIETNER, Continental Baking Co., 285 Madison Avenue, New York, New York.

Executive Committee—ALL OFFICERS AND THE FOLLOWING:

ERNEST D. FOWLER, Americus Hotel, Allentown, Pennsylvania.

ALBERT PELL, Lamont, Corliss and Company, New York, New York.

WILL COOPER, Executive Offices, Stevens Hotel, Chicago, Illinois.

FRANK HASSE, Corn Products Refining Company, Chicago, Illinois.

ALEXANDER DIENST, National Sugar Refining Company, Long Island City, New York.

VERNE D. SUTTON, c/o Postum Company, Inc., Battle Creek, Michigan.

CHAIRMAN COOPER: You have heard the nominations, if there are no changes or additional nominations, it is suggested we proceed to ballot.

Mr. MINEUR: I move the nominations be closed.

(The motion was seconded and carried.)

Mr. DIENST: I move that the secretary cast the unanimous ballot.

(The motion was seconded and carried.)

CHAIRMAN COOPER: Next on the program is the gentleman who is in the publicity safety work, S. M. Lippincott, and he has a very interesting subject to handle in that he is going to talk about home made posters. I guess there is hardly an industry that is a member of the Council that doesn't wish there were more posters that were definitely applicable to them. Mr. Lippincott is going to show us how to get around that by making our own posters.

S. M. LIPPINCOTT, (secretary, Erie Safety Council, Erie, Pa., and safety engineer for the Liberty Mutual Insurance Company, at this point presented an interesting series of home-made safety posters; he stated that the success of many of the safety campaigns conducted by him depended, in his opinion, on home-made devices of various kinds. Mr. Lippincott gave running comments on the posters as he exhibited them.)

CHAIRMAN COOPER: Have you ever run into trouble in the copyright line?

Mr. LIPPINCOTT: No, they haven't checked me up but I do not believe there is any danger because your men are using it in your own industry and I am careful if I send it out to customers, for in that case you are practically selling something. I do not understand the copyright laws, but I believe it would be treated the same as a patent. One can make an article that has been patented, and as long as he does not sell it, he is privileged to use it himself.

ALBERT W. PELL (Lamont, Corliss and Co., New York City): I use a great many bulletins, and these bring up one question that has always been more or less puzzling to me and I would like some opinions on the point. There are three classes of bulletins, the joking, the more or less horrible (illustrating the details of an accident: legs lost, arms lost and fingers lost, with the blood showing and that sort of thing), and the ordinary type which is a warning. I have generally avoided the horrible on the theory that they made the man nervous and he is more apt to meet with an accident after seeing those things than he might have been before. The amusing, I have never been quite able to make up my mind about. Mr. Lippincott has had much success. I have used these to some extent, but I am not sure whether it results in a feeling among the employees that it is not serious and is of no consequence, or whether it really makes an impression. I would like to have some opinions on just what type of poster is considered the best.

Mr. MINEUR: I do not believe the National Safety Council, with all its experience, has as yet reached a decision whether the gruesome picture or more conservative picture which shows abnormal conditions or conditions as they should be, is the better of the two. There is also some question as to whether or not we ought to have some safety in cartoon form. Frankly, I think that you will run great risk when you put out safety messages in cartoon form. There is room for the cartoon in the poster campaign but those cartoons must be very carefully considered before adopted. I think it is wise that the poster and the message should be around the idea of the instructions that are given out by the company. We stick very closely to them.

VERNE D. SUTTON (Postum Company, Inc., Battle Creek, Mich.): Regarding Mr. Pell's question of whether to use the humorous or the gruesome bulletins or posters, I recommend the method which I have found successful in our industry. In our plant when I first started sticking up posters, I got a great many kick-backs from them. I put up humorous posters and found the men were very sensitive. They thought we were ridiculing them. They thought, "Old Safety Sutton up here thinks we look like that."

I took the posters that I proposed to use, a sample of each one of them and fastened them on a card and put it up in the committee room, and I provided the men with ballots, and there were numbers on the ballots corresponding with the proposed posters. During the meeting, about in the middle of it in order to give them a little recess, I had them get up and walk around and examine these posters and mark "yes" or "no" in a space opposite the number. I did not know how anyone

voted but after the meeting I drew up a schedule or a chart indicating how many votes were for and how many against each. If a poster has 20 per cent opposition in votes, I do not use it. I do not take the risk, because if I did, too many would come back and have a bone to pick, particularly with Safety Sutton. I find that when I put up humorous posters, except in very rare cases, most of the humorous posters get a favorable vote of two out of fourteen people and the rest are all against them, so I use very few humorous posters. I think humor has a place in putting across the safety message but be careful not to ridicule the safety idea. It can be used, but not in our plant because so many vote it down.

Gruesome posters have about the same sort of record. Once in a while the gruesome poster, if not too gruesome, gets a favorable vote and is used. So I recommend that practice, that you let your safety committee, if it is composed of people from the plant, not all foremen, but people from the workbench and the machine shop, vote on your posters because they know what the people in the plant are saying and how they feel.

G. L. GORE (chief safety engineer, Bruce Dodson Co., Kansas City, Mo.): I have had a good deal of experience in sending out safety posters to our subscribers. I am not an old timer in this work at all, but when I started sending out those posters I expect I got in more jams than you can shake a stick at. The posters that have been effective are those that are of a serious nature and instructive. I have not had anything but back-lashes from gruesome posters. I used to think that the way to warn against infections was put up a picture that would make men think. I have sent out 2,200 or 2,300 of those and I have heard from our subscribers that they didn't like them. They had visitors come through the plant, and they didn't want the visitors to get the impression that there was any such possibility in their plant of a serious infection, especially in handling the food products.

I am really in favor of instructive posters, but I do not think so strongly of the humorous posters. I think that you have got to watch that very carefully.

CHAIRMAN COOPER: I would like to give you some information that I gathered over at the library of the National Safety Council. They have some posters over there that they have collected from foreign countries. You would be surprised how the nature of those posters seems to line up with the nature of the people. Some parts of Europe, particularly Spain where they enjoy bull fights as a Sunday afternoon pastime, and particularly cock fights, which are a great pastime, seem to run to these gruesome posters. You get up in the Scandinavian countries and the British Isles, and you do not see any of them in that collection at all. I do not want to make any comparison between the merits of those different nationalities, but it is perfectly evident to me that the likes and dislikes of the nature of posters are all in the way you are brought up.

I do not like the gruesome poster, myself. We have one out here in the hall showing the result of some infections. I think that is a particularly bad thing to put up. The National Safety Council did publish one of a man who had his thigh caught in a gear wheel. He had both hands back and the whole attitude and expression on his face showed great pain. I put that poster up as a test and it did not stay up one day. Somebody tore it down. I put another one up and that did not stay very long. It was torn down. I put a third one up and one of our employees came to me and said, "I don't like that Mr. Cooper. I wish you would not put a thing like that up", so I did not put up any more of that kind.

About the humorous ones, I am inclined to think as Mr. Sutton says, that if we took a vote on their value, it would prove that they were of little good. That has been my experience with them, that no attention is paid to them. I never got any comments on humorous posters at all. I have gotten comments back on some of the others.

Mr. SUTTON: On this poster proposition, I keep in pretty close touch with the man who gets out these posters and I want to say that the National Safety Council

wants to learn, and if you want to send in suggestions to them, they will be very glad to get them and very glad to get comments on the posters they do publish. I know, because I write dozens and dozens of letters; and I was talking with one of the young ladies down at the convention registration desk and she said she read a lot of my letters and she assured me very frankly that none of my letters went in the waste paper basket, they all went in the files. Now, if my letters go in the files, yours surely will, so do not hesitate to write Stan Kershaw what you think of the posters. Make suggestions for new posters.

ROBERT E. DAY (Kellogg Company, Battle Creek, Mich.): We prepared a problem one time and it got over in good shape. It gave our message in the way we wanted it. We took an X-ray picture and made a photostat copy, with typewritten copy telling the story, after asking the man's permission to do it. He agreed, so we had a meeting of machine men, put posters up, and it was quite effective. In that way we touched on the gruesome and it was serious and educational. It did not have all the bloody details of the injury as it might have appeared had a photograph of his arm been taken, but it just showed this broken bone and here was photostat copy in blue and white and it made a rather effective picture.

CHAIRMAN COOPER: I think you will get a great deal of benefit out of home-made posters from photographs you can make in your plant. I never thought of using a mimeograph machine and a stencil, the way Mr. Lippincott has, but I can see that it would have almost unlimited possibilities.

Mr. SUTTON: The mimeograph is a fine way of getting out home-made posters and if you have a blue print machine you can use it also for getting out home-made posters.

ADJOURNMENT

Wednesday Afternoon Session
October 14, 1931

WILL COOPER, Chairman
The Stevens Hotel, Chicago, Ill.

The second session of the Food Section convened at two-fifteen o'clock, General Chairman Will Cooper presiding.

CHAIRMAN COOPER: Gentlemen, Mr. David J. Price, Principal Engineer in charge, Chemical Engineering Division of the United States Department of Agriculture, has made a study of dust explosions. Some may remember that we had the pleasure of hearing Mr. Price a few years ago and the very interesting talk he gave. I understand that since that time they have made some new discoveries and he has new practices to recommend. Mr. Price.

Reducing Dust Explosion Losses by Industrial Cooperation

By DAVID J. PRICE

Principal Engineer in Charge, Chemical Engineering Division Bureau of
Chemistry and Soils, U. S. Department of Agriculture,
Washington, D. C.

The splendid cooperation between the Federal Government and all agencies interested in dust explosion prevention has brought about a reduction in losses of life and property from dust explosions in the industrial plants in the United States and Canada. In recent years very marked progress has been made in our industrial plants by the development and application of methods of control and prevention. It is very proper, therefore, that the Food Section of the National Safety Council give consideration to the accomplishments in the adoption of safety measures that have proved effective in order that further progress can be made in the prevention of dust explosions in the food industries.

Research Work of U. S. Bureau of Chemistry and Soils

The Bureau of Chemistry and Soils, United States Department of Agriculture, has had leadership in this country in the research work on dust explosion control and prevention in industrial plants. The research investigations of the Chemical Engineering Division of the Bureau on explosion and fire prevention are conducted along the two following major lines:

- (1) Dust explosions and resulting fires in grain-handling plants and other industries.
- (2) Spontaneous heating and combustion of agricultural products.

The investigation of dust explosions has placed the members of the Chemical Engineering Division in close touch with the industries of the country, especially the food industries. A very pleasant relationship has been established with the result that the combined efforts have been largely instrumental in the application of safety methods and appliances which have been very effective. This valuable cooperation with the food industries has been supplemented by splendid cooperation with fire prevention associations, safety and insurance organizations, and State and Federal commissions.

This splendid spirit of industrial cooperation has been definitely demonstrated by members of the Food Section. The engineers of the Bureau of Chemistry and Soils have enjoyed the confidence and interest of the safety organizations repre-

sented at this meeting, and have been happy in playing a part in the important work of saving life and property by dust explosion prevention.

Extent of Dust Explosion Losses

It may be of interest to consider the extent of dust explosion losses in what might be considered some of the grain-handling and food industries. The following summary has been taken from the records of the Chemical Engineering Division of the Bureau of Chemistry and Soils, and includes dust explosions from 1860 to the present date.

Industry	Total Explosions Reported	Explosions with Injury or Fatality	Number Killed	Number Injured	Amount of Property Loss
Flour Mills	78	19	22	34	\$ 4,327,900
Grain Elevators	76	20	70	116	14,390,655
Feed and Cereals	61	24	52	165	5,348,800
Starch and Corn Products	30	15	128	123	5,095,800
Sugar Refineries	22	4	12	31	1,622,300
Coffee and Spices	10	2	5	13	201,700
Some of the other industries affected by dust explosions include the following:					
Wood-working Plants	64	27	22	76	\$ 1,791,860
Cork Plants	28	4	4	19	161,700
Fertilizer Plants	17	3	11	10	646,250
Metal Dusts	10	7	23	55	1,375,800

The Bureau of Chemistry and Soils has record of 531 dust explosions in industrial plants of the United States. One hundred seventy-three of these explosions resulted in the loss of 424 lives and injuries to 835 people, or a total of 1,259 persons directly affected. The property loss in 422 cases reported was approximately \$45,000,000.

Although the records of dust explosions in foreign countries are very incomplete, more than 100 dust explosions have been reported, resulting in the loss of 197 lives, injuries to 530 others, and property damage in excess of \$7,000,000. These explosions occurred in 16 different countries.

Taking the records of dust explosions in the United States and foreign countries, we have a world total of 633 explosions resulting in the loss of more than 620 lives, injuries to more than 1,360 others, and a property loss in excess of \$52,000,000.

Reduction in Losses in United States Plants

A careful study of the records of losses from dust explosions in the food industries will show that there has been a marked reduction in losses during the last five-year period (1926-1930). In flour mills, for instance, we find a record of only six explosions—all of minor proportions—during the period. No lives were lost, three people were injured, and the total property loss reported as the result of the explosions and the fire which followed amounted to \$322,500.

In starch and corn products plants we also find records of six explosions. Six lives were lost and 18 persons were injured. The damage reported from the dust explosions and resulting fires amounted to \$253,900. In five of the six explosions there was no loss of life, and in two cases there were no injuries, the explosions assuming limited proportions. This is a very significant recognition of the value of

the safety organizations of the starch industry, and indicates definite progress in dust explosion control.

If we take the sugar industry we find records of only four dust explosions during the five-year period. No lives were lost, six people were injured, and the property damage was limited to approximately \$26,000.

We can appreciate the significance of these figures when we observe that there were 131 dust explosions during the five-year period which resulted in a loss of 102 lives, injuries to 262 others, and total property damage of over \$9,500,000.

The object in calling attention to these records is to indicate that the three industries referred to, namely, flour, starch, and sugar, have all made marked progress in the control and prevention of dust explosions. The dust explosion hazard in these respective industries is fully recognized and the safety organizations of the companies included in these lines of industry are to be commended for this fine record.

Dust Explosion Safety Codes

The Dust Explosion Hazards Committee of the National Fire Protection Association was organized in 1922 and for the past ten years has been engaged in the preparation of safety codes for industrial plant dust explosion prevention. The scope of the work of the committee covers a wide range of industries. There are at least 28,000 industrial plants in the United States that are subject to the hazard of dust explosions. These plants employ approximately 1,324,000 persons and manufacture annually products valued at more than \$10,000,000,000. The committee has prepared the following safety codes which have been adopted by the National Fire Protection Association and the National Board of Fire Underwriters. The American Standards Association has approved these codes as American Standard.

1. Flour and Feed Mills
2. Sugar and Cocoa Pulverizing
3. Pulverized Fuel Installations
4. Terminal Grain Elevators
5. Starch Factories
6. Coal Pneumatic Cleaning Plants
7. Wood Flour Manufacturing Establishments
8. Spice Grinding Plants
9. Use of Inert Gas for Fire and Explosion Prevention

These codes are available to safety engineers and the recommendations made should be carefully followed by the industries creating combustible dusts during manufacturing operations.

Summary

1. The results of technical research of the Chemical Engineering Division of the United States Bureau of Chemistry and Soils on dust explosion and fire prevention have been well received by the industries subject to dust explosions and resulting fires.
2. The splendid cooperation given by the food industries of the United States, through their safety organizations, in the application of control measures has been instrumental in bringing about a marked reduction in losses of life and property resulting from dust explosions.
3. The Bureau of Chemistry and Soils has record of 531 dust explosions in industrial plants of the United States. In 173 of these explosions 424 lives were lost, 835 people were injured, and property loss in 422 cases reported was approximately \$45,000,000.
4. Although records of dust explosions in foreign countries are incomplete, over 100 industrial plant dust explosions have been reported with a resulting loss of 197 lives, injuries to 530 others, and property damage in excess of \$7,000,000.

5. In the five-year period from 1926 to 1930 three representative food industries, namely, flour, starch, and sugar, have experienced a marked reduction in dust explosion losses.

6. The Dust Explosion Hazards Committee of the National Fire Protection Association has prepared special safety codes for dust explosion prevention in a number of the principal industries subject to the dust explosion hazard. These codes have been adopted by the National Board of Fire Underwriters and approved as American Standard by the American Standards Association.

Although very definite progress has been made in the reduction of losses from dust explosions and resulting fires in some of the representative food industries, this experience should not be relied upon as a complete guarantee of future protection. "Eternal vigilance is the price of safety," and the safety organizations of all industrial companies should be always alert to adopt and apply effective precautionary measures that are developed for dust explosion and fire control and prevention.

CHAIRMAN COOPER: The meeting is open for general discussion.

C. J. ALGER (Corn Products Refining Co., Chicago): I want to thank Mr. Price for the tribute he paid to our industry. After what we have gone through the last decade, we really need it. I also want to say that if there is any one man in the United States as directly responsible, I may say, for the great improvement that has been made in the prevention of dust explosions, it is none other than our friend, Mr. Price. I have had the pleasure of working with him directly for a period of seven years; we have gone to him with our problems. He has always been there with a helping hand and I can say that Uncle Sam should be very proud of what he has done in the past and what we expect of him in the future.

MR. PRICE: There may be a question asked about the methods of control and prevention. That is covered very fully in the two reels of motion pictures which we will show later, but I will be glad to have any other questions. I always enjoy going out to these meetings because the men in the industries have problems on dust explosions and the only way we can get your reaction or questions is to have you ask the questions directly.

I wish I had a chance today to say something about another kind of work we are doing, and that is the spontaneous heating of industrial products (I mean spontaneous combustion), the funny fires caused by water whether in cattle feed, hay or grain, or sawdust or whatnot. It is a study as to why water in these industrial products will light up and make fire which we call spontaneous combustion.

What we are doing right now, what we consider very fundamental workings, which I think the food people will be interested in, is to find out why water causes fire. There were some of the most amusing fires in Vermont a couple of years ago during the floods. The government of Vermont said, "We have lost a lot of cattle, we have lost lives and our property has been destroyed. Now the barns are beginning to heat up and the houses will burn. We would like some help."

We went to Vermont and we saw that peculiar thing. When the water began to recede, it started to recede on Friday, it was about seventeen feet high from the valley to Montpelier. Monday afternoon, for instance, when the water was still six feet high, I saw a barn burning, standing in six feet of water; in other words, the receding of the water had dried out the barn and it had caught fire. We are trying to find out just why it burns. I wanted to tell you about that because you may want to ask questions about that problem. I will be glad to have your questions if you have any.

HENRY J. MINEUR (The Borden Co., New York City): It is my understanding that the dust explosion hazard of the dry milk plant is rather removed. As a matter of fact, Borden and Company has no record of explosions. However, I was interested enough to get some information on it, having read some of your publications. There was only one case on record of a dust explosion in a dry milk plant. Is that correct?

Mr. PRICE: I would have to confirm that before making a public statement. I know very definitely of one case and I could easily answer that question by looking in the records. I don't want to mention the company or the place. I just came from the Pacific coast where they have never had a dust explosion in any industry out there, and they claim that they probably can't have any on account of the humidity. (I had forgotten, we did have one in Portland,—I mean the big elevators.) I rather like to feel that there is a potential hazard there, and ward against it. I would rather feel that powdered milk companies have taken precautions to stop explosions. That is the better approach. I would like to say the powdered milk companies do not have explosions for that reason. I think that same thing is true with spices. I do not think we have had a big spice dust explosion, and many other dusts that I can mention. The laboratory tests show that they will explode. Perhaps the operating conditions are of such a character that that will not happen.

J. L. STONE (Globe Indemnity Co., Chicago, Ill.): Taking it country wide, all starch dust explosions, in how many cases have they been able to definitely determine what the underlying cause was?

Mr. PRICE: That is hard to answer. Here are 30 cases of major proportion. I have personally directed many explosion investigations all over the country. We feel from our end that we have, in almost every instance, solved them to our satisfaction. I mean by that, when we come on the ground and there are 30 or 40 people killed and there is a mass of wreckage, we have got to arrive at certain conclusions. Two and two make four. I cannot prove in all my investigations that the explosion started from any certain cause. It is a matter of personal opinion based on experience and the difficulty is to get that cause. We go out and we may have a different idea than the company's engineers. They may be right and we may be wrong. We think we are right and so publish those results. They may have a different opinion but the two causes can be taken and guarded against, if there are two causes. I want to make clear that investigation is very difficult. It is just as difficult as an investigation of an explosion of a coal mine. It is just like going into the dark. Men are killed, many of them. You go in and get certain evidence and discuss it pro and con, but I think in recent years we are getting pretty close to getting the right cause. There is no difficulty as far as the company is concerned getting evidence and cooperation. Sometimes Doctors disagree, that is natural. We have got to have that difference of opinion.

ROBERT E. DAY (The Kellogg Company, Battle Creek, Mich.): How can we get copies of these safety codes? Are they in published form now?

Mr. PRICE: The Department of Agriculture has available a large number of publications on dust explosions which you can easily get on request. The safety codes are published by the National Board of Underwriters, 85 John Street, New York. I understand that Mr. Ethelbert Stewart of the Department of Labor is going to take these nine safety codes and publish them in one pamphlet. You can get a copy of these complete codes in a very short time from the Department of Labor.

Mr. ALGER: I may add if anyone will take the safety codes prepared and study them, they can see what is the cause in a good many cases of dust explosions. Where precautionary measures are recommended in the code, the story is right there; you do not have to look any further.

Mr. MINER: Mr. Price, from a general standpoint may we not assume that wherever there is dust in confined spaces with the proper mixture of air (or whatever it is) this will finally bring about explosion, there is always danger?

Mr. PRICE: Yes, Mr. Miner. We say that any dust which burns will explode. I say practically all dust because we must qualify the cause. We have never had an explosion of hard coal dust to my knowledge, and it burns too. All other dusts explode.

The metals come in and they always raise a question. Now we have gotten down to this simple formula. If the dust burns, it will spread fire through this mass of

dust and air which must be mixed in proportion and concentration the same as gasses. Illuminating gas has a range of five and one-half per cent to 14 per cent. The gas will run until you reach 14 per cent. Keep on adding gas and you get to nine and six-tenths per cent of gas and five and four-tenths per cent air, you have the most explosive mixture of highest pressure. You continue to add and when you get to 15 per cent of gas and five per cent of air, you cannot make an explosion; it goes out. The same thing is true of the dust. You have the higher and lower concentration and when that dust and air is mixed the fire travels through. I say a fire because in this type of explosion it is very hard to draw the line between a fire and an explosion. Any fire may be an explosion if your dust is fine enough and the flame travels through. An explosion, after all, is nothing more than the rapid flame propagation building up a pressure which causes explosion. It is quite different than if we had dynamite right here and it went off. The greatest violence in gas explosion will be at the point where it starts, but that is not true with dust explosions. You soon learn not to look for the cause where you have the greatest damage. Go back beyond that, probably where there is not very much damage, other than a little fire or little flash, but that fire ignition had enough concussion to shake this dust loose, to shake it off the girders and ledges, and that dust coming into the air feeds the flame and causes the secondary explosion; the technical secondary explosion would have to come from the first.

An Interesting Experiment

While the operator is setting up the movie machine I want to tell you of an interesting experience we had recently in connection with this dust. It goes to show there is nothing new. If you think you are working on a new subject you would be surprised when you have gone far enough with the demonstration of explosion with dust to find that very high pressure is produced with a mixture of dust and air of right concentration. Some time ago the engineers thought it would be well if we could determine a way to utilize the pressure to operate an engine on dust instead of gas. The work was done and it was found that you could introduce dust and an engine would run the same as with gas. There is not one doubt in my mind that we will have starch and flour dust in engines some day.

We published this in "Power" magazine. A German on the other side read the article and he replied immediately. "Well boys, that is a fine story but I have been doing it for five years over here. I have some engines operating on German coal dust. If you will send me over some of your dusts, I will try them out and see how the engine runs." We did so, and received a report that the engines operated just the same. He told us he was a pupil of Dr. Diesel, and when Dr. Diesel designed the engine he intended to use coal dust, but on account of an abundance of oil, he used oil instead. The German was able to overcome some of the difficulties that had confronted Dr. Diesel.

I wish I could say something about spontaneous combustion. Dr. C. A. Brown has just furnished Bulletin No. 141 on spontaneous combustion. Many folks think we are talking about something new when we talk about spontaneous combustion. He shows in this bulletin that a few years after the birth of Christ, some of the Roman writers discussed spontaneous combustion and warned against it, and the Greeks discussed another case of spontaneous combustion caused by the water being in the product.

(Moving pictures of dust explosions were then shown on the screen.)

CHAIRMAN COOPER: We are considerably behind our schedule so we will go right along with the next number on the program, by Mr. William A. Sullivan, Loose-Wiles Biscuit Co., Kansas City, Mo. I want to introduce Mr. Sullivan to you as the next chairman of the Food Section.

Accident Experience of the Food Section During 1930

By W. A. SULLIVAN
Chairman, Statistics Committee

Injury experience in the Food Section during 1930 and previous years has many favorable features, but there are real problems for solution. The records of representative members during the last two years, for example, show a decrease in temporary disabilities but an increase in the frequency of serious injuries. Consequently, there has been a rise in our severity rate during this period. Our aim, of course, is to reduce all types of injuries. In addition, the records show that our small establishments should pay more attention to safety; the large plants are responsible for our rates being below those for all industries combined. Furthermore, to continue the development of reliable information on the accident experience of our members, we need the support of those companies that have not been reporting to headquarters. The number of plants reporting for 1930 was the largest in the history of the section, but there were still about 100 members who failed to contribute.

The frequency rate for the entire section, based on reports from 189 establishments, was 17.72 and the severity rate, 1.48. These rates are lower than those of 18.47 and 1.97 for industry as a whole; but our frequency rate, in comparison with rates for the cement and steel industries, which are commonly considered hazardous, is somewhat high. These industries, through years of well organized safety efforts, have reduced their frequency rates until now they compare favorably with such low hazard plants as textile, laundry, and printing and publishing. Among 28 major industries in 1930, we ranked fourteenth in frequency and eleventh in severity.

There were marked differences in the injury rates for various branches of our section. Frequency rates ranged from 12.0 for bakeries to 30.27 in milling establishments. The next highest are found in canning and preserving plants and sugar refineries; dairy products occupy an intermediate position, and corn products manufacturers and confectionery establishments have lower than average rates. Fatalities occur in all groups, but are highest, in proportion to exposure, in corn products plants and milling establishments. Corn products plants also have the highest permanent partial disability rates followed by canning and preserving factories, and milling establishments. This experience shows what are the largest safety problems in our section.

Differences in type of work, however, do not account entirely for the variations in injury rates. As previously indicated, small plants have, on the whole, higher injury rates than larger ones, regardless of work done. The records of members with less than 500 employees show, nevertheless, that they can achieve excellent results in accident prevention work. Three milling establishments, each with less than 100 employees, led their division with no-accident records. This group, you will recall, had the highest frequency rate in 1930. A food extract concern, employing 124 people, has gone two years without a lost-time injury. Other no-accident records during the last two years were established by a baking company with an exposure of 62,000 man-hours, and a milk bottling plant with an exposure of 64,000 man-hours.

Even though large plants have done excellent work in reducing injuries, possibilities for future improvement also exist in many of them. An inspection of individual records of companies reporting for 1930 shows variations from 9.0 to 35.0 in the frequency rates of dairies with over 1000 employees. We also have several large bakeries with higher than average frequency for that group. Sim-

ilar wide differences in the experience of plants of the same size are to be found in all divisions of our section.

Reductions in the frequency and severity of injuries since 1928 are most accurately measured by the experience of 93 establishments that have reported in each of the last three years. These identical companies reduced the frequency of lost-time injuries 22 per cent from 1928 to 1930, but severity increased 20 per cent. The records of over 1500 identical establishments in all industries were better; showing reductions of 28 per cent in frequency and 8 per cent in severity during this period. It is frequently asserted that curtailed employment makes accident reduction easier. If so, the food industry has not benefited quite so much as others. Our 1930 experience indicates a decrease of about 12 per cent in working time among identical companies compared with about 17 per cent for all industries.

The contrary trends of our two injury rates may be accounted for by a sharp reduction in temporary disabilities but an increase in serious accidents. The marked decrease in the frequency of temporary disabilities was accompanied by a decline in the severity of these cases. Permanent partial disabilities increased in both frequency and severity from 1928 to 1930 although in the latter rate there was a slight decrease from 1929 to 1930. Fatalities, therefore, had the most adverse influence on the 1930 severity rate. Industries in general are finding it difficult to reduce serious accidents in the same proportion as temporary disabilities. This situation raises the question as to whether serious hazards may not have been overlooked in the process of eliminating minor ones. Also, the increasing use of machinery in practically all industries has probably introduced new hazards causing more serious injuries. Then, too, hazardous conditions still exist because of the large cost which their elimination would entail through engineering changes or the lack of a better method of doing the work.

Injury rates may have been increased artificially by better and more accurate reporting. This would apply particularly to permanent partial disabilities with their arbitrary scale of time charges. It has also been asserted that compensation awards have become more liberal in recent years which, if true, would mean higher time charges than for the same injuries several years ago. Whatever may be the real reasons for the increase in serious injuries, we need to devote study to them.

Serious injuries, at the worst, do not occur often and many of them are the result of unusual accidents not easily foreseen. Some companies have an arrangement whereby each company receives a full description of every fatality. In this way, each company may avoid the occurrence of a similar case in its own plants. This plan might be extended to cover other serious injuries.

In conclusion, your sectional officers appreciate the excellent support you have given them by responding to their requests for your 1930 injury records. We hope that next year will show another fine increase so that information on the accident experience in this industry will become broader and more valuable each year.

CHAIRMAN COOPER: I think a paper like that, composed largely of statistics, is rather hard to discuss. You cannot remember all the figures as he reads them along, but if there are any particular points on which you would like any additional information, he will be glad to answer your questions.

The next speaker on the program is a representative of one of the largest canning industries in the world. I used to be a steamship engineer and ran a boat between New York, the British Isles and Africa, and I ran onto a nian from Libby's one time, down in Madagascar, buying beans. They are nearly all over the world and if anybody knows anything about the canning industry and the hazards of it, it ought to be Mr. Drews, of Libby, McNeill & Libby, Chicago.

Safety in the Canning Trades

By E. E. DREWS
Libby, McNeill & Libby, Chicago

My subject is a very widely spread topic inasmuch as it covers all eatable items handled, and it is hardly possible for me to cover the entire Food Industry; I am directly connected with our Chicago plant which handles the canning of meats only.

This is my first time to attend your section although I have attended the conventions for the past five or six years. I have been more interested in the Packers & Tanners Section on account of our slaughtering operations and the cutting of meats. We have very recently divorced ourselves from these operations, and we are now therefore more closely affiliated with the Food Section.

There is practically no difference between safety work as applied to the Food Industry and other industries. We all have our own methods and systems to help this one humanitarian cause of trying to eliminate serious accidents. There is no standard method of handling accident prevention work in any industry. We are required by state laws to protect the workers and certain rules are outlined for us to follow. These, however, do not in the least cover everything in all fields.

Society says that industry must pay for injuries entailed in producing the goods that society consumes and, of course, all the cost is borne by the consumer; so if we as safety engineers lower the unit cost of production by decreasing the industrial accidents we fit into the economic scheme of things as we find it today.

The impression seems to prevail that insurance carriers make the insurance rates and also that the insurance carriers pay all the bills. Both assumptions are wrong for the State Legislatures determine what the injured worker shall receive and the insurance carriers are but the agencies who handle that part of industry's money that is set aside by law for the purpose of assuring that the injured worker will be paid.

These guardians of the public, or the legislators, have even said that no casualty insurance company can write fire insurance, because something may wipe out the assets of the casualty company and some injured or their dependents might thus be deprived of their compensation money. If the benefits are increased at any time by the legislature, the State Insurance Commissioner issues an automatic proportional rate increase to cover it, for if the cost of industrial accidents goes up, of course, industry has to foot the bill. I merely state this to remind you safety engineers that the insurance carriers do not make the law. You are close to your injured and you have no doubt often wished that this or that case would be paid more money, but it is necessary to comply with compensation laws of the various states. Provisions are made in the law to differentiate between the plant with the high accident cost and the plant in the same line with the low accident cost and that is where we fit into the economic structure. We can justify our position by saving in claim cost, and the resultant saving in insurance costs, more than we cost our employer. But none of us will agree that the money paid can compensate fully for the loss of an eye or an arm.

Society is not benefited by industrial cripples, and the difference between complete restitution of earning power and the earning power of the cripple is, of course, the measure of that loss.

Now, how can we prevent the industrial accidents? As engineers we look first to the causes and then we find the remedy. The causes can be well summed up

into three divisions—inattention, ignorance, and willfulness. So we are inclined to charge our accidents up to one of a large number of causes while in fact there are only three.

Study accident cases as you will and you can classify each one of your accidents under one of those three headings—inattention, ignorance or willfulness on the part of some person.

Each of our plants has a safety inspector or committee, enjoying the fullest cooperation of the management. Foremen are the "keymen," as they are in a position to carry out the safety policies of the company. Their job is to send out of the plant quality products at the lowest cost. Part of this cost is compensation, accident prevention and other expenses that go into the manufacturing of that article. That is the reason why we hold each foreman responsible for the complete management of his department.

We do not believe in holding rallies of all employees where someone mounts a box and preaches to the tired and hungry workers about being careful. One good foreman's meeting, with the men sitting comfortably with their pipes, while we talk over the foreman's position in the organization and how they depend on him is worth a dozen open air shop meetings.

The foreman can either make or break any employee and the employee knows it, so we do not try to take the foreman's place in his relations with his men because the men will "yes, yes" you and then when you are gone they will do the job just the way the foreman let them do it. Our meetings are held weekly in our Supervisors' Class Room, limiting them to one hour, and wonderful results have been obtained.

Safety campaigns have also been discontinued. It may be said that we conduct a yearly campaign, as it is found that continuous steady application in conducting accident prevention work brings far better results.

A statement of department standings is furnished each foreman—monthly listing—minor, major, N. C. C., neglected and infected cases, as well as lost-time accidents, showing new, old, hours, and salary, also the number of accidents occurring during each hour. These figures are shown in comparison with previous month and year. We also distribute a monthly "Safety News" to all foremen.

All employees hired are questioned as to their safety standing and instructed by the employment manager concerning our rules. A medical examination is given to all new employees before they are turned over to their respective departments, at which time they are instructed further on requirements pertaining to the reporting of all accidents at the time they occur regardless of how slight they may be. Employees are encouraged to report all cases promptly and they are reprimanded if they neglect to do so.

Our medical department writes up all accident reports and notifies the safety department when accidents require immediate investigation. A careful check is made daily to see that all injured persons report back for treatment at time requested.

Our operations on the Chicago plant produce any number of hazards both in the handling of material and machinery. The plant is divided up into twenty-five departments, the largest of which is the can factory manufacturing lard pails and all our cans for canned meats. Approximately 70,000,000 food containers were manufactured during 1930, using 22,000,000 lbs. of tin plate. You can readily visualize the hazards connected with this one department. Seventy percent of our minor accidents are tin cuts and scratches. So far this year this department has not had a major accident. Last year we had several—one of which caused the dismemberment of a thumb and forefinger. A press operator violated all rules and reached around the side of the guard to remove a mis-

stamped body. The lug on the clutch broke, wedging the broken piece between the hub of the fly wheel and collar and causing it to operate just as the operator's fingers were under the die. On some press operations the left side was never guarded on account of guaging the sheet while cutting lithographed lard pail bodies. However, this accident brought out several ideas and our presses were immediately equipped with an inexpensive guard.

The canning department is next in size, packing 60,000,000 cans of meat food products annually.

We have not had a major accident in connection with operating machinery since August, 1929. We had several other major cases in the form of severed tendons caused by knives, a fractured wrist caused when slipping on the level, and a fractured arm caused while lifting.

There are a number of operations in the canning department that bear watching while handling certain food products such as picking chicken meat from the bones. Bone scratches are common and require prompt medical attention. In connection with this as well as when peeling potatoes, onions and other vegetables, we have knife cuts. There are also many dangerous machines in use. Without doubt, the most dangerous of these is the Enterprise hasher. Experience has taught that regardless of the size of the feeding table around the hopper which was designed to keep the operator's hand from coming in contact with the feed screw or worm, operators occasionally stand on a box or bench while feeding meat to the hasher, allowing them to reach feed screw should they so desire. Therefore a galvanized iron feeding table three feet square and eight inches deep, with a cover which completely covers the hopper, has been adopted. An electrically controlled flap, fastened to top cover of table at open end where the meat is forced into the hopper, shuts off power when the flap is moved one-half inch.

Stationary knives used in the casing departments are protected with an aluminum guard the length of knife blade and about one-half inch from cutting edge of blade and securely anchored.

Since the process of boning meat requires that the knife blade shall follow the bone as closely as possible, a drawing traction is exerted on the knife occasionally, the point of the knife becoming imbedded in the bone. When the operator applies pressure the point of the knife is released and unless the operator is wearing a leather apron serious injuries, sometimes fatal, usually result as he is pulling the knife toward him. Therefore, I believe the wearing of leather aprons by ham boners should be strictly followed.

By adopting chip guards in lieu of using goggles for grinding purposes a decrease in eye injuries has been experienced.

To overcome the hazard of climbing ladders, oilers in some plants have a standing order to provide extensions for all grease cups to bearings.

It has become more and more evident that injuries resulting from unguarded machines and equipment are rare occurrences, so closely have the industrial safety standards been applied. However, the standards do not begin to take into consideration all the hazardous conditions prevailing around plants. For instance, there may be an unguarded belt and pulley, also a poorly stocked pile of material which is liable to fall unless repiled properly. The standards specifically state the belt and pulley shall be guarded while no mention is made of the improperly piled material. Therefore, in this instance the real hazard is the unsafe piling of material and not the unguarded belt and pulley.

It has been truly said that if we prevent something, nothing happens. Just so with the prevention of injuries. It is difficult to measure something we cannot see, therefore, we never know how many lives have been saved and injuries prevented by proper care, education, safety devices and other factors.

F. A. HASSE (Corn Products Refining Co., Chicago): Gentlemen, it has been necessary for our chairman to leave us and he has asked me to take his place. After listening to the interesting paper, the meeting is now thrown open for discussion on this subject. Mr. Drews, did you say that the new employee is instructed by the employment manager in regard to rules in the plant?

Mr. DREWS: Yes.

The meeting adjourned at four o'clock.

ADJOURNMENT

Thursday Afternoon Session
October 15, 1931

Joint Meeting of the Delivery, Taxicab and Bus with the Food Section

T. A. HORROCKS, Chairman
Minnesota Truck Owners Association, Minneapolis, Minn.

The joint meeting of the Delivery, Taxicab and Bus Section with the Food Section was called to order by T. A. Horrocks, General Chairman of the Delivery, Taxicab and Bus Section.

CHAIRMAN HORROCKS: The first subject that is to be presented this afternoon is a very important one. I take great pleasure in introducing Mr. F. C. Oldham.

Vehicle Maintenance—A Factor in Safe Distribution

By FRED C. OLDHAM

Safety Supervisor, Richards Storage Corporation, Grand Rapids, Mich.

Coupled with accident prevention, we usually find statistics, and there are those speakers who can reel off statistics by the yard. And this reminds me of what a newspaper friend of mine once said when he was giving a talk: "If all after-dinner speakers who quote statistics about this, that or the other thing, were laid end to end—the world would be better off." Statistics are undoubtedly very important in reaching a solution to a problem, or for finding causes and results of accidents in connection with safety and so on, but I know you are more interested in hearing common facts, coupled with as few statistics as possible.

Vehicle maintenance, as you know, should begin the moment a car leaves the factory. The manufacturer stipulates a moderate rate of speed the vehicle should be driven for a certain distance, and the principal reason for that, as I see it, is to keep the car in the best possible working order while being broken in and thus insuring longer life to the vehicle.

Vehicle maintenance is an insurance—a mechanical insurance—and is just as important from a safety standpoint as property damage and public liability insurance, or any of the other insurances you may carry on your car. It protects you against unnecessary items of expense that usually crop up when a vehicle is not properly taken care of.

Vehicle maintenance should be viewed in the same light as the Chinese consider their doctors. Chinese doctors are paid by their clients to keep them well. We pay our doctors to make us well—after we have become ill. We wait until we are sick, then call the doctor in and expect him to perform a miracle and make us well over night. The comparison with vehicle maintenance is obvious.

Our method is usually the most costly procedure of the two, and when you let your automobile or truck go so long that it hammers and knocks, and your tires are badly worn, or the car wobbles all over the highway, then you are running true to form with our modern way of thinking, and then you expect the garageman to make a brand new car out of a decrepit old wreck.

Just think how much more economical it would be, from the standpoint of the purse, and how much more productive to safety it would be, if you worked on the assumption that automobile mechanics are trained to keep automobiles and trucks in first class running order, than to leave it for them to doctor the cars up after they had all gone to the dickens.

Now when I refer to car, we are going to use that to cover either a car or a vehicle, to cover trucks, taxicabs, automobiles or anything of the kind that runs on four wheels on the highway.

When it comes to the subject of vehicle maintenance, I don't doubt for one minute that every man in this room knows as much, or maybe more than I do, about the care and upkeep of motor vehicles, but you will find when I get further along with this paper there are some points many of you overlook, and the importance of these I intend to drive home to you as emphatically as possible.

Let us consider the various important parts of a motor vehicle, beginning with the motor. From the standpoint of safety, about all I can say about the motor is that all gasoline connections should be tight and there be no leakages. The wiring should be in good order, with the prime idea in mind of avoiding fire. As regards the mechanical set-up and maintenance of the motor, there is no need for us to discuss that because every fleet operator is being continually bombarded with literature, and is being called on by salesmen who keep impressing on him the necessity of using good oil, and of changing the oil every 500 or 1000 miles. They keep your attention attracted to the oil filters, if you use them, and the necessity of changing your plugs every 10,000 miles or so, and your mechanics, if they do what they are paid to do, will see to it that the motors are kept in good running order. This applies also to the transmission and differential.

A fleet owner's natural pride will see to it that the paint jobs and general appearance of his vehicles will look well at all times.

With regard to the tires and batteries, we find we can fall back on the service being rendered by the larger tire distributors, who will on a contract basis make a weekly check of the air in the tires of all your vehicles, check the batteries and fill them with water at the same time. An arrangement such as this is considerably more positive than leaving it to the care of the driver or a garage mechanic.

With the laws that are now in effect in a great number of states, we find that periodically the police, with the assistance of the garages, conduct brake testing campaigns. This of course means that brakes will be watched more carefully, the horn will blow when needed, the lights will be kept in good working order and properly focussed. You will also find the rear view mirrors are where they belong and the windshield wipers properly working.

Most talks on vehicle maintenance are either of a technical or a mechanical nature. The speaker will usually attempt to tell you how a vehicle should be maintained and kept in good running order.

This is not the purpose of this paper. It is our desire to look at vehicle maintenance from the standpoint of safety—first, last and always.

Now, inasmuch as a vehicle standing still is not liable to be the cause of accidents, unless improperly parked, we must therefore consider the vehicle in motion. From the time you start your car to drive somewhere, the steering wheel is in your hands at all times and this is the foremost controlling power you have over that tremendous weight which is under you, rolling along over the highway, and which, when not under proper control, is a death-dealing instrument to yourself and others. So when we consider a car in motion we are forced to consider the controlling devices, or the steering mechanism and running gear.

Here is the spot where I place my finger on the motor vehicle and say—"This is what I consider the most important part of the car, and it is that which needs the utmost of attention from the standpoint of vehicle maintenance—a factor in safe distribution."

I will venture to say there is a very small percentage of men who have had the front end or steering assembly of their cars properly checked within the last six months. In spite of the fact that a car may be new and may only have been away from the factory for a short time, a change takes place in the front end of that car that, without an atom of doubt, will change the alignment of the wheels.

Two of the reasons that bring about this change are the gradual sag of the springs and the use of the front wheel brakes. The front end of your car is adjusted to within one one-hundredth part of an inch in its angles and connections, when it leaves the factory. Such things as the amount of toe-in, the amount of "pitch" or "camber" and the degrees of "caster" are scientifically figured out by the engineers, and any change from the correct adjustment will gradually bring about that well-known "shimmy", or the car will be found to wander and weave, or a condition is brought about whereby the car has to be continually "steered."

There are hundreds of men driving cars over the highway today with a shimmy in the front end that would do justice to a Hula Dancer, and these fellows either know or do not know why the car is difficult to handle, but the majority of them have enough sense not to allow anyone else to drive the wobbly outfit, except, perhaps, their mother-in-law.

Again, I say, from a standpoint of safety we have got to consider the controlling features of the automobile, and that is the front end.

Suppose we consider what may go wrong in this part of the vehicle and the effect it will have on the control of that car.

Twisted axles are very common today and the cause for this is principally due to the front wheel brakes. Just imagine—when you are driving along the highway at 50 miles an hour or so, and you jam on your brakes; what happens? The tendency is for the weight of the car to dive or heave itself forward. The action is upward in the rear and down at the front, and if exaggerated would cause the car to turn end for end. Now, if one of the front wheel brakes grabs before the other, and this can happen very easily, the axle at that spot is going to receive the brunt of the entire weight when the car pitches forward. Therefore with the back pressure of the brake and the dragging of the tire, it is the axle that takes the shock, and there is no small wonder that with this taking place every time you stop the car, that you have twisted axles.

A twist in the axle upsets all the delicately balanced and adjusted steering angles, principally toe-in and caster. And it is this change that brings about such things as shimmy, hard steering, wandering and weaving, cupping and excessive wear of tires, making the car hard to control. It immediately places that car in the category of a hazard to public safety.

I do not want you gentlemen to feel for a moment or think that I am trying to sell an idea of brake or wheel lining or anything like that. The idea I want to get across, based upon my knowledge of motor vehicles is that since the advent of four wheeled brakes and balloon tires, the matter of misalignment of wheels is something new, something we have not had to cope with in the past. The average talk that you might hear on vehicle maintenance has always been change your oil, do this and do that and the other thing, but I have never yet heard this subject of wheel alignment brought out. So when I found from investigation that a great number of accidents were taking place on the highways, due to defective steering mechanism, I naturally concluded that here would be the meat of a paper on vehicle maintenance, a factor in safe distribution.

We find the most careful drivers today are those fellows who risk their lives on the Indianapolis Race Track. The cars they drive have been designed and built by engineers from a scientific standpoint with the thought in mind of studying the changes that take place in the vehicle after a long grind at high speed. The public greets these contests as sport and they get plenty of thrills at seeing these fellows race madly around the track at a tremendous speed, risking lives and limbs. No one knows what risks they run more than these drivers themselves. They are cool and analytical during all stages of the race. They know every feature and part of their respective cars, and will only enter the race when they and their mechanics know, absolutely, that the car is right. Practically the last thing they do before starting is to have the wheel alignment and running gear of their cars checked by experts, on

special wheel aligning machinery, which has been installed at the race track only the last couple of years.

I was told that in 1930 in the city of Evanston an extensive check-up was made on motor vehicles and it was found that 70 out of every 100 cars—think of it—seven out of ten or 70 per cent, had defective running gear; in fact I could go so far as to say they had defective steering mechanism. I think you will agree that a condition like this that applies to one city will be found to be very much universal; and when we think in terms of safety, I know you are with me when I say this is a serious, a very serious situation.

If you go to the average garage and ask them their opinion of it, they will say, "Yes, that fellow's car came in here; yes, it was wrecked. We found the wheels bent and toed in, due to the accident. He probably went to sleep and fell off the highway." The driver himself probably would not admit it, but in these particular instances, we have the stories of the drivers as well as the mechanics who actually checked the cars.

In order to get some definite facts concerning accidents which resulted from defective steering mechanism, I visited our local Police Department, and here I might state that the police of Grand Rapids are noted throughout the country for the statistics they keep in connection with accidents. But they were not able to give me any information at all, other than the number of motor cars involved in accidents that had defective brakes. I therefore went to the representative of the Bear Manufacturing Co., who is conducting a school on wheel alignment in Grand Rapids. I asked him how many cars came into his shop for adjustment of the steering assembly, that had featured in accidents due to the misalignment of the wheels; and I asked him if he would give me the data on the next 100 cars that came to him for a check-up. Would you believe it, when he turned this report over to me we found that 19 out of those 100 cars had been involved in accidents, which resulted in a total cost of many hundreds of dollars for repair bills, hospital expenses and other unnecessary costs and—one death. Each of the accidents was the direct result of defective steering mechanism and running gear.

Here I will give you the report, as given either by the driver of the car in each case or that of the alignment mechanic who checked the cars:

- Case No. 101—Car shimmied, went into ditch, broke axle and wrecked car. Driver in hospital four weeks at Kansas City.
- Case No. 102—Car pulled to the right and turned into yard. Driver couldn't pull it back, so ran into tree. Wrecked car.
- Case No. 108—Man, wife and three children. Driver claimed car would weave from one side of road to the other—he tried to pass a load of hay and in doing so the car swerved to the left, and before he could straighten up they went into the ditch. He showed doctor's bills paid for accidents to family, amounting to \$82. Incidentally he was many miles from home.
- Case No. 114—Car wandered and weaved—16 year old boy driving. Crashed into ditch and turned over.
- Case No. 118—This car never steered right, the driver claimed. The wheel jerked out of his hands and the car crashed into bridge abutment.
- Case No. 129—Car shimmied—driver lost control, went through wire fence into ditch.
- Case No. 136—Driver claimed car pulled, first one way, then another. In turning corner he couldn't straighten out and ran into another car. Both cars were badly wrecked.
- Case No. 146—Car shimmied—side swiped lamp post—sister of driver injured.
- Case No. 157—Car turned hard to the right—the steering arm was bent; while the driver was turning into the garage, the wheels locked and car tore garage door off.

- Case No. 159—High speed shimmy. The car jumped right off the road and hit a tree. Broken door glass cut driver's arm badly.
- Case No. 172—Car shimmed, jumped road and turned over.
- Case No. 174—The car wandered and weaved—ran off left side of road and hit a post with left wheel. Woman passenger hurt and was confined to bed for a week.
- Case No. 182—This car was hit by another car that undoubtedly had a bent steering arm and drag link. Driver claimed that, as he hit a bump in the road, the wheel was jerked from his hands, causing his car to crash into another, turning it over on its side in the ditch.
- Case No. 183—This driver claimed his car would wander from one side of road to the other. He took his hands from the steering wheel for a moment and when he came to he and the car were in a farmer's field. Both badly wrecked.
- Case No. 191—Shimmy—a garage man riding with the driver told him to step on it and cut through some traffic. The driver did so, costing him two fenders, radiator, head lights, extensive axle work and a broken nose for his 12 year old boy.
- Case No. 193—This car had been worked on by three different garagemen—no special equipment. It had a shimmy and loose steering connections, also a bent steering arm. The car ran off the road three times; sister's arm was badly cut with broken glass and it was only after that he awakened to the fact that the car had to be properly repaired.
- Case No. 197—Driver claimed car kept pulling from one side to the other. He got mad and gave the wheel a jerk, and before he could pull it back had gone off the left side of road and over steep embankment. Several bad injuries.
- Case No. 198—This car was checked two weeks before the accident and the driver was warned not to drive faster than 45 miles per hour. According to his story afterward he had to speed up to faster than 50 miles per hour to pass another car. His car broke into a shimmy which was so bad he had to release his hold on the steering wheel. The driver of a car ahead slowed down at that moment and before driver No. 1 could slow up and regain control of his car they crashed. I learned he paid a hospital bill of \$200 for the other man, besides the expense of repairing two cars. He had no insurance. Here is a case of a twisted axle and unbalanced wheel and the driver simply couldn't find time to have it repaired.
- Case No. 199—This car was checked and found to have a bent steering arm and unbalanced wheels. When the car was tested the owner was warned that the high speed shimmy in this car was unusually severe owing to the double cause for shimmy. He was in too big a hurry to have the trouble corrected at that time and said he would come in later. A few days afterward, however, while he was trying to pass another car, his car broke into a shimmy, rolled over into the ditch twice, killing the driver's father who was riding in the rear seat.

These few cases only tend to show that in a great many cases where there are accidents there is probably an underlying cause that is not apparent to the general public and perhaps not apparent to the driver's themselves.

The gentlemen here who have fleets of trucks and cars should be interested in accident prevention and vehicle maintenance of the right sort for nine different reasons which I will briefly outline:

- 1.—Abnormal depreciation of equipment. Frequent accidents increase the maintenance costs and lower the trade-in values of the cars.

- 2.—Necessity to invest in extra equipment to take the place of that laid up for repairs due to accidents or neglect.
- 3.—Repairs—Owing to the high cost of collision insurance few fleet owners carry it and are obliged to stand the cost of repairs.
- 4.—Damage to cargo being carried. Damage claims result which are costly.
- 5.—Accidents cause unreliable delivery which creates ill will on the part of the customer.
- 6.—Adverse advertising value. Poorly maintained equipment is poor advertising.
- 7.—Effect on efficiency of drivers. If equipment is not right, drivers are more prone to have accidents.
- 8.—Loss of good will. If the equipment is dangerously or carelessly operated it reflects badly on your company.
- 9.—Increased insurance rates are caused by a bad accident record; and properly maintained vehicles carefully driven will create a saving by decreasing your insurance premiums.

I will give you a concrete example of that. In one of our branches, in our Grand Rapids branch, we operated in twenty months seventeen moving vans 312,250 miles without an accident or traffic violation of any kind. Prior to January, 1929, we had been having accidents, more than our share. In January, 1929, we joined up with the local Safety Council and we started a safety movement among our own men. Immediately accidents began to decrease. Our insurance premiums were very high. At the end of 1929, that year, we were fortunate enough in winning the Inter-fleet contest for the city of Grand Rapids, and when 1930 came along and we were out looking for insurance, on the strength of our performance in the past twenty months—less than twenty months—our insurance premiums were reduced 57 per cent.

Just think of it! Fifty-seven per cent on our automobile insurance and our compensation insurance was reduced 12 per cent, just on account of the fact that we had a very good accident record; so it pays a great deal to watch that very closely.

In conclusion, I just want to impress on you strongly that if you keep the thought of SAFETY foremost in mind where your car or truck maintenance is concerned, you will naturally create an investment that will pay you a high rate of interest, and save many lives!

CHAIRMAN HORROCKS: I am very much impressed with what Mr. Oldham said about decreased premiums on insurance. It has been my experience where fleets have had intensive safety campaigns. Safety campaigns among individual fleets are a mighty good investment that returns fine dividends. If you have any questions to ask, Mr. Oldham will be very glad to answer them.

W. E. FELLER (West Chester Lighting Company, Mount Vernon, New York): Is there any question about the variations possible in reporting? No two employees have the same method of reporting, and that might have something to do with it.

MR. OLDHAM: We are quite sure those reports are correct, for this reason: Naturally a corporation having vehicles that are involved in accidents is going to be called on to pay insurance to the other fellow, if there is a collision or there are two vehicles concerned in the accident. And at no time did we have to call on the insurance company to pay any claims during that entire period. That was one thing.

The other thing is that every time a truck comes into our garage from a trip it is very carefully checked by our garage mechanic. If there is a dent in the fender or a scratch along the side of the van,—our vans are highly ducoed or polished—it would be noticeable immediately and the driver would have to explain.

C. W. TURNING (J. H. Harper Company, Duluth, Minnesota): A year ago I think we had some rather interesting discussion regarding check-ups at intervals of the truck in the garage maintenance department.

MR. OLDHAM: We have not any definite intervals in which we check them up other than the fact that our drivers are required to report any defect, no matter how slight, as soon as noticed in the truck. We endeavor as much as possible that each

driver has his own truck; but I switch those drivers from time to time, put another man on another fellow's truck, just to catch anything that may pop up. Also about once every week, the garage mechanic and I go out and drive each one of those vehicles. I will pick a truck here and there, drive it myself and check the brake, horn and lights and everything in connection. That is because we want to keep our insurance down.

CHAIRMAN HORROCKS: If you find a defect in the car, it might have been caused by the carelessness of the driver on the trip. Do you find your drivers report those faithfully, or do they often come up by chance?

MR. OLDHAM: No. I think the drivers report them faithfully. It depends very much on the type of driver. Every driver we have is a married man, and with one exception they have families. They know what they are up against, at this particular time of the depression, if it becomes a matter of looking for a job. There is no man in our employ who needs to fear his job, if he tells the truth; and any man that we have who has anything unusual happen in the way of a slight accident, or who breaks a headlight lens or has a damage to a piece of furniture while loading or unloading it, knows he can come to me in the utmost confidence and tell the whole story.

They work along with me, for this reason: If one man is prone to have more than one accident, or a series of accidents, he is not going to be fired. We are going to investigate and find out the real reason for his having those accidents, from what you might term the psychological standpoint, and for that reason we find the fellows work with us a whole lot better. They realized that if they have something go wrong, which later on is discovered, they might lose their job and it would be better to work with us from the first; so I think if you have the confidence of the men working with you and for you, you do not need to have much trouble with the men telling falsehoods. I do not believe they would.

CHAIRMAN HORROCKS: On the method of checking the tires and batteries, I think you meant you had some kind of arrangement with the tire companies that take care of that question. I wondered how general that arrangement is. I know it is in force in a number of places, and I was wondering how general the practice was.

How about yours, Mr. Mineur? How do you check tires and batteries? Are they done systematically?

MR. MINEUR: Yes. They are. As soon as our cars come in off the day's run, the man we call the gas man checks the tires all the way around by striking them, but does not test the pressure and the exact poundage.

CHAIRMAN HORROCKS: How about batteries, Mr. Lundsteadt.

MR. LUNDSTEADT: The tires are checked every day and the batteries are checked every day by the garage mechanic.

MR. FELLER: We have more than 400 cars operating every day. We have night mechanics who make it their business to inspect these cars every night. They not only check up their tires, batteries and all that, but the mechanism generally. In other words, if the driver reports in the log book anything wrong with the car, that is taken care of first, and then after the principal part of the work is done they go back and have a systematic way of checking the cars that are turned into that particular garage. In that way, I think, we have a very careful check on our cars.

WALTER C. BECKER (Chicago Surface Lines, Chicago): I wonder if Mr. Oldham is not taking advantage of some of us maintenance men? I would like to ask him if in those cases that he spoke about, whether or not those were controlled fleets or whether they were just the ordinary individual automobiles? In other words, it seemed to me that some of the causes of these accidents might have been the human element instead of the mechanics of the vehicle.

MR. OLDHAM: That may be true. In each one of these cases, they were a privately owned and privately driven automobile; but what will apply in a case of an automobile or one large truck or small truck is liable to apply in any truck regardless of how well maintained they are. It only takes one crash to change the entire set-up of

a vehicle, and where the human element enters into it, we find the commercial drivers are less prone to have accidents than the individual drivers, driving in the privately owned cars.

The point I was trying to bring up, more than anything else, was that the fleet operators should not ignore or neglect the steering mechanism of their car in making general check-up. They should give that some kind of prime consideration, because only recently we had every one of our fifty odd trucks checked, and I think there were only about two or three that were right. From now on we are watching that particular thing as closely as anything else.

F. J. MELLAR (Western Electric Company, Chicago): Mr. Oldham spoke briefly on the accident-prone driver. I am wondering if he can tell us how he analyzes these cases and how he gets at them? How he changes an accident-prone driver to one who is not accident-prone?

MR. OLDHAM: We have not had any accidents so I can not very well answer that question. What I mean by that, we have not had enough accidents to make that a very important feature in our organization, except in handling of household goods. We had one case where there was one man had reported four or five accidents in a row, possibly more than others. One day it was a broken table leg; another day he scratched a piano, and the next day it was something else; so I got hold of him one day and asked questions about it. The first thing that entered my mind was whether he got along with his wife or not. This was not it at all. It was his eyesight. He was wearing glasses and had not had the glasses changed in ten years. We sent him down and had his eyes examined, and his eyes were out of focus. We had him fitted up with new glasses, and he has not had any trouble since. That is the only concrete case we have had.

J. L. SWEETIN (Shell Eastern Petroleum Products, Inc., New York City): I would like to ask Mr. Oldham whether or not in their operation they have a central repair shop or whether they have traveling mechanics. Do you operate entirely in Grand Rapids?

MR. OLDHAM: No. We have branches at Kalamazoo, Grand Rapids and Muskegon. Our main shop is in Grand Rapids. Anything of minor importance in the repair of trucks is taken care of in Grand Rapids, but we have a very well set up garage in our Muskegon branch. The other night I had a long distance call from Albany, New York, where one of our drivers had some trouble with his motor. He called up and wanted to know how far we wanted him to go to have it repaired. If it is too far from home to send one of our own mechanics, we have it done on the grounds at the service station that represents that particular make of truck in question.

If it is one hundred or one hundred fifty miles we send our own mechanic. He has a service car and does the necessary repairs.

MR. SWEETIN: The reason I asked that question, we operate over quite a large area, and we have central garages and repair shops where we send the trucks; but we do have cases where a truck is out more or less on its own and has to go to a local repair shop. We also have traveling mechanics. In view of that fact, you can not always keep the same control over your job as you can in your own shop.

MR. OLDHAM: No, we have found cases where you have had work done in outside places and later on the work has to be done over again.

MR. SWEETIN: Another question, which might be pertinent or impertinent; that is, do you receive or have you received any letters, or criticisms claiming your drivers hogged the road, as some transportation trucks do?

MR. OLDHAM: No, not from a moving van, but from driver of a mail truck, going down the road at sixty miles, we have had that sort of complaint. We had to finally fire the driver. He hogged the road at sixty miles an hour. That was purely the fault of the driver. However, where the big trucks are concerned, the men have the rear view mirrors in such a way that they are in duty bound from the standpoint of safety to watch from the rear as well as in front and signal for other cars to go ahead if the way is clear, and pull over to the right.

We try to drive home to the driver that courtesy is one of the best forms of safety insurance that there is on the highway today.

CHAIRMAN HORROCKS: Mr. Oldham, we have all thoroughly enjoyed the subject matter presented by you. I know it has stimulated quite a lot of thought, from the number of questions asked. I want to thank you on behalf of the two joint divisions.

Now we come to a part of our program which many of us have been awaiting with great interest. The subject is: "City-wide Operators' Conferences—Their Value as an Agency for Developing Among Fleet Operators the Best Thought on Commercial Vehicle Safety and a Closer Bond of Interest Among the Same Group."

(At this point Mr. H. J. Mineur and an excellent cast from the Metropolitan Group of Commercial Vehicle Operators of New York City presented in dramatic form the sketch entitled "City-wide Operators' Conferences—Their Value as an Agency for Developing Among Fleet Operators the Best Thought on Commercial Vehicle Safety and a Closer Bond of Interest Among the Same Group." This, in mimeographed form, may be had on request from the National Safety Council, 20 North Wacker Drive, Chicago.)

F. H. DECKMAN (Columbia Eng. & Management Corp., Columbus, O.): I would be very much interested in knowing just how many of the member companies have adopted a definite disciplinary measure within their own organization?

H. J. MINEUR (The Borden Company, New York City): As I understand your question, you would like to have an expression of opinion on the part of those at this session, by a show of hands? (There are six hands.)

H. V. SCHREIBER (Capital Traction Company, Washington, D. C.): I would like to ask if any of these owners and operators have followed that up with conferences with similar groups of drivers? Do you get the driver's reaction to various problems and opinions the same as you did in this group?

MR. MINEUR: Some believe in small groups and some believe in having the entire personnel present. When an accident is reviewed, after being reviewed by the Safety Committee, the man tells about it in his own words, and the others present have an opportunity to inject any particular thought that they might have; but there is no set rule, and the groups vary according to the ideas of the individual companies.

J. L. SWEETIN (Shell Eastern Petroleum Products, Inc., New York City): I would like to take up a few minutes, for the information of this gentleman, in the operation of our Company. We start out with the idea of having all drivers in a certain district. We have five large districts and several smaller areas. We have meetings of all drivers of any kind of vehicle. We bring up in front of the meeting those who have accidents. We have the usual charts and have them explain the accident; we have the district manager, myself and the operating manager as judges. The decision as to the responsibility is made after he explains the accident.

Anybody who was working with him, his terminal manager or anybody who was supervising him may also come forward and bring up any point that he may have overlooked. After the explanation is made, the judges make the decision as to his responsibility in that accident and in very few cases has it ever been questioned by any driver or group of drivers; in fact we put it to the group as a whole in some cases, and they have given the same opinion as we have rendered, without our telling them what our decision was.

During the summer months we had small meetings, involving just those that had accidents. I might tell you that these large meetings very seldom involved more than forty or fifty drivers. In the summer months, with the smaller meetings, bringing in drivers that had accidents, we found over fifty per cent of those who were not invited come in because they liked the meetings and liked to find out what the other fellow was doing that caused him to have his accidents.

MR. MINEUR: There is one thing I did not explain, which is perhaps worthy of mention, and that is the fact that this group is made up entirely of operators. There are only two men that have attended our meetings that are not directly connected and

representing fleet operators. Insurance companies and brokers or any one of that type, any one selling a service of that kind in regard to insurance or safety are not members of that group, unless they come there as direct representatives of some operator.

However, we do expect to have at least once a year, insurance night, at which we will bring up for discussion subjects that are common or rather of common interest to the insurance men and the operators.

C. W. TURNING (J. H. Harper Company, Duluth, Minnesota): Another place where the operators and representatives are doing work is Detroit. I was wondering if there was anybody here from the Detroit Safety Council.

JULIEN H. HARVEY (National Safety Council): I can say that Detroit is doing splendid work along that line, and quite a few of the Community Safety Council cities are doing the same thing. There is one peculiarity of these meetings in New York, which has come to me as quite a revelation.

We started out and after the first two meetings we suggested that Mr. Mineur make a talk on safety committees. He said he would not do that but he would prepare an analytical outline of safety committees and have it mimeographed for the third meeting. He brought copies, spoke for five minutes, and left the discussion to the audience.

It took not one meeting to conclude that subject, but three meetings. The next subject and outline covered three months. I think the interest is because we have broken down the resistance of those people.

When you bring in a speaker from outside the organization, the fellows feel somewhat timid. They feel backward about getting up and disputing the speaker, because he is the guest from out of town and they do not want to take issue with him; but as far as this bunch is concerned, the more they can take issue with the fellows the better they like it.

There are a lot of local Council cities doing jobs of this kind, somewhat along the line of what you speak of in Detroit. St. Louis is doing it, Chicago, Kansas City, the Massachusetts Safety Council in Boston; in fact there are probably eighteen or twenty such organizations. However, we have no local Safety Council, as such, in New York City. We have there a branch office of the National Safety Council, but the set-up of our fleet group could be attempted in any city not now having a Community Safety Council. It is just a question of getting a bunch of the operators together. There is no expense attached to such a series of meetings. In New York they tacked twenty five cents on to the dinner, I think, and that takes care of all postage and anything of that kind. So if any of you are in a community where there is no safety council or no work of this kind being done, I think personally it will be a splendid thing to take the idea and sell it to a half dozen or more of your fellow operators and see what you can do. My prophecy is you will do exactly the same thing as we are doing in New York, with the group there.

CHAIRMAN HORROCKS: How often do you meet?

MR. MINEUR: Once a month.

CHAIRMAN HORROCKS: I am sure the Section appreciates very much the efforts made by Mr. Mineur and his Metropolitan group. Some time ago, information came out relative to report forms. It was our intention to have some consideration of report forms and Mr. Sidney J. Williams of the National Safety Council staff will discuss this.

S. J. WILLIAMS (National Safety Council): In the dramatic presentation, I notice the first item discussed was the subject of accident reports. As a matter of information, I think what was said about reports in their discussion dated back a few months ago, didn't it, Mr. Mineur?

MR. MINEUR: Yes.

MR. WILLIAMS: And most of the insurance companies agreed to accept reports made on the forms since then put out by the National Safety Council, as part of Safe Practices Pamphlet No. D-4.

On those forms there was relatively little mention of the very important subject of personal causes or personal factors or elements in causing an accident. That is a very important thing; one which is pretty hard to get at. In all the Council's statistics committees that have been working on accident report forms for the last seven years, for police departments and motor vehicle departments and also for fleets, we have followed rigidly the policy of putting on those forms items of fact and not items of judgment; with the thought that if items of judgment are put on the report form you get into all kinds of complications. The report form therefore contained such items as will describe what the other driver was doing; what the pedestrian was doing, if any; the condition of the weather, light, etc.; but they have not undertaken to say what was the cause of the accident, or whether the driver was responsible for the accident, because that was so highly a question of opinion.

It has been the thought of all these statistics committees and everybody who has worked on these things, that after the initial report is made, setting forth these items of fact, then the question of fixing responsibility, whether by jury in the police court or state motor vehicle commission in the suspension of license or whether by the company in the matter of driver discipline, that question of fixing responsibility is another, a second matter, that must be kept rather distinct from the first matter of reporting the objective facts of the accident.

Nevertheless, I have come to feel that our report forms probably are defective, are incomplete, in that they give little attention to the important matter of the personal factor in these accidents. What is the answer?

It occurred to us on the staff a few weeks ago, and largely because the matter was brought up in the New York group, that perhaps the time had now come when we could put on the report form or perhaps on a supplementary report form, something about the personal factors in the accident, but carefully reported as items of fact and not as items of judgment. Now, what does that mean? Well, to say that an accident was due to the driver being intoxicated is decidedly a question of judgment. To say the driver had liquor on his breath is a question of fact. To say the driver was apparently under the influence of liquor to the extent that he talked incoherently is a question of fact, and it would be possible to put down three or four or a half dozen items indicating the man was under the influence of liquor, that could be reported as fact without making the judicial decision that the man was intoxicated.

Now, in like manner, it might be difficult to say that the accident was due to fatigue of the driver; and yet, it would be a matter of fact to put down on the report that the driver had been on duty continuously for a certain number of hours preceding the accident.

We took this up with some of you, and also with our committee of psychologists, which is extremely interested in this subject. We recently had our Mr. J. S. Baker, a staff engineer, compile a tentative schedule of personal factors in an accident which might be added to a report form or made as a supplementary report form. We sent that tentative schedule to some of the members of this Section, some of whom are in the room; we also sent it to our Committee on the Driver, consisting of psychologists. I do not know that this is the place for any long discussion, or certainly any action on that report form; but I would like to have some expression of opinion on it.

Let me mention one more thing. There have been several attempts on the part of various organizations in the past to develop schedules of personal items, running into causes, and some of them we think are open to serious criticism in that they mix up questions of fact and questions of judgment or responsibility.

I have in mind one classification which has a lot of interesting items in it, but it takes an item like "The driver was making a left turn improperly," and puts it under the head of "disobedience of rules." Now, the fact of the driver making a left turn improperly is a fact, but whether it was due to disobedience of rules or whether it was due to the fact that the driver did not understand the rule or due to the driver being fatigued and doing a dumb thing without any intention of doing it, is decidedly

a question of judgment, and that illustrates the great importance of keeping these questions of judgment and questions of fact separate.

Well, we must take up with the Executive Committee of this Section presently a more careful consideration and decision on this, and we might possibly have today some expression of opinion as to whether some of the fleets would like to have the National Safety Council, or rather this Section, through our staff, send suggestions to them of an enlarged report form or supplementary report form which would take up personality items, and then if any of you have advice to give us or suggestions on what kind of personality items should be taken up, that would very well come in the record for our study later.

We talked over this subject with our Committee on the Driver this week, and they gave us advice on certain items, and we hope with the joint efforts of that committee, this Section and our staff, that we can make a real contribution to this important job of helping all of us to get at this elusive and very important personal factor.

CHAIRMAN HORROCKS: Is there any information now that we can give Mr. Williams on this matter?

MR. MINEUR: I think the Section ought certainly to work with the Council's staff in the development of a practical form. Mr. Williams knows I have been very much interested in this question of accident cause classification. Unfortunately, we have never gotten to the point where I could use his forms, and we are using one of our own because we can do it with a whole lot less work.

Just as a concrete illustration, here we have a man on one of these milk wagons or automobiles, traveling down the street, and as you know they can be operated from the side with a hand lever. A man is going down the street and is distracted for just a moment and when he turns he unintentionally hits the lever and the vehicle starts for the curb. He realizes it before hitting the curb, and in order to get out of trouble he quickly snaps it the other way. The vehicle turns over right in the street. It has not left the road. What would you attribute it to? Driver failure. There is nothing wrong with the mechanical features of the rig, nothing wrong with the road, nothing else in his path except that young lady coming down the street that distracted him.

Another case is the rear end collision. I say in a rear end collision it should not be necessary to answer but one question. A rear end collision, whether your man or the other fellow is responsible, gives you the whole story.

MR. WILLIAMS: How do you know who is responsible in case of a rear end collision? How do you determine that?

MR. MINEUR: In our case we determine it by the fact that the fellow in the rear ran into the fellow ahead.

MR. WILLIAMS: You would automatically say in all cases where somebody else hit your fellow in the rear it was the other fellow's fault?

MR. MINEUR: I would, for this reason: A man would have a very difficult job convincing a safety committee he had his car under proper control, that he was traveling at a safe speed, that he was paying attention to his job, if he ran into the vehicle ahead of him.

MR. WILLIAMS: I do not want any of you to get the impression that we disagree about the importance of fixing responsibility. It is merely a question of what sort of items should be on a report form, and whether the original report form should include the judicial decision as to responsibility or whether you should first make your report describing the actual circumstances of the accident, describing what happened, and consider that as statistics, and then as a second step, make whatever investigation your procedure calls for and fix responsibility, and call that fixing responsibility and not call it statistics. That is the only question.

I might say there is quite a difference of opinion about these rear end collisions. Some companies which have studied the accident prone driver have found that here and there a driver will have a record of a number of rear end collisions. On any

one of them alone, the inference would have been that it was the other fellow's fault. But here is a driver that has four or five rear end collisions, and the other fellows are not having them, in the same company, and the inference is that it is our driver's partial responsibility, also; that our driver had a habit of stopping too quickly at a red light or stop sign, thereby being partially responsible for the inattentive driver behind running into him.

MR. MINEUR: The only reason I mentioned responsibility is this: No concern is going to make up any record that is going to tell them merely what kind of accidents have been happening without a definite indication of what proportion of those accidents your own people are responsible for. The operator is interested in that information, and if he is going to compile that data he wants to make it up in such form that it will have practical application in his safety program.

CHAIRMAN HOBBS: Is there anybody else that has an opinion to express on the subject of report forms? If not, I think we are through with the session and the Twentieth Annual Congress. I want to assure you on behalf of the National Safety Council that we thank you very much for your attendance at the sessions, and also for the close attention to the matters which have been discussed in the sessions.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Governmental Officials

Tuesday Morning Session
October 13, 1931

ETHELBERT STEWART, Chairman
Commissioner of Labor Statistics, United States Department of Labor,
Washington, D. C.

The Governmental Officials Session convened with Ethelbert Stewart, Commissioner of Labor Statistics, United States Department of Labor, Washington, D. C., presiding.

CHAIRMAN STEWART: This is the second of the sessions of the Governmental Officials at a National Safety Congress. I believe that our meeting last year was very successful and served to accomplish much of the purpose of these sessions. It has been felt by a number of us for a good many years that the National Safety Council is the best place for contacts between private industry and those State and Federal departments that have to do with those industries. We will first hear from Mr. W. J. Maguire.

Use of Accident Statistics for Code and Regulation Purposes

By W. J. MAGUIRE
Director, Bureau of Statistics, Pennsylvania Department of Labor and Industry,
Harrisburg, Pa.

My subject concerns itself with accident prevention with special reference to the uses of accident statistics in the control and prevention of accidents.

The need for statistical data with regard to any problem depends upon the importance of the problem, as well as upon the usefulness of statistical data in its solution. The detailed requirements for statistics depend upon the nature and characteristics of the issues. Whether the purpose be to appraise the general need or to ascertain the detailed requirements for statistical data on industrial accidents, attention must be given to two fundamental considerations: (1) the scope and importance of industrial safety, and (2) the value of accident statistics in dealing with the problem effectively.

The scope and importance of industrial safety are universally recognized. Every wage earner is personally concerned in accident prevention. An injury to a worker causes suffering and disability, results in loss of income, and directly affects the living standards of the worker's family.

Industry is interested in preventing accidents. Accidents cost money, and the pruning of production costs is a function of increasing managerial importance. The indirect costs, such as work interruptions, absences of workers, and the replacement

and retraining of workers on account of accidents, are becoming more and more evident.

Society is concerned with the industrial efficiency and well being of its labor force. Obviously then, industrial safety is of sufficient scope and importance to require statistical analysis.

This brings us to the second consideration, namely, that of the value of accident statistics in dealing with the problem effectively. At every point in the accident prevention program statistics are indispensable. Statistical data are required in the first place to arouse interest in the accident problem and to stimulate prevention. The need for safety measures and the possibilities of accident prevention can be set forth only through statistics. In the absence of information concerning the existence and nature of accident hazards, no steps will be taken to remedy them. Prevention and control wait upon knowledge of the facts. Statistics must be available to set forth those facts upon which an effective appeal for remedial action must be based.

Statistics furnish a factual basis for measures of prevention and control. They show where the hazards to be overcome are and they indicate the relative importance of each hazard. They determine the causes of accidents and indicate points of attack for their prevention.

For guiding legislative bodies and industrial boards, statistics are indispensable. Laws, codes, rules, and regulations constitute a most important phase of accident-prevention work. Statistics pointing to inadequacies in existing measures suggest ways to increase the effectiveness of control.

Statistical analysis is required to guide administration. The weak points in the operation of measures already in existence can be shown adequately and effectively only by properly prepared statistics. Analysis of the working of the system is the only satisfactory means of determining how successfully it accomplishes its aims. The efficiency of administration should be tested by means of statistical data.

Statistics are invaluable in appraising the effectiveness of preventive measures. Not only should the methods of attack be well directed and aimed to remove causes, but the proof that they are well directed can be furnished only by adequate statistical data. Data on the results achieved by specific methods of prevention are helpful in judging their value. Statistics are needed to test the progress of prevention. Correct appraisal of the work of control and prevention as a whole requires a bookkeeping of accomplishments, of losses and gains, of failures and successes, in the form of a statistical record of results. Only as a result of the work of an adequate statistical service can the task of prevention be judged intelligently and directed to its maximum accomplishment.

In short, statistics are indispensable not only to show the possibilities of prevention and control, but also to transform these possibilities into realities with a maximum result for the effort expended.

The statistical data obtained, of course, should meet the requirements of all who will use them. Their compilation should be undertaken with a view to satisfying the particular needs of those who have to deal with particular problems. The administrator requires data to form the basis for his report of work. He needs data to show what he is accomplishing, what the weak points in his system are, and how they may be remedied. The safety engineer and factory inspector needs information to guide him in eliminating causes of accidents. The legislator needs information concerning the principal defects in existing legislation on accident prevention and disease control. He needs concrete data that will help him to determine what additional legislation is necessary or desirable. Employers who are intent upon making their establishments safe for their employees need data on the practical methods of eliminating hazards in their own plants. Safety and accident prevention agencies need data for use in campaigns to arouse public interest in prevention. Inspection services should be kept informed of the value of their own work. All these various users should be supplied

with all the statistical data which they can use profitably in dealing with their problems.

This general principle, that statistics should be available for practical uses, must be interpreted in a broad way. It is by no means sufficient merely to keep a record of official administrative acts. On the contrary, data should be gathered that will throw light upon the need for changes in legislation, that will show gaps in existing laws, and that will help to perfect the administration of existing measures. Accident statistics that look toward the improvement of remedies and the elimination of problems serve the highest practical use.

The subject of this paper probably contemplates some discussion of a concrete plan for the practical use of accident statistics in code and accident-prevention work by the state governments. Frankly, we, in Pennsylvania, have evolved no such thorough-going and comprehensive plan as that outlined in the foregoing discussion. Nevertheless, we do provide some rather comprehensive statistics of accidents covering certain phases of the accident-prevention program, particularly in the awakening and maintaining of interest in accident prevention, in the analysis of causes of accidents and the locations of hazards, in guiding administration, in informing legislators, employers, safety engineers, and inspection services, and for the basis of administrative report. Even so, it seems presumptuous of me to suggest a definite plan, yet some consideration of it seems pertinent. Perhaps a minimum program could be suggested:

An outline of a minimum plan for the effective use of accident statistics in code and regulation work, it seems, should embrace the following items:

1. The classification of accidents by individual industries, establishments, and occupations.
2. The classification of accidents by detailed causes and contributory conditions.
3. The classification of accidents according to hazards covered by particular codes or regulations.
4. The classification of accidents according to inspection districts.

It is to be understood, of course, that the tabulations for any one or combinations of these groups should be on the basis of accident frequency and accident severity whenever practicable.

CHAIRMAN STEWART: The question of accident statistics originally came up as a part of workmen's compensation. It grew out of compensation, and the statistics of accidents as a whole was largely to furnish information for compensation boards. Therefore, in our accident statistics we lean too much toward giving the cause of the injury and not enough to the cause of the accident. The compensation man wants to know something about the cause and the extent of the injury. The safety man wants to know the cause of the accident. They are two very different propositions and two which I think statistically we must face.

SAMUEL G. BEATTIE (Labor Commissioner, Dept. of Labor and Industry, Lansing, Michigan): I have been a labor commissioner since the first of the year, but I have been a deputy of the commission and have heard disputed compensation claims since 1920, as our Labor and Compensation Departments are united.

Nobody can disagree with the speaker as to the necessity of compiling statistics. We have no comprehensive plan, I believe, in the United States or in any of the states where these statistics are properly compiled. In other words, most of us don't have access to any statistical information of an experience until a year or two years afterward. Many accidents also involve several injuries and may have something to do with after conditions. For instance, I have a case in mind where a man five or six years ago fell and had a head injury, also fractured limbs. At the time the fractured limbs overshadowed the other injury entirely, but after the fracture had been reduced and the man had gone back to work on part time he disappeared. We heard nothing about the case for five years and then he came in with a claim

that the head injury had incapacitated him entirely. In the accident report from the employer, no mention was made of the head injury.

Now if a code could be devised and if we could get industry in making these reports to mention all facts no matter how trivial they might appear at the time, we would know better what to do. I understand an effort is being made to devise such a code, and compel or secure the cooperation of industry to make reports that will mention all of the occurrences surrounding an accident. This would enable us to compile valuable month to month statistics.

JAMES L. GERNON (Director, Division of Inspection, State Department of Labor, N. Y. City): During the last two months I have personally read and examined over 25,000 reports in New York State. I imposed that task on myself to prove a theory that I have had for a great many years, and that is that the reports that we have in New York State, and we think ourselves that they are as good as in most states, are not satisfactory by any means. They are not reports of accidents. They are reports of injuries. An accident is something that is unforeseen, and as you read these reports you will discover that the primary cause of the injury was just pure carelessness. A man fell into a machine; but what caused him to fall into the machine? The machine is all right if the man doesn't fall into it.

Now, the trouble is that the reports basically are no good, because they don't ask for the right information. And the greatest trouble is that the employer doesn't give the information as he should give it even on the poor report. As you read these thousands of reports, you can't help being impressed that in too large a group the employer is trying to put the burden of the injury on the injured. We all know that there are many employees who are responsible for the injuries they receive because of their failure to do the things that they should do. But the report carries no evidence that the employee was negligent and still this whole report leaves the burden on him.

What we need is a standard form of report, and we should require the employer and employee and everybody to give the proper information that we want as set forth on that report, and not the mere fact of how the employee was injured. We know he fell into a machine, but that didn't cause the injury. He probably slipped. Why did he slip? You can find five thousand causes for slipping in industry. Until we get a proper form for reporting injuries we will never get a proper amount of information.

O. F. McSHANE (Industrial Commission of Utah, Salt Lake City): I believe that most of the forms of the states are adequate in so far as the form itself is concerned, if we can have a careful and painstaking investigation of the accident or injury by one whose duty it is to make that investigation and to record it on the report to be sent in. Also, I am not willing to "pass the buck" on to the employer and say, "You must give us a detailed report of the nature and extent of this injury." I don't think it is possible for a man to investigate a case and to tell just the extent of the injury that he is reporting. Personally we have found many instances where the doctor into whose hands the injured man fell, failed in his duty to make a thorough examination to determine the nature and extent of the injuries. We have actual cases of men who have sustained very serious fractures that have not been discovered for some months after the man has been hospitalized and treated for the injury that was discovered. When that condition exists we can't hold the investigator or the employer responsible. You must hold the medical department in charge of treating the injury.

I also think there should be a clearing house for reports in all our compensation boards and that incomplete reports should be sent back for additional information. With these added remarks I can concur in what has been said by Michigan and New York.

J. A. HALLER (Director of Safety, State Industrial Accident Compensation, Baltimore, Md.): I am inclined to agree with our friend from New York. I think our state reports are rather inadequate. These reports, in practically all states, are

the form suggested or compiled by the International Association of Compensation Boards. This form deals with the nature and extent of the injury. It is filled in by the employer. The state does investigate some accidents, but they cannot investigate all accidents occurring in the state. Therefore, we must rely upon the employer's report for the purpose of compiling statistics. If the report is faulty our statistics will be faulty. I think this body can have some weight in formulating a new report form, and I am going to suggest to the Chairman that he appoint a committee to investigate this subject thoroughly at leisure and to communicate with the International Association of Compensation Boards for the purpose of getting a new form for employers to report accidents.

Like the chairman, I have had some difficulty in trying to arrive at the causes of accidents. In nine cases out of ten we can't get from our state reports the causes of injuries. It is possibly good propaganda to send reports back occasionally to employers to get more information. But still our forms are not adequate. They do not give us any cause of the accident, only the cause of the injury.

CHAIRMAN STEWART: In reply to the gentleman, I will say that the National Insurance Commissioners Association asked the entire International Association of Industrial Accident Boards and Commissions to appoint a joint committee with the Insurance Commissioners to revise our forms for accidents and our procedure. That committee report will suggest, I hope, some cause of the accident along with what we now have which deals primarily with the cause of the injury.

MR. BEATTIE: H. W. Heinrich, who has published several works along this line and who is now with the Travelers' Insurance Co., has a plan that I am going to try to adopt in Michigan. I am asking the two largest Safety Council groups we have in Lansing to send representatives to a meeting in our office, and Mr. Heinrich has agreed to send us what he calls a "Complete Plan for Code Reports." I am asking the Safety Council groups in the different industries just what they want in order to determine the cause of an accident, and if we can get this plan in working order we will try to revise our report system to cover in some measure what they want.

W. J. MAGUIRE (Dir., Bureau of Statistics, Pennsylvania, Department of Labor and Industry, Harrisburg, Pa.): I understood you just now to say that the National Insurance Commissioners Association had asked the I. A. B. C. to find ways and means of giving complete cause information. Isn't that a duplication, or isn't that in conjunction with the efforts of the American Standards Association for the revision of 276?

CHAIRMAN STEWART: I think not.

MR. MAGUIRE: I want to express the hope that that work will take place. I am connected with the I. A. B. C. and hope to be a member of the sub-committee on the revision of the classifications for accident causes. That committee is going very thoroughly into the question of causes of accidents as distinguished from causes of injuries.

CHAIRMAN STEWART: Mr. Heinrich has an invitation from the I. A. B. C. to join with them. I don't think there will be any conflict in that respect.

MR. MAGUIRE: The Commissioner of Labor from Michigan mentioned that he was unable to secure any statistical data of accidents until about a year after the close of the period for which they were tabulated. While that is true to a large extent as far as permanent records are concerned there is a means of securing up-to-date information for accident investigation purposes. In Pennsylvania we have adopted a plan of tabulating accidents monthly and reporting that information to the factory inspection office. It happens that we have a bureau of inspection in our state. The plan has worked very satisfactorily in guiding the inspectors to the plants that are having bad accidents. That is one of the many practical uses to which we have put our accident information.

I also agree with Mr. Haller of Maryland, that information as reported on accident report forms is not entirely satisfactory. We get such reports as these in

a fatal accident case: "The cause of the foregoing accident was that he was killed by a train." Now if anyone can in any way interpret that to show the cause of that accident he is clairvoyant. But I do think that all the information necessary for statistical compilation can be secured on the original accident report from the employer. It is true that you can't get all the details, neither can you show statistically all the details concerning the cause of the accident, but you can get one fundamental cause of the accident which is all that is essential for statistical purposes. I do believe that as many accidents as possible should be subsequently investigated by the inspectors and a full detailed report made. But that is not wholly essential in so far as statistical data are concerned.

CHAIRMAN STEWART: Our next speaker will be Lt. Col. Henry A. Reninger, of the Lehigh Portland Cement Co., Allentown, Pa.

What Is the Matter with State Inspection?

By LT. COL. H. A. RENINGER

Special Representative, Lehigh Portland Cement Company, Allentown, Pa.
Past President, National Safety Council

What is the matter with state inspection? It seems to me that this is a rather big subject for a person to criticize, particularly when we have state inspection in the great majority of the states in this country. Whatever remarks I may make at this time are meant as constructive suggestions by one who has been dealing with the inspection departments of ten states in this country; but perhaps I will speak with a better knowledge of our own home state than I can of some of the others in which we have plants located, for I am fully aware of the trials and tribulations of the heads of bureaus in the various state departments.

It was my privilege to talk at Richmond, Virginia before the 18th Annual Meeting of the International Association of Industrial Accident Boards and Commissions and at that time I spoke along similar lines and offered some of the same suggestions that I am bringing to you. There should be uniformity in inspection, standard codes, accident reports and compensation laws that are uniform in regard to the methods of procedure, payments, etc. The various departments of labor and industry have been organized and created for the purpose of serving labor and the industrial interests of the commonwealth and to enforce the laws relating to safety, health and the well being of the employees in industry. Since the creation of these departments their powers and duties have been greatly expanded, to such an extent that ordinarily there are not sufficient inspectors to cover the ground.

In Pennsylvania we have a number of bureaus coming under the Department of Labor and Industry, the Bureau of Inspection being one of them and the one that we are interested in today. The work of the Bureau of Inspection is performed through an organization which includes a field force of 100 inspectors and 20 section chiefs—generally factory inspectors constitute the largest single body. This body is composed of nine divisions, under a supervisor. Elevator, boiler, building and quarry inspections are made by especially trained field men operating under the section chief. This method of handling inspection today is far superior to the old factory inspection of the early days. I can recall very clearly in the old days that a visit by a factory inspector meant trouble around the plant. In those days the factory inspector, armed with the authority of the law, paper and pencil, and wearing a badge, came into the plant and when he had finished his inspection of the machinery he had a long list of recommendations of changes to be made, which changes had to be made within 30 days

or he threatened to shut down the plant. He came not as an advisor and friend but rather as one to be feared.

Those days are past and to-day the bureaus of inspection of the various states and insurance companies are keeping pace with the modern educational trend, and while the inspectors are compelled to carry out existing legislation, there are some that are more inclined to follow out the rule-of-thumb method and look at the same pieces of machinery each time they visit the plant, limiting their recommendations to these and perhaps overlook the more important hazards. We in industry appreciate the fact that toe boards may be very necessary at one place and perhaps useless in another, that a grating platform allowing small particles to fall through might be condemned in some places, but that in a boiler room or blast furnace this prevents the accumulation of monoxide gas above the platform and permits those below to see a person who might have been overcome, thus eliminating a serious hazard at the expense of a trivial one.

Twenty years ago we all thought that mechanical safeguarding was the answer to accidents, but our views have changed, and with years of experience in mechanical safeguarding and in trying to comply with the state and insurance regulations we have found that about 20 per cent of our accidents have been cut out.

I recall, back in 1916, that a safety committee included in its minutes the statement that the machinery had all been guarded, all recommendations received from the state and the insurance company inspectors had been taken care of and, therefore, they suggested that the committee be dismissed. Today that same committee is doing more and better work in accident prevention than ever before, and we never have seen any such recommendations come in during the past ten years.

In the early days we did not appreciate the value of education along safety lines. We did not think that safety included the study of a minimum labor turnover; that contentment, that absence of worry, had anything to do with the attitude of the worker or might be the cause of an accident. Good health, good lighting, good housekeeping, sanitation, safe clothing, and bright and cheerful surroundings all enter into the problem of accident prevention and the wide-awake executives are paying a great deal of attention to this phase of the work. The experience of the larger companies and the experience reported to the National Safety Council shows that accident prevention is not entirely mechanical safeguarding. The old inspectors in the department are realizing that they must keep pace with the modern educational trend and they are paying more attention today to the subject of accident prevention from the personnel standpoint than the actual mechanical safeguard. It should be the aim of every Bureau of Inspection to see that the factory inspector is a competent safety engineer.

The difficulty that has existed for years and still exists is the fact that inspectors are political footballs and many good men have lost their jobs because they did not happen to be of the same political faith as the reigning power. The Department of Labor and Industry occupies a very important part in state government and we do not think that politics should enter into this department. Every effort should be made by the heads of these departments to build up a competent corps of inspectors. The method of appointing a man who might have been a silk weaver or shoemaker and sending him to a plant like Bethlehem Steel, Westinghouse, or any cement company to inspect the plant and tell the trained engineers and operators who have been working in the industry for years how to operate their plants and how to safeguard the machinery is entirely wrong. It takes years to train an inspector and when he goes into a plant he should know the rules and regulations of the department of labor. He should know the interpretations of the department and if he had a technical training

it would be of value to him. He should know the general operation of the plant that he is going to inspect. It would be a mighty good thing for him to know the personnel that is employed in the plant, for we find in our experience that the personnel operating our Birmingham plant is entirely different from the one in Pennsylvania—the Pennsylvania Germans. They are entirely different from the Swedes, Norwegians, Greeks, or Mexicans that we have at Mason City.

As I have said, it takes years to build up a competent corps of inspectors. Perhaps the ideal inspector would be the fellow who has had a technical training and after a few years of experience in industry could be brought into the department to study the labor and compensation laws, the safety codes, and the interpretations placed thereon, the routine of the department and the handling of the accident reports, also studying the accidents in the various types of industry, making investigations to discover the contributory causes and to determine the best means of avoiding them in the future. He could then be sent out on the job with an old trained supervisor. He perhaps would make an ideal inspector, providing he has common sense and the ability and personality to talk to all of those with whom he comes in contact during an inspection trip.

Education of the employee, the foreman, the superintendent in safety work is the thing that counts. Every inspector should be trained in accident-prevention work; by this I mean he should be able to talk safety not only to the laborer, the foreman, and the superintendent but also to the executives. This inspector should be able to organize safety committees; he should be able to talk to gatherings of employees, and to sell them this idea of safety, and in selling safety he should be able to sell them not only industrial safety but highway safety, public safety, home safety.

It is usually the case that in every state the corps of inspectors is limited. They cannot visit every plant that should be visited, with the result that when they start making an inspection of one of the bigger plants in the state, plants like any of the big steel corporation plants, Baldwin, Westinghouse, it takes weeks to go through them carefully.

One suggestion I would like to make to you gentlemen who are in charge of inspection work in the various states is that the different industries be classified, that a careful study be made of the last inspection report and the accident experience of the various plants for the five years previous. Those plants that are making progress and have good accident records with active safety committees should receive a rating which would place them in a class where the inspector would not have to visit them and waste time trying to tell this organization what is necessary to cut down accidents. Why spend the time and money if this plant with a large number of employees has had a good five-year record? We have found in the National Safety Council (and I believe you gentlemen have the same experience) that it is not the big organizations that are having accidents but it is the small plants that are the hardest to interest in safety. We have tried all kinds of experiments to interest the small plant, and by the small plant I mean the shop that has from five to fifty employees. Somehow or other we have never been able to solve the problem as to how we can reach these people. We believe the only people who can reach the small shop or plant (and whose job it is, without question) are the State inspectors and the insurance inspectors, and that their time should be spent in inspecting and in visiting these small plants and helping them to organize their safety committees—to sell them the value of safety.

The factory inspector exercises a wide influence in the small plant. This type of establishment is usually without organized effort of any kind to educate and warn the new employee of the danger lurking in his daily work. The inspector

with expert knowledge in the control of plant dangers, mingling with the workman and getting daily experience of his occupation, can help greatly in creating an interest in the minds of the employees and getting them to exercise due care at their various jobs. The inspector's experience in a wide field of industrial activity being familiar with existing conditions from the hazardous trades, he establishes immediate contact with the employee and can show from actual facts and figures what has been accomplished in the various types of plants, large and small.

Speaking from experience, why should a state inspector spend his time in visiting six plants in an organization that went through the year 1930 with one lost-time accident and with two of these plants having operated over a period of two years without a lost-time accident, when right across the road a plant employing thirty men had seven or eight lost-time accidents. One organization has safety committees that have regular meetings to carry on a continuous safety campaign, paying particular attention to educational work with a complete first aid hospital and many of the men graduates of the Standard Course of the American Red Cross in first aid, while the other plant has no safety organization of any kind and do no safety work whatever because the management says it cannot afford it. They tell you that they are insured and the insurance company will pay their losses. Right here we believe that the State inspector should get on the job and help these people to reduce their accidents. We also feel that the insurance departments and State commissions should classify these industries, and that the industry that is doing the real job should receive the benefit of the rates put into effect, because as it is at present, the plant with the low experience rating is helping to pay the cost of a man who is not doing any safety work. I have talked this matter over with many leading industrial safety engineers and they all feel that if any state wants to reduce accidents the place to do the real work is in the plant that has no safety organization. When you talk to the insurance companies, their executives tell you that they have lost millions of dollars in compensation. If they have, we believe it is partly their own fault. They say they cannot afford to send inspectors to the small plants whose premiums may run anywhere from \$50 to \$200 a year. Wouldn't it be more practical, wouldn't it seem like better sense for their inspectors to help the small plant with a premium of only \$100, when they may have an accident in that plant resulting perhaps in a disability or perhaps a fatality which may cost anywhere from \$2,500 to \$7,500, than to spend their time and money in inspecting a plant that may have a premium of from five to fifty thousand and over a period of years have a loss of probably ten or fifteen thousand a year?

We realize that not every inspector has the ability, the personality, education, and training to sell safety, but we believe every insurance company, every department of labor and industry ought to have one or two inspectors (if they wish so to designate them) who not only have the knowledge and ability, the personality and education to sell safety to the men in the plant or the foreman, but who can walk into the president's office and sell him safety, because you and I know very clearly that unless the president and the executives of any organization are sold on safety it is impossible to put safety across in the organization. The inspectors should have the ability to go through the organization not looking only for set screws, unguarded belts or pulleys, but to study the personnel and to be able to set up a safety organization. No matter how much the employees may believe in the work, unless they have the backing of the executives, safety is not and will not become a part of their operation. The inspector who can show the executives the cost of accidents, the saving that can be derived through accident prevention, the power of stopping accidents (which means pain and suffering), is the type of man that we need for this special job.

We have an outstanding case in Pennsylvania of an inspector who can handle this problem and sell the idea of safety to the heads of organizations better than any other one man. This man does it, not because he is a college graduate, for he is not, nor because his knowledge of the English language is like the great orators, Patrick Henry or Daniel Webster, but because he knows human nature. He has the ability to talk to men, whether they be Slovak or Polak, whether they be common laborer or president. He can talk to them from the bottom of his heart; he believes in safety and he is not only an inspector but a teacher, a preacher, and practices what he preaches. Common sense is what this man has and he is so convincing that I believe he could sell swamp lands to a rheumatic or horse liniment to an automobile driver.

You gentlemen who have the power of directing your inspectors should take a little more time in selecting, studying, and training these men and sell them the idea of safety, make them feel they are part of a great organization that is trying to do a job that is worth while, trying to save human life and limb; that they are not policemen or politicians; that they are teachers and advisors and that it is their main job to enlist the services of every industry in safety work and teach them to try and create a spirit of cooperation between industry and the department. Let them know that the department is not antagonistic to industry but wants to cooperate with them in every way possible; that they come as advisors. Then, perhaps, we can eliminate a feeling which still exists in many organizations that the department of labor and industry and its inspectors are a damned nuisance and only come around to create trouble.

CHAIRMAN STEWART: You see what Col. Reninger wants for \$650 a year.

COL. RENINGER: I want fewer inspectors, better trained men, and better salaries.

CHAIRMAN STEWART: Inasmuch as Col. Reninger brought up the very important feature of the small plant, and we all know what the small plant means in the way of accidents, I want to say that however much we may decrease the accident rate in the large plant the small plant keeps the general rate going up all the time. In that connection the chair is going to take the liberty of asking Mr. Wenzel of the Workmen's Compensation Bureau, N. D., who lives in a state where they have this special trouble with small plants, to discuss this idea of the possibility of using our inspectors as a means of reaching educationally the small plant. I will ask Mr. Wenzel to lead this discussion.

R. E. WENZEL (Chairman Workmen's Compensation Bureau of North Dakota, Bismarck, N. D.): We are here from North Dakota primarily to learn, not to instruct; and at this meeting as well as at the one at Richmond I have been very much interested in discovering some sort of method of reaching the small plant and also reaching the employees. I recognize full well that most of the statements made with respect to the responsibility of management in accident prevention work are important ones. Yet I feel that in the course of my studies of this problem, the main point if we are going to successfully meet with any results in accident prevention work will be to reach the small plants and to reach the employees themselves. Even with the meager and unsatisfactory methods of reporting accidents we have discovered certain trends. I am speaking now, of course, from our experience in North Dakota, in which state it is compulsory that we have no private insurance, and we cover every plant that has one or more employees.

We find our accident frequency record running like the ones referred to. We have to base our record on payroll expenditure for 1925, five years ago, which runs approximately as in 1929, and our accidents have increased by 106 per cent, which doesn't take into consideration any of the depression effect. During that ten year period we also find that accidents due to machinery decreased from 16.4 per cent of the total to only 9.3 per cent. Notwithstanding the accident prevention

programs of large plants, our records are going up and up and up, and it isn't only a case of accident frequency increasing. Five years ago our percentage of deaths to the total accidents was 35 per cent, and today it is only 6 per cent below that ratio. These facts prove my contention, made some six years ago, that with increase in accident frequency you would get increase in accident severity.

In my travels over the eastern part of the country, I find everywhere you have the same experience, although you don't have quite as many small plants and not quite as small. In an intensive study I made for a period of three years in one particular line I discovered that six of the large plants were paying 71 per cent of the premiums over that period, but they had only 19 per cent of the accidents. In other words, the plants that were paying some 29 per cent of the premiums had about 81 per cent of the accidents. Therefore, if you are ever going to meet with any success in accident prevention work you will have to go out into the highways and byways and reach the small employers and reach the men in the small plants.

HARRY D. IMMEL (Director, Bureau of Inspection, Pennsylvania Dept. of Labor and Industry, Harrisburg, Pa.): Let me say to the man from North Dakota that he has no monopoly of small plants. The larger states have them too. We have our automobile repair shops at every cross road and a multitude of small plants. In Pennsylvania we have about 30,000 industries and at least 60 per cent of them are small plants. So we have the same problem of what to do about the little fellow. Education is the very foundation of everything we do in our Bureau of Inspection. Our system of factory inspection is based on individual plant accident records. When we drive at the sore spots we don't admit that the big fellow doesn't need some looking after once in a while, because he does. We get into the large plants and from time to time through our system of accident investigation we get into even the plants with better records.

I believe we investigate close to 50 per cent of all the accidents that are reported to us from the Bureau of Statistics, under the new system which guides us in determining where inspection is most needed. Those investigations are made on a sort of form that does help us to ascertain the cause of the accident. We believe that this safety idea is reducing accidents constantly. We are having a safety campaign this year in Pennsylvania. And just to show how the educational feature may be developed, we had a drive in March which reduced March accidents below any previous year for which statistics were kept. We are having a similar drive in October. We distribute posters and we always put out a small accident card. We give these to every individual worker in the state. We found that this educational plan has done our inspectors about as much good as it has done industry. The inspector to which Col. Reninger referred is doing efficient service as only one of a number. They don't all come under the Colonel's observation.

Just the other day one of my inspectors came in to me with a feature he had developed in the course of this October campaign. It was a newspaper in a town of about ten to fifteen thousand and he had succeeded in getting the community industries to go together to produce a full page advertisement about this October safety campaign, to carry a poster with it. In Pennsylvania we are firmly convinced that education is essential, and in fact the obligation of the Bureau of Inspection. We realize that there is much more that can be done, but we hope to extend the usefulness of our service constantly.

JAMES M. HUNT (Inspector Kentucky Labor Department, Covington, Ky.): I am an inspector in the state of Kentucky and Mr. Immel has stolen my stuff. I appreciate Col. Reninger's talk and I think it would be well to have his paper in the hands of every inspector in the country, because it covers pretty nearly everything. Instead of carrying a policeman's club in the hands of the inspector it carries education, and the effort to try and cooperate with the plant and get things accomplished in a way different from methods of former years.

I am an old time machinist myself and know the need not only of the workers.

but of the foremen, the superintendent, and the president which now must be brought together in a single group to bring good results.

MR. GERNON: I heartily agree with everything in Col. Reninger's paper. There are a couple of points I would like to illustrate. Col. Reninger spoke of an inspector as an engineer. There is no question that the more knowledge a man has the better he is. But the engineer doesn't always make a good inspector. We have had college graduates and they actually have failed as inspectors.

Now, everything that you suggest an inspector should do in giving an order is being done in New York. When an inspector gives an order he should be capable of explaining how it shall be carried out. He must give the name of the person to whom he explains the order. There is no camouflage in it; he must mention whom he has explained the order to so that when it goes out to the firm it bears the name of the man to whom it was issued. He has to report on these orders from time to time and if he doesn't secure compliance with the orders that he issued he has to answer for it. Now that does this. It prevents the inspector from issuing a partial order and not a full order. I don't want to infer that some of our inspectors don't issue full orders, but we have a system of correcting that. No order goes out of our department until it is examined by the supervising inspector and then by the examiner to see that it is a legal order.

We have a large plant in our state that does as good work as is done anywhere in the country. But the inspector goes into this large plant and he finds a number of things to be corrected. They are things that even the safety man has missed. We first instruct our inspectors how to use their authority. There are two things that an inspector does when he is new. He either pounces on his authority like an eagle or he walks out like a cur with his tail between his legs. Now if we can with proper instruction balance this man to use his authority properly we can make a good inspector out of him. Of course, it takes time to make an inspector. He isn't an inspector in the first three months, but the man who has traveled for a few years through the industries in such manufacturing states as New York or Pennsylvania has acquired knowledge he can't acquire in any other work. His knowledge is of considerable value not only to the state, but to the industry. Of course he must know how to use it. He can go into a plant and have everybody sore; and when he goes into a plant he needs all the ability that the best salesman needs, because in the last analysis the successful inspector must be the super salesman.

COL. RENINGER: I want to be pardoned for using Pennsylvania as an illustration, but I have been very familiar with our Inspection Department ever since it started and very familiar with Pennsylvania plants. Of course, Harrisburg is much closer to Allentown than for me to jump out and see Mr. Funk in Iowa, or Baker in Topeka, Kansas, or Spear in Montgomery, each of which has an excellent Department of Labor and Industry.

It takes years to train an inspector. But what we do need is a man with technical training and then the years of experience that I mentioned in my paper, and common sense. Native ability is the thing that makes the inspector valuable to the department and to the employer.

W. H. BAKER (Safety Engineer, J. E. Baker Company, York, Pa.): Speaking for an individual company, when Mr. Immel sent Mr. Quigly of the State Department down to see our president, and after he told his story about safety, the president smiled and said, "Well it might be done. We will see what we can do."

We looked up our records and found that we had 1216 accidents and we only employed 1200 men. That was in 1927, and in 1930 after we had been working three years with active safety committees reporting regularly every month, we reduced our accidents to 7 for the entire year 1930. I just want to say that I believe the best work the various state departments can do is to go out and sell safety to the various plants and impress upon them that education first, efficiency second, and enforcement third is necessary to have a good safety performance.

MR. GERNON: I want to mention that no state has a bigger problem than we have

in the small plant. We have some that are very small. We had in the best of years a 20 per cent removal of plants in New York City alone, and what this year's depression will mean I would hate to predict.

CHAIRMAN STEWART: Do you mean 20% turn-over of establishments?

MR. GERNON: Yes. That is, small plants going out of business and changing names. Don't get it into your heads that there aren't good small plants. There are on the average as many good small plants as there are good large plants. After all it is a problem of what the management intends to do.

This safety movement demonstrates conclusively that we are never going to get anywhere with the plant management alone, because figures prove that average workers do not know the art of working, which I can demonstrate in any small or large plant. I can show you in New York State a hundred people doing the same operation in almost a hundred different ways. That is the result of management.

If we are going to make this country safe industrially we must go back to school. We must teach the child in school the manual art of using his body. The average employee does not know how to use his body; consequently, he is injured. We must teach the average citizen of this country, and because of the restrictions of the immigration laws it isn't as much of a problem as it was a few years ago. We must teach the adults.

That burden is on industry, and the sad part of it is that after 35 years' experience the industries are not competent to teach adults the proper way to work. They don't seem to care anything about it. They think, because a man is operating a machine that any way to get material in and out is all right. If we had in our schools more of Swedish gymnastics we would make better industrial workers.

When we try to find out what is causing accidents we have some job. There are many serious injuries from pieces of paper on an ordinary factory floor. In New York State there are more falls on the level that cause injuries than falls from an elevation. Every industry has a technique and an art for its work and most of our workers don't know it. It is amazing to see laborers not lifting right, with the plant safety man and foreman permitting it. The foreman either should show the man or get rid of him if he won't stop doing the work that way, but the trouble is that the foreman doesn't know. It is not possible for any inspection department to go in and train the entire force. But industry can do it, because in the last analysis it knows that the average American worker is more skillful than the worker of any other country. However, we want to bear in mind that since the war we have a lot of workers who have stolen in from other industries. They have picked it up but they don't know the trade, and they may not be physically fit to do the work.

In our state we have 78,000 factories, and last year 106,000 compensated injuries costing \$35,000,000. The state of New York spends a meager sum to try to correct that condition. I would say that if New York State were to spend \$2,000,000 they could lop off \$20,000,000 of the \$35,000,000 in one year.

COL. RENINGER: The one thing that has helped my organization materially in trying to teach men to do a job properly is the Safety Pamphlets of the National Safety Council. They are not codes but the best practices of certain industries that we can get. They are written by the engineers of the National Safety Council or others after studying the situation and then sent out for constructive criticism. For instance, in the cement industry we have five pamphlets originally written by men in the cement industry. Then they were sent to all the Cement industries. About 85 or 90 people checked them and made suggestions. Now we are using these pamphlets, and if the State Departments and the Inspectors will suggest employers who may need them, the Council will send copies.

If you will recall, I said in my paper that factory inspectors should not only try to teach safety in industry, but in the home, in the schools, and on the highway, since accidents in industry are lower than on our highways and in our homes. We are asking industry to advocate the safety education of children. I am firmly con-

vinced, after having safety in the schools in my own home town for the past ten years that this is where we must start if we are to make progress in accident prevention work in America. And I am happy to say that the State of Pennsylvania, realizing the importance of the safety training the children, at their last meeting of the legislature introduced an amendment to the school code which now makes safety education a part of the regular course of the public and parochial and private schools in Pennsylvania. We must teach in that state, English, reading, writing, arithmetic, history, civics, and safety education. If we can get the children of America safety minded and safety conscious it is going to be a great help. Because the school children of today are the workers of tomorrow, and when they come into your plant they will pay attention to the rules and regulations and we won't have to spend 25 years trying to teach an old machinist or an old carpenter how to do a job safely. If you gentlemen who are interested in this work will try to help us in the National Safety Movement to educate your employees we will appreciate it. You gentlemen from all over the country could help very materially if you would encourage your inspectors to get the people in the communities interested enough to put safety into their public schools, as we have in Pennsylvania.

MR. IMMEL: I agree with what Col. Reninger has said about the National Safety Council literature and the influence on industrial safety. We recognize this in our Pennsylvania Department of Labor and Industry, and at the present time three of my nine supervising inspectors are seeking to form branch Safety Councils. They were instrumental in forming the big Western Pennsylvania Safety Council. We are doing everything that we can to encourage the formation and development of branch Safety Councils.

We are going to make an award of certificates to industries that have had outstanding safety records this year with the idea of stimulating them to further their efforts. One type is a certificate of honor with the state seal, issued to every industrial concern in Pennsylvania that has a perfect safety record for 1931. Another certificate will be issued to every concern with an improved safety average in 1931, based on reports from our Bureau of State Inspection showing the average number of employees and the average number per hundred of employees who sustain lost time accidents during the year. This award can be criticized from a standpoint of a difference in hazards and a difference in the character of work, but we feel that there is great value in this sort of recognition of worth while achievement as a stimulation for further efforts.

CHAIRMAN STEWART: Is there any further business?

HARRY D. IMMEL (Director, Bureau of Inspection, Pennsylvania Dept. of Labor and Industry, Harrisburg, Pa.): Before we contemplate adjournment I have a resolution to offer. We had this Governmental Officials session last year and again today. It is only a session because it hasn't been developed into a permanent section of the National Safety Council. Personally, I am strongly of the opinion that it deserves that sort of recognition. I feel that with a permanently established section we can begin immediately to develop a program each year and we can enlist more governmental agencies and we can get more representatives of industry together and make this Governmental Officials Division of considerable value to the cause of industrial safety. Therefore, the resolution that I wish to offer is this:

"Resolved, That this meeting call upon the National Safety Council to make of the Governmental Officials session a permanent section of the Congress. Be it further resolved that Dr. Ethelbert Stewart be requested to assume the chairmanship of the section for 1932."

In explanation let me say that we have no authority here today to elect officers for a continuance because this is only a session, but I do want to put in my resolution the request that Dr. Stewart be asked to assume the chairmanship for 1932, and I, therefore, offer this resolution.

(The Motion was seconded and adopted.)

W. H. BAKER (Safety Engineer, J. E. Baker Company, York, Pa.): I wish to say that I think Col. Reninger's talk has been helpful to all of us.

I think we should point out to the executives and foremen of the individual companies the necessity for stressing to all their workmen the importance of finding the causes of accidents and preventing these accidents before they happen. Different safety men say that after an accident happens they have a meeting of workmen and try to find some remedy that can be applied. If this were done in advance accidents would be greatly reduced.

R. E. WENZEL (Chairman, North Dakota Workmen's Compensation Bureau, Bismarck, N. D.): I want to tell what we are doing in North Dakota. The plan isn't very far under way as yet but we hope to develop it further. We put in the hands of every inspector a photostatic copy of every report sent by the employer of an injury. When he goes in to make his inspection he will have the complete record of the injuries that have happened in that plant. He must insist on going to the chief executive of that plant and laying the cards right on the table and showing him the causes. He might have a tendency to keep the inspector away from the responsible man. Somebody down the line probably isn't enthusiastic and maybe the chief executive isn't enthusiastic, because he would probably kick the works apart if he found out the real record. We also go further. We list all the injuries for each plant and each industry. Then we obtain from the employer his different types of employees. We think we know the total hazards in each industry, but we don't know what occupation in each industry is most hazardous.

E. F. CARTER (Director Division Standards and Inspections, Raleigh, N. C.): I want to say to Mr. Gernon that he is working along the same line that we are. We will have the industries and occupations in North Dakota classified, and also we will establish the accident rate and the man hours of those industries. We now have about half completed a study of our twelve leading industries and about an equal group of the medium and small industries. We are trying to get a cross section view of industry. We are having our troubles with the small plant, especially, and we are emphasizing the educational side of our work and trying to determine where the trouble is.

CHAIRMAN STEWART: I want to say this for North Dakota, that after her very long nap she has awakened as thoroughly as any state in the union.

EDWARD F. SEILLER (Chief Labor Inspector, Kentucky Dept. of Labor, Louisville, Ky.): A good deal of emphasis has been placed this morning upon the responsibility of the factory inspectors and those who have the responsibility of directing inspection. I concur with all that has been said but I certainly would like to see a paper developed in this section by a competent speaker from some state department to show just what industry should do to help or assist State Departments of Labor and Industrial Accident Boards. The Department of Labor and Industrial Accident Boards' inspectors have been hampered a great deal by lack of cooperation on the part of industry. Of course, our safety program has helped that situation some. As Colonel Reninger mentioned this morning, the old inspector came in armed with a billet and a badge and he practically tried to change the history of industry in this country. The factory inspector today does not have to do that. We have learned a new method. Speaking of politics in the Departments, another way that industry could help to maintain good inspection forces would be to lend us more assistance. I don't believe that there is a state that has adequate inspectors. Even with such highly developed inspection forces as Pennsylvania, Illinois, and New York they all could use additional inspectors to a very good advantage. I think a hundred inspectors for such a great state as Pennsylvania is far too few. They don't get around to these small plants, and I believe that industry should do more than offer us critical analysis to build up more efficient Departments of Labor and Inspection.

MR. GEMMON: I have lived long enough to see inspection work when it was a great deal worse than it is now, and when the difficulties were a great deal more

than they have now, and the development is to my mind rather satisfactory. The manufacturing in other states is no different than in New York, and I can speak with authority about New York. The attitude of the manufacturer today makes it much easier for the inspector, even though it is difficult enough now.

We prosecuted 7,000 of them last year in New York State, but not for safety measures. Most of them related to hours of child labor. There is no necessity for them to be prosecuted for that if they obey the law.

Just take our record of last year. If I remember correctly we issued 169,000 orders. I know one man in New York who spent \$230,000 to comply with a single order, and another company appropriated \$300,000. Our orders run from a small amount to considerable amounts. We have a good many compliances but not compliances to all our orders, unless it would be within a year after they are issued. Of course we have to exert some energy in getting compliances; the inspectors must come back time and time again and meet the difficulties of the employers. About 9,000 orders are floating between those issued and those complied with, but I am convinced that we have the cooperation of the manufacturers in New York State both large and small.

There are only three ways to get rid of an order; by compliance, by modification, or by waiver when the order is not necessary. There may be a waiver, for example, when a man is ordered to provide closets for his female employees and he decides to get rid of his female employees. Although there are three ways of getting rid of an order, our orders are complied with within the year. As far as the manufacturer is concerned we could secure that same cooperation in accident prevention. However, as I view industry I don't believe they know any too much about safety. When I say manufacturer I mean the direct heads of a concern; for if we tabulate the names of people in the state of New York who have safety organizations and who believe in it and are following it right, the number is small in comparison with the 78,000 plants in the state.

CHAIRMAN STEWART: So far as the cooperation of the employers is concerned, it is becoming more and more sincere and purposeful year by year and day by day. We don't need to kid ourselves as to why the Workmen's Compensation Law made it cost money to hurt men, and the means of saving money when you quit hurting them. But entirely aside from the functional side of it, the very fact of that cooperation has developed all along the line a greater feeling, man for man, than we ever had before. It is a sort of a habit, and I think you see that in this depression. For instance, I have gone through a good many of these depressions and always before nobody gave a darn whether people were employed or not. After all we are becoming humanized by some force or other. I don't know whether it is entirely to the credit of the Workmen's Compensation Law, but the whole attitude of man to man has improved. It is, I think, up to us to take advantage and go along, and cut out as much as we can of the "chip on the shoulder" method which was more or less necessary in the first place and do things in a more friendly way. In the first place you get things done better by agreement and a friendly attitude than you do by force.

I think we need more meetings like these where we can get the officers and the officials of the State and Government who have to do with such things together and the more we do this the more we are going to have of that feeling of doing the right thing because it is right.

A few years ago you pretty near had to follow the line of making it cost a man more not to carry out your orders than to carry them out. Of course, as I said, Workmen's Compensation has taken care of this thing to a certain extent. But in order to get the right kind of cooperation and the right kind of taking care of these things it must be done on a human basis and not on an enforcement of the law basis.

ADJOURNMENT

TWENTIETH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Laundry and Dry Cleaners Section

Officers 1930-31

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ABRAHAM PAPP, Linen Supply Association of America, Boston, Mass.

Secretary—ROBERT C. HAVEN, Baxter Laundries, Inc., Grand Rapids, Mich.

Thursday Afternoon Session
October 15, 1931

HOWARD F. BAXTER, Chairman
Baxter Laundries, Inc., Grand Rapids, Mich.

The session of the Laundry and Dry Cleaners Section convened with General Chairman Howard F. Baxter presiding.

CHAIRMAN BAXTER: This is the second annual meeting of the Laundry and Dry Cleaners Section. We are going to have a most interesting meeting.

These are very serious times. They are troublesome times, times that try the souls of executives in business. It is our problem to see that we give employment to as many employees as we can to help tide them through this next winter. To do that it is essential that we decrease our costs in order to keep our profits at a point that will permit us to pay interest on securities, pay necessary obligatory dividends, and meet other expenses. Those of us in our particular industries, laundry and dry cleaners, towel and linen supply, realize the loss in sales that has hit our particular activities. In looking through our costs to attempt to locate ways in which they can be decreased I believe most of us have gone right over the question of the premium that we pay for fire insurance, for employees liability, and automobile insurance of different kinds. We have jumped right over costs that we have been forced to pay because of absenteeism and because of low production rates due to lack of good health on the part of our employees. We have felt that most of these costs were constant.

It is to those particular costs that we should direct our attention this afternoon, because it has been proved in a number of instances, and very markedly in the case of our particular company through the activities of Major Haven, that enormous savings can be effected in individual properties to decrease those costs. It seems to me that we should pay very particular attention this afternoon, because it is our obligation to the country to help in a solution of this business depression. We should examine those costs and take advantage of the suggestions that may be put forth here in adjusting simple but definite forms of activity for safety, fire prevention, and health promotion in our own particular plants next year.

Report of the General Chairman

By **HOWARD F. BARTER**

Barter Laundry, Inc., Grand Rapids, Mich.

Because our industry has taken its rightful place among more than twenty-five of the other leading industries who are meeting at this Congress under the guidance of their Section leaders, for the sole purpose of conserving life, limb and property, I am very happy to preside at this our annual Sectional meeting.

When the National Safety Council was organized in 1913, the founders had the vision to see that many accident and health problems would necessarily have to be studied by groups of members representing specialized industries.

Each group, or Section as it is now called, has the privilege of formulating and carrying out its own plans under the general supervision of the Executive Committee of the National Safety Council, following certain standardized activities.

It was upon that basis that our Section, meeting here today, was organized last year at the 19th Annual Safety Congress in Pittsburgh.

In one of his masterful articles appearing in the Bulletin, published by the Laundry-owners National Association, President Frank Huebner expressed a fundamental truth when he said that "education is the foundation of all progress."

It is upon this theory that your chairman began the activities of our Section for the season of 1930-31. The first questions, therefore, that confronted the Executive Committee of our Section were, (1) what had the two industries, as a group, done to promote safety activities, and (2) to what extent was it known that annually thousands of dollars were needlessly being spent by the trade in payment of doctor and hospital bills, compensation costs and excess costs of industrial accident, auto public liability and fire insurance premiums as a result of preventable accidents and fires, not to mention the losses due to absenteeism of employees that could be prevented through individual and collective effort.

It is a well known fact that the Laundryowners National Association and the National Association of Cleaners and Dyers have made great strides in developing a technique in sales, production, accounting and other methods, but it was found that practically nothing had been done, as a group, to educate the industry in the value of organized safety nor how to go about it to get results.

You can't get any individual to take up some additional activity which is going to require added energy by him unless he fully appreciates the need for it and the gain in himself. That, of course, is just the ABC of management. Therefore, our problem, it would seem, is (1) to show to these members of the three industries the necessity for some definite safety work, because of the gain it would give them personally; and (2) to show them the amount of loss which they have sustained, in order to arouse their desire to investigate it more fully.

After consulting several of the men at our meeting in Pittsburgh, your chairman concluded to confine the efforts of this committee for the first year, at least, to the job of pointing out the seriousness of the situation and suggest ways of meeting it.

It is the accomplishment along this line that constitutes my report today. Nothing in the way of committee appointments or activities was undertaken.

The necessity of having the present representative group of men act as members of our Executive Committee is perfectly obvious. When I invited them to serve with me during the past year and received their gracious acceptance, I promised them that they would not be called upon to contribute any of their time and I have tried to keep my word. Upon several occasions, however, I have asked their advice which was freely given and I want to express long enough to express publicly my keen appreciation of their assistance.

It was found that for our educational campaign we would have to depend entirely upon the generosity of the National Safety Council and others for assistance. Obviously, we have no paid staff member who could visit the various cities personally and by word of mouth tell our story, so we had to rely on the printed word to carry our message.

In ours, as in all others, the Sectional set-up of committees provides a place for a NEWS LETTER Editor, whose responsibility is to have in the office of the National Safety Council on a regular basis each month the copy for a six-page NEWS LETTER. The letter is then mimeographed and distributed from the headquarters office, the Council paying all the expense except for the time of the Editor, which our company was glad to donate.

These NEWS LETTERS would, ordinarily, contain reports of all Sectional activities, personnel, list of new members, statistical information, achievements of members, announcements of interest to the industry, questions and answers, and special articles that would, among other things, constitute an exchange of ideas.

As was expected—due to the newness of the activity—there was little response from the laundrymen and dry cleaners receiving the NEWS LETTER, when, on several different occasions they were invited to contribute. The editor has, however, very faithfully issued the letter month after month. For the most part, the letters have told of the need of safety in our industry and have contained a complete outline of the methods which he has so successfully employed in reducing the costs of accidents, fires and absenteeism in the 25 plants operated by our company. To date, 11 of these letters, each of which required considerable time and much thought, have been issued. To those of you who have not received them, we suggest that you make a note at this time to ask for your copies from the National Safety Council. You will find that they contain valuable suggestions and information.

Since the National Safety Council is footing the bill of expense, the circulation of these letters is limited, although more than 100 prominent laundryowners picked at random have been receiving them regularly.

It was because of the limited circulation of this propaganda that your committee enlisted the cooperation of the Laundryowners National Association Bulletin, *The Laundry Age* and the *Progressive Laundryman*, who have so willingly and generously donated much space to the cause.

Beginning with the February issue, the *Progressive Laundryman* has been printing a series of monthly articles under the caption, "Practical Safety Suggestions for Your Laundry." Starting with the May issue, *Laundry Age* has graciously permitted Major Haven's articles to appear under the heading of "Cooperative Safety in Industry." Most of you receive these splendid magazines. May I also suggest that when you return to your plants you have the pages containing these fine articles clipped and use them as a basis for your safety activities?

This, briefly, represents the accomplishments of our educational activities since our first meeting. It has been pretty much of a one-man job so far, but during the coming year, as a result of the publicity and educational work done, I hope the Sectional activities will be broadened to include some of the committee work that could be undertaken to advantage.

Today, it is generally recognized that business success in the laundry and dry cleaning field is dependent not alone upon individual effort but to a larger degree

upon what others do. Safety in our industry is one of the important factors of plant operation. The solving of the problem cannot be accomplished through the activities of one plant or group of plants. We are still interdependent. As previously stated, the members of the institutes of our two industries have cooperated in solving, to a great extent, the problems of sales, production, service, accounting and other problems of equal importance. There has been a very generous exchange of ideas and experience of members that has resulted to our mutual benefit. This exchange of ideas must also be had in safety. The success of our attempt to eliminate this needless waste of millions of dollars annually in our industry will depend entirely upon the interest taken individually and collectively in the activities of this Section.

Of course, affiliation with the Section will not immediately cure all the ills effecting the laundry and dry cleaning industry and eliminate all accidents. Rather, it must be recognized as a forward looking movement initiated and perpetuated by representatives of the industry who have recognized that intelligent self-regulation and control through cooperative effort is essential to success. This cooperative effort must be translated by every individual member into contributions of company experience. Then, and then only, will we advance, as an industry, in the work of saving life, limb and property.

CHAIRMAN BAXTER: The speakers we have today are going to give us some most interesting information. Our first speaker is a man well known to many of us. It gives me a great deal of pleasure to introduce Mr. J. Clair Stone, President of the Elk Laundry Co., and President American Institute of Laundering.

Turning Safety Activities into Profits

By J. CLAIR STONE
President, Elk Laundry Company, St. Paul, Minn.

The United States leads the world in accidents by a wide margin. Accidental deaths in 1930 reached the enormous total of ninety nine thousand, with an increase indicated this year that will bring the 1931 total considerably in excess of this.

The annual economic loss directly and indirectly attributable to carelessness in one form or another has reached the staggering sum of \$3,250,000,000 of which \$1,000,000,000 is for preventable accidents in industry.

These are facts, with which you are familiar, but I suspect that, since we are not directly affected by them, the figures mean no more than those that might be issued by the Secretary of the Treasury and concern us less.

In our own industry, the estimated yearly loss due to accidents, fires and absenteeism from illness is close to \$3,000,000, but this in no wise represents the incalculable losses that grow out of these unhappy occurrences, which add substantially to this sizable total.

The percentage which this direct loss bears to gross income is much too large to ignore. We can, indeed we must give heed to the measures that are open to us with which to meet this challenge to the maintenance of profits. We most assuredly know how to deal with the problem intelligently. The steps that need to be taken to set our corrective program in motion have been well thought out and clearly defined. We lack only the will, as a group, to make the sustained effort, and it must be sustained if we are to do the job in creditable fashion, because carelessness is with us always and the urge to gamble with chance takes no holiday.

In the family of American industries those here represented are outstanding in what they have achieved in the interests of commercial advancement. There are no finer examples of what can be accomplished by industry bent on meeting conditions which rapidly changing customs are constantly imposing, than the Institutes of the Cleaners and Dyers at Washington, and the Laundryowners at Joliet. Both bear witness to an unswerving determination to keep pace with the all embracing

demands of progress (and to the upholding of the ideals and best traditions of the industries they represent).

Conceivably such a group could go a long ways toward writing off these controllable losses once mind and hand were put to the task.

Just how many plants have enlisted in the very practical safety program laid down by Mr. Baxter and his associates, I do not know. Neither do I have accurate information as to the number that are undertaking to do something toward the bettering of conditions that admittedly can be improved. But speaking out of a knowledge gained from a very recent attempt to secure some first hand statistics that I very much desired to submit to this audience, I am convinced that only here and there has success attended the endeavors of this little company of men who have volunteered to render this commendable service in our behalf, and but few have registered their formal decision to carry out its suggestions for accident and fire prevention and for the promotion of safety and health.

It would seem then, that the particular responsibility which rests with us now is to awaken the interest of the key people in this important group and stir them to action.

In a day when the principal topic of conversation, wherever men gather for a discussion of business problems, is how to reduce operating costs, the subject of industrial safety, and its relation to profits, should command some measure of attention.

Competition is so keen, and the struggle to maintain a proper balance between income and expense so vital to our very existence, that we can no longer be indifferent to a single item that offers even the smallest opportunity to increase the spread between these two factors, much less one which taps our earnings in so many different and unexpected ways.

Men are moved to act from various motives. The humanitarian aspect has a very strong appeal to some, and decisions to do the thing or not to do it are influenced very largely by this consideration. By far the greater number, however, decide on this or that course because of certain advantages which may be gained, and when these take the form of money, no matter in what manner it may be calculated, conclusions are generally reached with promptness and the action which follows is fairly immediate.

It is from the standpoint of what safety activities mean to us in dollars and cents that we are to discuss this subject. To those who are yet to be convinced that it pays to make accident prevention a direct responsibility of management, along with the equally important ones of production and sales, we extend an earnest invitation to examine the facts as they are hereafter presented.

In the first place let me state that every accident we are unfortunate enough to have costs us money directly and indirectly, and the indirect cost may be as much as four times the amount paid out for compensation and medical attention as prescribed by law. The latter figure is not an approximate calculation, but one that has been determined after an investigation of ten thousand claims selected at random from all sections of the country.

Our insurance, of course, takes care of the major portion of the direct cost, but not all of it. There are certain expenses quite frequently assumed by the employer that are not covered by insurance, such as payment to the injured person of the difference between the regular wage and the amount allowed under the statutes. If the employee is especially valuable, or has faithfully served the firm for a long period of time, or has a number of dependents who could not get along on the reduced income, it is the practice of many firms to continue the same scale of wages as prevailed before the accident.

Then, too, there are such items as medicine, food and labor, all or part of which may at times appear as charges against some particular mishap.

In a case which recently came under my own observation, it was not only necessary for the company to arrange for medicine and food for the injured person, a widow with children too small to be of much help, but likewise for the services of a woman to assist with household duties on a part time basis, and I daresay that if an analysis could be made of all claims originating within this group, many situations of like character would be revealed, the cost of which cannot very well be ascertained.

When we come to the consideration of the *indirect* cost that must be entered against every occurrence which interrupts the productive routine of all well regulated establishments, we have an impressive list of factors, most of which we conveniently omit from the expense calculations either through ignorance or design.

The Compensation Insurance Board of Minnesota, quoting a recognized authority, enumerates the items that combine to make up this hidden cost as:

1. Cost of lost time of injured employee.
2. Cost of time lost by other employees who stop work
 - (a) Out of curiosity
 - (b) Out of sympathy
 - (c) To assist injured employee.
3. Cost of time lost by foremen, superintendent or other executives
 - (a) Assisting injured employee
 - (b) Investigating cause of accident
 - (c) Arranging for replacement of injured employee
 - (d) Selecting, training or breaking in new employee
 - (e) Preparing reports of accident.
4. Cost of time of first-aid attendant.
5. Cost of machine damage.
6. Cost of interrupted production.
7. Cost under employee welfare and benefit systems.
8. Cost of continuing the wages of the injured employee in full after the return to work—even though the services may only be worth part of their normal value.
9. Cost due to loss of profit on injured employee's productivity.
10. Cost of subsequent injuries that occur in consequence of the excitement or nervousness arising out of the original accident.

Except perhaps in a minor degree these are losses which cannot be protected by insurance, and therefore must be borne by the employer. They are a certain consequence of every major injury, and, as I have previously pointed out, may amount to as much as four times the total direct expense.

I want to frankly admit that the first time our attention was invited to this particular analysis of *indirect* costs, which, by the way, included many more items than had been set up in our own carefully prepared record (Elk Laundry Company, Saint Paul), we determined to bear down on every hazard that in the remotest degree held the possibility of an accident, regardless of the judgment and opinion of inspecting engineers, because we realized as never before that, with eighty percent of the expense of every injury (falling within the classification of a compensable case) coming out of our own pocket, *we couldn't afford to have an accident.*

Now it seems to me that if these folks, who look upon a casualty of this character as just one of those unfortunate affairs that had to occur every once in a while in spite of anything that might be done about it, could be made to see that, with all the protection accorded by the most liberal policy written and issued, their loss in any given instance was covered only to the extent of twenty percent, there wouldn't be the slightest reason in the world for any anxiety as to what they were going to do about it because no man in these times is neglecting a single opportunity either to protect or add to what he has, least of all his potential profits.

Accidents are costly things and the employer, whose fatalistic attitude or smug

indifference to them leads him to take none of the steps which experience dictates should be initiated for safeguarding the person of his employees, is most assuredly omitting a fundamental responsibility of management, the immediate penalty of which is inefficiency in plant operation, leading finally to lowered earnings. No need to elaborate on that.

Make no mistake about it—accident prevention is sound business, and if it were not so, the leading industrial enterprises, the country over, would have none of it.

They recognize the very close relationship between safety activities and profits, and the records will show, that as the tremendous burdens of industrial accidents have been reduced, plant efficiency has materially improved and production increased.

There are no circumstances which might be conceived that would operate against a similar accomplishment within the circle of our own little group, *if we will to do it*, because the problem is only one of size and the advantages which accrue to the larger units as a result of this businesslike procedure, would likewise be proportionately spread over the individual plants that undertake such a program.

We have only to look at the splendid record of achievement which attaches to the efforts of a single corporation to confirm the conclusion that success must inevitably attend any reasonably well organized attempt to deal with the matter.

From it we can well believe that a fair share of the 17,800 individuals employed in the Laundering Industry alone, who lose time each year because of accidents of one sort or another, can unquestionably be retained on duty.

In those states where Industrial Commissions have been created for the enforcement of such regulatory measures as are written into the statutes for the protection of workers, the safeguarding of machines and equipment is compulsory.

The safety engineers who, at required periods, examine the physical condition of insured plants for the purpose of discovering and correcting hazardous points of operation, are effectively dealing with the mechanics of this safety problem.

The manufacturer of equipment generally, recognizing present day safety requirements, is designing his product to comply with the most rigid demands for the protection of operators.

Laundry and Dry Cleaning machinery such as washers, extractors, ironers and presses, particularly within the last few years, has carried guards wherever there was the slightest danger to those who used such equipment. It might not be out of place to say that our industry is protected as well in this respect as any and a great deal better than most, if we accept the statement of one prominent engineer whose observations cover a period of more than twenty years.

This part of our responsibility to the employee seems to be going along in rather satisfactory fashion in spite of us. Automatically we are penalized for failure to carry out the recommendations of state or casualty inspectors by the amount of premium demanded, and rewarded by a reduced premium when we comply. Thus are we brought abruptly to a realization that there is, in actual fact, a relationship between *safety* and *savings*.

Our energies need rather to be concentrated on the much more important phase of personnel control by—

1. Selecting the right employee.
2. Educating the employee in the principles of safety.
3. Enforcing the regulations governing safe conduct.

In a recent analysis of 50,000 accidents that resulted in injuries, some very interesting and illuminating information was secured by the insurance company which made the survey and I submit this to you in support of the statement that as between *men* and *machines*, the selection, training and supervision of personnel is of vastly greater consequence to us from any standpoint we wish to view the matter.

It shows that accidents resulting from purely mechanical hazards absorb but 10 percent of the total, while those that occur because of the *failure of the employee* to act *safely* amount to 90 percent.

If your interest in determining the underlying reason for this seemingly unbalanced condition, leads you to make an investigation, here are the startling figures that present themselves:

Faulty instruction	30%
Inattention	22%
Unsafe practice	14%
Poor discipline	12%
Inability of the employee	8%
Physical unfitness	3%
Mental unfitness	1%

With such clearly established findings before us, management may as well face the human side of this problem squarely and deal with it promptly and intelligently because it looms large and cannot be disposed of by the simple process of ignoring it. More than any other, it influences our accident experience record and bears directly upon the compensation rate we pay.

The relation between education as applied to the training of the employee in safe plant practice and *expense* as identified with accident frequency is indeed very close. Make no mistake about that.

Furthermore it should be remembered that as management succeeds in making the employee *safety conscious* through the effectual enforcement of protective measures, accidents occurring outside the plant as a result of carelessness can and undoubtedly will be reduced, because the habit of *playing safe* will extend beyond the hours of labor.

Last year (1930) out of the nearly one hundred thousand fatal accidents, fifteen odd thousand were charged to industry, indicating that many more workers are injured away from their place of employment than in it.

The opportunity to contribute indirectly to the improvement of such a situation, while advancing our own particular interests, through whatever safety activities we may wish to inaugurate, should encourage and inspire our most enthusiastic efforts in this direction.

The National Safety Council, through the Laundry and Dry Cleaners Section, has set up a very definite and comprehensive program as a guide to management in planning and carrying out its accident prevention work.

It has outlined in detail the manner in which we might get started on a safety program by describing the very simple internal organization necessary to its operation.

The duties of this little group, which may be made large or small to fit in with the demands of any size plant, have likewise been recorded step by step, as well as the manner of their performance.

It hasn't left out a single direction as to *what* must be done to properly deal with this problem of making our plants safe, or *how* to do it.

Particularly does it treat of those things which relate to the training and supervision of personnel, the most important responsibility of all, since it is to this source we trace ninety percent of all our accidents.

Nothing that one might think of has been omitted to aid us in introducing the plan or making it effective.

I know that many have adopted it to their material advantage and profit, but I also know that a far larger number has failed to do so, either through lack of interest or because of the opinion that its initiation and supervision might consume too much time.

Manifestly such things do require some time, but the investment is so very small in comparison to the far reaching benefits that, were they fully understood and appreciated, I am sure their inclusion in the routine procedure of plant management would be the rule rather than the exception.

We have only to examine the cost of liability insurance to some of our good friends in this industrial group to be convinced that this part of the job of manage-

ment quite evidently needs a much wider acceptance before it can be said that we are indeed "safety minded."

The spread between manual and net rates in no wise warrants the belief that safe plant practice is being stressed to the extent and degree it should, because, if it were, the reductions earned through efficient guarding of equipment and rigid supervision of personnel would be reflected in larger credits for these items.

Presumably we shall some day include a safety program such as has already been prepared for us, as a part of the specific duties of management.

Ultimately it will be the almost universal practice because no man will venture to face the handicaps imposed upon him without the protection which it provides.

Eventually it will be considered as essential to efficient operation, as any of the things that now take up so much of our time, and require so much of our attention.

If I am right in making this forecast may I suggest, indeed may I urge, that we get in motion on this thing that holds so much good for us, that offers so many advantages to us, and that distributes so many benefits, and that we do it now.

CHAIRMAN BAXTER: Mr. Stone has made a most valuable contribution to safety literature. He has brought together statistics that are directly applicable to our own personal problems. It is our problem and our responsibility to benefit from that information.

The program that has been found so successful in some of the properties is a three-fold one. One-third of the time is devoted to safety; one-third, to health; and one-third, to fire prevention.

It will be shown a little later in the meeting, but if you will have to leave you might not get it so I will state it now. Each individual plant realizing the point that was so potently stressed by Mr. Stone, that 90 per cent of the prevention of accidents must take place through the education of the employee, provides a program that consists primarily of that educational work. The best way to educate an individual is to give him some degree of responsibility or leadership. The minute you do that, that individual must become well informed and he begins to take an interest. By applying those principles, the simple little program is worked out by a committee of either three or four, depending upon the size of the plant, which is rotative as far as membership is concerned. One member drops out every six weeks and another comes in.

They are given a little badge of the safety committee. That committee has one meeting each two weeks. The activity for one period will be safety, and they are provided with some very simple material and they make some little inspections themselves, the real thought being that they themselves become educated. They have a feeling of responsibility on their part and one of doing something for their fellow employees.

The next two weeks is devoted to the activity of fire prevention, and they are provided with necessary information as to the prevention of fires, inspection, etc. The third period will be devoted to health. The rotating membership is so simple that it works out very nicely. One chairman remains on for six weeks and then they shift to another chairman so that the actual responsibility can be placed on an individual who is capable of really carrying it on in a satisfactory way.

In connection with fire prevention there is also a Fire Brigade. The Fire Brigade has certain individuals on each floor who are assigned specific responsibilities in case of a fire. They know where the fire extinguishers are and a fire drill is held about every three months. One plant works against another to see in how many seconds they can empty the buildings. Major Haven will outline in detail just how that program is developed.

In order to make you realize what your industry can do in connection with a safety program I want to point out the fact that six years ago the cement industry was looked upon by insurance people as one of the worst possible risks. They had

the same attitude toward that industry that they have toward the dry cleaning and laundry industries. I think it was even a little more extreme. The dangers of quarrying and the dangers of cement mills were such that they did not want to write any employers' liability insurance. The cement industry has a national association that is very active. This association began to study the question of costs to its members for casualty insurance and decided it was out of all proportion to what it should be. They started an intensive campaign among their own members covering safety and last year thirty cement plants in the United States went one entire year without a single lost time accident. If that isn't proof of the advantages to accrue to an industry, I am afraid none of us are able to accept any proof.

The next question is the very important one of fire prevention. We are very fortunate today in having an expert to address us on this problem. The next speaker will be Mr. Percy Bugbee, National Fire Protection Assn., Boston.

Meeting the Fire Hazards in Laundry and Dry Cleaning Establishments

By PERCEY BUGBEE

Assistant Managing Director, National Fire Protection Association, Boston, Mass.

It is presumably safe to assume that the purpose of this address is to provide a basis for discussion of the fire hazard problem by the members of the industry present. I think it is wise for the speaker to mention at the outset that he has never been employed in the laundry or dry cleaning industry and is therefore approaching this problem as an outsider and with an outsider's viewpoint.

Let us take the laundry problem first and endeavor to show what the fire record of laundries discloses and what the most common problems of fire protection in the laundry may be and what can be done to meet them.

We have in our fire record files reasonably accurate information on 505 fires in laundries since the year 1900. It is believed that this is a sufficient amount of experience to indicate the causes of fires in laundries and advantages of certain types of protection. A study of the causes of these fires indicates that they are about evenly divided between common hazard causes and special hazard causes. Of the common hazard causes of fires in laundries, those which predominate are the usual hazard of the careless smoker, improper protection or care of heating plants, and spontaneous ignition of oily waste and other material, defective chimneys and flues, defective electrical wiring, and ignition of accumulations of rubbish. Fires from these causes are common to nearly every class of business. Common sense principles of construction and good housekeeping will eliminate most of them.

Of the special hazard causes in laundries our record discloses 164 fires where a definite cause was established. Of these fires, 31 occurred in the washing process, 65 in the drying process, and 65 in the pressing process. The number represents the relative hazard of these three divisions of the industry. The majority of the fires in the special hazard class occur from such causes as loose matches left in clothing, spontaneous ignition of unwashed clothing, overheated dryers, pressing irons improperly installed or left on, sparks from motor on ironing machine or mangle and ignition from hot steam pipes. An interesting piece of information obtained from the study of the laundry fire record demonstrates the great value of automatic sprinkler installations in this class of property. One hundred and fifty-six of the fires studied occurred in sprinklered laundries. Of these fires 152 were successfully extinguished or held in check by the sprinkler system, showing an efficiency of 97.4 per cent.

Mention of a few specific fires may be of interest and serve to throw additional light on the fire record of the industry. One of the earlier fires recorded occurring

in Portland, Ore., in 1910, causing a loss of \$40,000, was due to the ignition of a celluloid stay in a lady's shirt waist which was too close to unprotected steam pipes. It seems likely that fire from this cause would not occur today.

A fire occurring in Chicago in 1912, from some loose matches in the pocket of a waiter's jacket, caused a loss of \$26,000.

One rather unique fire occurred in Ottawa, Kansas, in 1920. A defective boiler exploded killing three of the employees. The steam which escaped from the boiler put out the fire which resulted from the explosion so that when the fire department arrived the fire was extinguished.

A fire which occurred in Lawrence, Mass., in 1919, was due to a careless employee leaving a gas-heated pressing iron on at the close of work. The loss amounted to approximately \$10,000 and the laundry went out of business.

A fire in Somerville, Mass., in 1925, started in waste matter and oily rags piled up against the outside wall of a laundry building and completely destroyed the plant.

In Kokomo, Ind., in 1928, the explosion of a steam mangle killed four employees and caused a loss of \$10,000 to the plant. Fire starting in the battery charging room for the electrically driven delivery trucks of a laundry in Chicago in 1929 spread into the laundry proper and did heavy damage.

These specific fires reinforce the data in the general fire record which demonstrates that for the most part well recognized fire hazards are responsible for loss of life and destruction of property in laundries.

Commercial laundries are found in all kinds of buildings and no general type of construction predominates. As laundries increase in size, new and larger buildings are usually built and these are as a rule of superior construction. The washing process proper is not of a hazardous nature. Where starching is done, care should be taken of the heating device employed. The dry room of a laundry probably constitutes the principal hazard. Steam pipes are generally used and if properly arranged and protected with guards should be reasonably safe. The important thing is to see that combustible material does not rest against the pipes for any considerable length of time and that the room is kept clean. If conveyor dryers are used, it should be evident that all bearings must be kept well lubricated and fans in good adjustment. A dry room constructed of wood is undesirable and it should be lined with some non-flammable material such as metal lath and plaster.

Where electric irons are used, it is important that the current be shut off the entire ironing room at night by a master switch. There should be pilot lights in all such circuits. Gas heated irons are perhaps somewhat more hazardous and when employed there should be a master gas valve to shut off all gas in the room at night. Flexible tubing should be as short as possible and metal-clad tubing is preferable. Steam mangles are not particularly hazardous, but where gas or gasoline is used to heat the mangle great care should be taken to see that the cylinders are not overheated.

If a garage is connected with a laundry it should be cut off from the main building by a standard fire door and the usual safeguards for garage occupancy taken.

There is nothing about a laundry to call for unusual fire protection. Hand fire extinguishers should be provided and, as mentioned above, automatic sprinkler systems are desirable and entirely practical.

Let us now consider the problem of the fire hazard and protection of the dry cleaning establishment. The dry cleaning industry has received a great deal of attention from the fire hazard viewpoint because of the past record of serious fires and loss of life. At the outset of this discussion I think it is desirable to mention and pay tribute to the very excellent work done by the National Association of Dyers and Cleaners in increasing the safety of their industry. The National Fire Protection Association has been cooperating with the National Association of Dyers and Cleaners and thoroughly appreciates the constructive viewpoint of the latter organization. The work of the Dyers and Cleaners Association in this field has been the advocating

of Stoddard Solvent which is now widely used in the industry, the advocating of a model dry cleaning law and assistance in the development and adoption of the National Fire Protection Association Regulations for Safeguarding Dry Cleaning Plants.

Our fire record contains 224 fires in dry cleaning establishments since 1912. In this industry special hazard causes predominate, there being 177 fires in the special hazard class and only 29 in the common hazard class. Naturally the great majority of the special hazard fires are due to ignition of gasoline, naphtha, or benzine from various causes. One hundred and sixty-five of the fires come under this classification. The ignition of the flammable liquid occurred from static sparks, matches in clothing, open flames, sparks from motors, friction, and other sources.

The common hazard fires in this industry are similar to those referred to in the discussion of laundry fires.

A brief reference to some of the fires of special interest in this class may be of value. A dry cleaning plant was destroyed in Lebanon, Missouri, in 1930. Gasoline was poured into the floor drain and shortly thereafter the boiler was fired. The fumes immediately caught fire, destroying the property.

Three employees were injured and a large section of the plant was wrecked in a series of explosions of solvent vapor in a dry cleaning plant in San Francisco in 1929. The arrangement of the plant did not comply with the state or national regulations on dry cleaning establishments.

Fire in an old frame building used as a dry cleaning plant in Dillon, Mont. in 1920 was due to gasoline which ignited from a spark. An employee was killed and the building totally destroyed.

A fire in San Francisco in 1920 in an old frame building heavily damaged the plant when a still which was used to redistill gasoline exploded.

Another fire almost identical with the one noted above killed six employees and destroyed the property in Saginaw, Mich., in 1906.

It is pointed out at the outset that the fire record of this industry may not be pertinent to the present-day because of the recent rapid change in methods. It is important, however, to emphasize that the Stoddard Solvent which is now so widely used and which is unquestionably materially safer than benzine or naphtha, must nevertheless be handled with reasonable care. Stoddard Solvent has the same properties as kerosene. No one can deny that kerosene will burn and must be handled with care. Briefly, the general requirements for dry cleaning plants laid down in the standard regulations of the National Fire Protection Association provide that such plants should be located preferably in an outlying sparsely built section and that the buildings should not be closer than 10 feet to the line of adjoining property except when the exposing wall of the dry cleaning building is of standard brick or equivalent construction and without openings. Buildings should be not more than one story with walls of brick not less than 12 inches thick or equivalent construction. Two exits remote from each other should be provided from the building. The dry rooms should be separated from the dry cleaning room by a fire-resistive wall. Skylights of metal frame and wired glass should be provided. Windows should be of wired glass and so hung that they will readily swing out in case of an explosion. A mechanical system of ventilation should be installed of sufficient capacity to insure complete and continuous change of air every three minutes. Special precautions should be taken in providing the lighting, heating and power equipment. Special requirements are laid down for the proper construction and protection of tanks, purifiers, clarifiers, washers, drying tumblers, extractors, washing machines, stills and condensers. The spotting operation should be in a separate fire-resistive compartment. Metal-topped tables properly grounded should be employed and flammable solvents limited to one quart in safety cans. Rigid precautions should, of course, be taken to prohibit smoking and eliminate matches in clothing.

As to the fire protection for dry cleaning establishments, steam has been commonly

used and if properly installed offers good protection. Automatic sprinkler systems may be used in place of steam or fire extinguishing systems using a fire retardant chemical or gas. Means should be provided to humidify the dry cleaning room to prevent static. Foam extinguishers and other extinguishers suitable for dry cleaning fires should be provided.

A campaign which should be of interest to all dry cleaners is the campaign to educate the housewife to the dangers of dry cleaning in the house with flammable solvents carried on by the National Fire Protection Association. Even in this enlightened age, there is a daily record of fires and deaths due to home dry cleaning. The dry cleaner who takes part in the campaign to educate the home owner in this hazard is not only benefiting himself commercially, but is helping to reduce the loss of life by fire. The National Fire Protection Association has distributed thousands of copies of a pamphlet on the dangers of home dry cleaning which contains the suggestion that dry cleaning can best be done by a professional dry cleaner in a plant where the hazards of flammable solvents are understood and guarded against.

CHAIRMAN BAXTER: Mr. Bugbee has given us a most interesting and instructive address. Fire can be prevented, not only in laundries but also in the dangerous conditions that exist in many dry cleaning establishments. Mr. Haven will have the privilege of proving that point to you in connection with certain statistics that quite dumfounded some of us when they were brought to our attention.

All of us here are particularly honored today. We have graduated from the national type of meeting to the international. We have with us today some representatives of a country that has the deepest regard of every one here. I hope I may have the pleasure of introducing to you Mr. Gilbert Bently, president of the Federation of Laundry Owners of England. Mr. Bently, we would be glad to hear a word from you.

GILBERT BENTLY (London, England): It was good of you to call on me at this particular time. We are here to see what you have done with regard to your own industries and I am very glad to report that so far we have seen nothing but good in yours, particularly with regard to your physical and general health. We have been feted and feasted and we have had nothing but smiling faces around us, and we have enjoyed ourselves up to the limit. We are hoping to go to Louisville and hear many things there.

We bring a message from England and that is, that, as far as we are concerned, we are not too concerned about depression at the present time, although we have been told that it is thought over here that there is a depression both in this country and among ourselves. However, I think that our message to you is to "Look forward and keep a stout heart." We are not looking down at all, and with the spirit of cooperation which has been of aid to us since we have been in the states and Canada, I am quite sure that even with the laundries doing a little less than before, they can look forward to the time when they will be doing even more.

Mr. Stone said the Committee had before them nearly every problem in safety. We are at present discussing with the Government the question of hydro extractors, and I should be glad to hear something about them. We have found it difficult to guard those installed in our plant for many years, and which now are expensive to replace with new ones. The hydro extractors are supposed to be perfectly safe if they have lids which cannot be lifted while they are in motion. If we can gain any information on that particular subject which we can apply to our industry, I should be glad.

CHAIRMAN BAXTER: It is indeed a pleasure to have you here, Mr. Bently. I also want to introduce Mr. James J. Stark who is secretary of the Federation of Laundry Owners of England.

JAMES J. STARK (London, England): It is indeed a pleasure to attend such a meeting as this. There are two or three points on which I would like further information. For one thing, I have learned from Mr. Stone's address that approxi-

imately the cost of your Workmen's Compensation accident insurance is one per cent, although it varies from state to state. Is that a fair average?

CHAIRMAN BAXTER: I think it would probably run somewhere along that figure. V. C. KELSEY (Safety Engineer, Commercial Casualty Insurance Company, Chicago, Ill.): In Illinois the rate runs around \$1.25 depending, of course, largely upon the physical condition of the plant, etc.

MR. STARK: That is near enough to my purpose. Our rate averages about one-half of one percent. Our rate, of course, varies according to risk, but it varies more perhaps according to the size of the plant—that is the number of employees. Whether that means that our accident rate is about the same as yours, I don't know. I do know, however, that the actual cost per accident with us has increased a great deal during the last few years, owing to the fact that conditions have changed from those when the insurance companies were able to settle the permanent injury cases with a lump sum. That sometimes seemed a little hard on the employee, but in other cases it was most fair. Those cases had to receive the approval of the courts and they have over and over again insisted upon a very much larger lump sum in settling cases than had been agreed between the injured person and the insurance company. I think that on the whole in England we have more carefully graded rates.

The next point that occurred to me in Mr. Stone's analysis was that of the cause of the accident. He referred to the cause of the accident as being negligence on the part of the workmen, lack of training, etc. We classify our accidents in our government reports according to the cause of the accident in this way: tractor, washing machine, freight work, ironer, etc. We find that is a better way.

The factory inspectors sent for us privately a few months ago and said that their records showed that during the last ten years there had been a certain number of fatal accidents on hydro extractors. In a great majority of these cases the accident would not have occurred if there had been automatic covers for them, and we have been asked to discuss the matter further with them as soon as we get back. The trouble is that in our country the majority of extractors have no covers. If the home office of the Factory Department of the government in our country makes an order that all extractors must have automatic covers it will cost some people a lot of money. Not only will it force them to put automatic covers on the extractors, but in some cases this cannot be done and it will necessitate getting rid of these machines. I would appreciate it if you could give me some information or send it to me for it will be of great help to us.

J. CLAIR STONE (Pres., Elk Laundry Co., St. Paul, Minn., and Pres., American Institute of Laundering): If I may be allowed the privilege of the floor for just a few seconds I want to assure Mr. Stark and his group that I will undertake to place in their hands the information that they particularly desire in relation to the kind of mechanism that you must set up in order to guard these extractors.

I shouldn't like Mr. Stark to get the impression that there is one rate which is applicable to an industry. The rates are established by states and are a result of many years of experience. Then there is a manual rate established by insurance companies, and a rate that the company pays which represents the difference between the manual rate and the credit that the laundry gets for guarding machines and for service. In our own case, we get a credit of eight cents on the manual rate of \$1.09 for guarding our machines efficiently and four cents for experience. I might say likewise to Mr. Stark that the rate in New York is somewhere around \$2.25. It is very high.

CHAIRMAN BAXTER: We appreciate, Mr. Stone, your providing Mr. Stark and Mr. Bently with that information.

We have that same problem, of course, in this country. These hydro extractors are very much of a problem, and no doubt Mr. Stone will furnish you with a blueprint or something specific that you can take back. In a good many of the properties we have worked out a solution which, though not perfect, costs practically

nothing. It is based on the principle that the cover cannot be lifted as long as the current is on, while the power cannot be turned on until the cover is down. This is not complete, however, because it is possible to lift up the cover and get into difficulties after you shut off the power. This can be taken care of in individual cases, though, by little overlappings of strip iron, thus carrying out the two basic principles.

The next item on our program is the election of officers. Before we actually take up that subject I should like to outline a proposal that has come from one or two of the members which is along this line. The safety activities of this section are confined to three industries, namely: the linen supply which is represented nationally by a National Supply Association; the dry cleaners who are represented nationally by the National Dry Cleaners Association; and the laundry industry represented by the Laundry Owners National Association. The resolution is that we call upon the presidents of these three associations to select the officers for this Laundry and Dry Cleaners Section of the National Safety Council.

I should be glad to hear any expressions concerning some such manner for the selection of officers. Has anyone any thoughts on the subject?

WHEREAS, during the year 1930 a total of 99,500 lives were sacrificed in accidental mishaps in a parade of tragedy including 33,000 motor vehicle deaths, 30,000 home deaths and 19,000 industrial fatalities, and

WHEREAS, This unnecessary waste represents a financial loss of more than \$3,250,000,000 annually and a social loss immeasurable in terms of money, and

WHEREAS, This huge economic loss, even in normal times, is a staggering load to carry, but during these days of economic distress, our nation, our industries—which obviously, includes the laundries and dry cleaning plants—and our people can ill afford to shoulder the burden, and,

WHEREAS, our own industry contributes annually over \$3,000,000 to this loss, and

WHEREAS, It has been proven through years of experience that other industries, have, through the Sectional activities of the National Safety Council, been able to get an exchange of ideas in all matters pertaining to accident prevention, fire prevention and health promotion, and

WHEREAS, Because of this exchange of ideas and a co-operative program carried on through the Section, tremendous reductions in not only the cost of accidents, fires and absenteeism of employees, but in the costs of insurance premiums have been effected with great savings to the individual establishments, and

WHEREAS, We now have an organized Section of the National Safety Council for Launderers and Dry Cleaners through which a like saving may be had. Therefore:

BE IT RESOLVED, That it be the voice and sentiment of those assembled here at the second annual meeting of the Laundry and Dry Cleaners Section of the National Safety Council, on this the 15th day of October, 1931, that the matter of energizing the activities of this Section be laid before the Laundryowners National Association which meets next week at Louisville, Ky., and be it further

RESOLVED, That the President of that body, the President of the National Association of Cleaners and Dyers and also the President of the Linen Supply Association of America be urged to appoint a Chairman to head up the Sectional activities for the coming year, which Chairman will have authority to select such vice chairmen and chairmen of the several sub-committees in accordance with the standard organization plans of the National Safety Council, and be it further

RESOLVED, that this resolution be recorded in the minutes of this meeting and a copy be sent to President Frank Heusch of the Laundryowners Association at Joliet, Ill., for his earnest consideration.

Are there any remarks? If not we will vote on the matter.

(Resolution was carried.)

I believe that that is the proper solution to our problem. It places the safety work squarely upon the shoulders of the three associations capable of handling it and upon which the responsibility definitely rests. They can consult with different individuals and select those who will show the greatest interest and have the time available necessary to put over the work this next year.

The next paper will be delivered by Major R. C. Haven.

How to Start Your Safety Program

By R. C. HAVEN

Director of Personnel, Baxter Laundries, Inc., Grand Rapids, Mich.

Before laying before you a few simple suggestions, showing how to start your safety program, I should like to have it definitely understood that I do not have even the most remote notion that I am going to bring you a lot of new ideas in the safe operation of your laundry and dry cleaning plants, nor that I know more about your problems than you do. You men knew before you came to this meeting what your major individual problems are, and after listening to the preceding speakers, I know you have a clearer mental picture of the seriousness of the safety problem in our industry, as a whole. On the other hand, I hope to be able to show you how to stimulate your present program or establish and maintain safe conditions in your plant, regardless of its size.

During the past two years I have visited many laundries. I have yet to find a single one that has not experienced either a preventable accident, or fire, or whose production has not been seriously interrupted at some time because of employee absenteeism. Still, I am ready to admit that laundries may be represented here today whose losses from these sources are negligible.

However, our industry as a whole cannot suffer an annual loss of over three million dollars from these sources unless many of us contribute to the toll. I am going to assume, then, that there are in this audience representatives from plants where men and women have been seriously injured or even killed; where serious fires have occurred and where the problem of labor turnover has been, or now is, a factor for serious consideration.

I approach my subject with these things in mind.

Were I compelled to justify my appearance on your program today, I should have to go no further than your chairman. Mr. Baxter's background in the laundry business dates back to the late eighties when his father, Alfred Baxter, organized his first laundry. Your chairman has grown up in a laundry atmosphere. Further than this, for years he has been an ardent safety enthusiast. He has made a study of, has an unusually keen insight into, and knows of the costly hazards of the industry as they apply to accidents, fires and absenteeism of employees.

It is little wonder, therefore, that when his company began operating a large number of properties, he quickly recognized the need of the safety engineer to further study the problem in this expanded field and set up the necessary organization and program to meet it. The creation of safety committees in all plants and the establishment of a regular program have brought splendid results and I am here to tell you how it was done.

Bear in mind, please, that the plan being presented is not a sketchy affair. It was conceived jointly by a practical laundryman and a safety engineer of eleven years experience. It is simple and practical, as attested to by the results obtaining.

Before getting into the details of the plan, may I digress long enough to express the firm belief that the reason we are having so many fatal and non-fatal accidents, the reason we have so many fires, the reason so many people are off the job as a result of these and also because of physical illnesses, is because we, as an industry, lack complete knowledge of the serious situation confronting us. We have not been

informed as to the tremendous sums of money the industry needlessly spends as a result.

To admit that our industry has known all along how much money is being spent, how many people have been allowed to injure or kill themselves, how many valuable properties have been carelessly allowed to burn down, and has not taken concerted action to cope with the situation, is to admit gross negligence on its part, and I am not ready to admit that.

I have reached this conclusion, also, that the solution of our safety problem lies in a well-developed program of education—one that will create and maintain a safety consciousness and responsibility in management and employee alike, and to the point where they realize and assume a sense of obligation to themselves, their associates, their company, their family, and their community. They must be made to understand that every time a serious accident occurs not only the victim sustains a loss but the loss reaches out in all directions affecting many.

This lack of education has resulted in many hardships being inflicted upon humanity. Had we, for example, paralleled the production of automobiles with an educational program teaching the purchaser of his first car how to handle it with due regard for the safety of himself and others, we would not now be killing 30,000 people a year through their use. It would have been unnecessary to create a lot of regulatory laws that have little effect and place on courts the burden of stopping the slaughter by imposing fines which most victims can ill afford to pay.

If we had also carried on an intensive campaign of safety education among pedestrians, few of these expensive laws would be necessary and thousands of men, women and children, now dead, would be living today.

I mention this phase of the accident problem only because it amplifies the fact that in every line of industrial endeavor we have been slow to start our educational program. A sad but true commentary is that our industry has been slower than others to meet our obligation in this regard. While the steel, cement, paper and many other industries have for years been meeting annually at this Congress, intensely studying the safety problems in their respective industries, ours—one of the largest in the country—gave little or no concentrated thought to it until last year at Pittsburgh, when this Section was organized.

One can readily see why we might not be classed as manufacturers, yet we also deal with hundreds of thousands of human beings, many of whom are exposed to hazardous machinery and conditions. In our business, we operate between 30,000 and 40,000 automobiles, the actions of whose drivers we must answer for to the public. From both the economic and humanitarian standpoints of this great project, we are just as much involved as any manufacturing, mill or mining concern; our obligation to society is just as great.

When we invite or permit an employee to come into our plant to work we assume the moral obligation of seeing that working conditions are made as safe as possible and that the employee is not only told of the hazards of the job, but kept constantly reminded of them. Some of the prime factors involved in proper working conditions are such things as safe machinery; mechanical guards; good plant housekeeping; proper illumination, ventilation and sanitation. They form the basis of an educational campaign which should begin with the management and extend to the lowest paid employee.

My third and last conclusion is that no matter how far behind in this safety movement we may be today, individually or as an industry, we can, through educational procedures, with a small investment of thought and time and even a smaller investment of money, practically eliminate accidents, fires and employee absenteeism in our industry. We have done it in our 25 plants. You can do it in yours. We can do it in the 2,400 plants now representing the Laundryowners National Association and the other thousands who will eventually affiliate.

And now, getting specifically to my topic, two questions present themselves. (1) *where* shall we start in our safety program, and (2) *how* shall we start it?

We must start with the individual plants. Before we can stimulate interest in 2,400 plants, we must arouse this safety consciousness in a smaller number. We must first plant the seed before we can expect to harvest a crop. And that is what is being done here today. There is enough interest in this meeting right now to guarantee a start. We have just elected our officers for the coming year and united support will see the work spread like wild-fire.

As indicated, it is necessary to start with the operating head. He, first of all, must be sold on the idea of an organized safety program. Unless he is intensely interested and determines to give the program his personal attention, it will fail. He must be convinced that the activities of his safety department or committee are a definite part of the regular routine of plant operation; that these activities must be constant, for it is the preventive measures carried on in a systematic and scientific manner that eliminate the causes.

The management must be made to realize that once the program is started, very little of his own time or that of his employees will be required to keep it going and yet it will enable him to keep a constant check on plant conditions and practices; reduce accidents and fires; reduce absenteeism and maintain a continuity of production; teach employees to be more systematic in their daily routine and, otherwise, will result in a saving to the company.

Taking for granted, therefore, that on these premises the management is sold and the plan is a good one, what is the first thing to do to get it started? Briefly, here is the procedure:

1. Upon your return, call a mass meeting of your employees and tell them:
 - (a) Point out to the employee again the losses to both themselves and the company when an accident or fire occurs.
 - (b) Your plant has joined the national crusade against accidents and fires that take an annual toll in this country of 100,000 lives, resulting in an economic loss of \$3,250,000 each year. Tell them about this meeting; what you heard; what the Section is and does and how your plant is definitely tied in with the Sectional activities.
 - (c) If your plant has had a bad record, say that accidents must stop—fires also. If your record has been good, tell them that according to the law of averages you are due for an accident or fire, but intend to prevent it through organized effort.
 - (d) Tell them the hazards of the plant shall be determined, eliminated as far as possible and made known to all.
 - (e) That a safety committee of rotating personnel shall be appointed and members' names announced in a day or two; that the committee will carry on a scientific and systematic campaign of safety education, involving accident prevention, fire prevention and health promotion.
 - (f) That safety rules shall be formulated by the committee and approved by the management, violation of which shall constitute sufficient cause for severe penalty or even dismissal from the service.
 - (g) Tell them that the program shall call for:
 1. Safety committee meetings every two weeks.
 2. Plant inspections every two weeks for either accident, fire or health hazards.
 3. Training of employees in first aid to dress minor injuries and act in case of emergency.
 4. The reporting to first aid department for treatment of every minor and major injury.
 5. Organization of a fire brigade and holding of drills.
 6. Meetings for Routemen and inside employees.
 7. Posting of safety bulletins about the plant.
 8. Analyzing of all accidents by the committee with recommendations to the manager as to responsibility, penalties and remedial measures.

9. And, finally, tell them that the cooperation of all employees must be had if the plant is to show up well when its experience is compared with that of other laundries and dry cleaning plants.

This, then, is the first step necessary to get your program started. You have definitely and forcefully called safety to the employees' attention. They understand that you mean business.

The next step is to select your safety committee, the personnel of which should rotate. You undoubtedly have a little group of key people in your organization. In our company we call it the "Operating Committee." From this group, select three of the most intelligent and active employees, men and women, to serve as chairman of the safety committee throughout the year. Then select enough employees from among the rank and file so that two can serve for six weeks with each of these chairman. This set-up means that a chairman and two other members constitute the committee. The chairman serves for 18 weeks and the other members only six weeks each, except one member who must serve 12 weeks to get the plan started. Obviously, you must have four members in addition to the chairman to serve the full 18 weeks.

Here is how the set up works for the first 18 weeks. We will call the chairman "Mr. A" and the other members, Messrs. B, C, D and E. Chairman "A" starts out with members B and C. Member B serves with Chairman A for 12 weeks but at the end of six weeks Member C drops out and Member D is added. At the end of the next six weeks, Member B drops out and Member E is added and serves the chairman with Member D. It takes three chairmen and 10 other members to provide personnel for one year or the three periods of 18 weeks.

There are several reasons why you must have a committee of rotating personnel:

1. It gains the interest of and brings into active safety service a number of employees.
2. It brings new ideas into the committee.
3. It keeps the members from going "stale".
4. It creates competition since one committee wants to do a better job than the others.
5. It permits employees from the production, sales, office, maintenance and other departments to serve.

You would naturally select your chairman from different departments and arrange service on the committees so that three different departments would be represented each six weeks period.

While the procedure may seem confusing at first, it is really very simple. Please make a note that the procedure is outlined in the December, 1930, Sectional News Letter, copies of which may be had gratis from the National Safety Council, 20 North Wacker Drive, Chicago.

The selection of your committee, then, is the second step and the third one is to get your committee into action.

It must be borne in mind that comparatively few people in your plant know how to conduct a meeting to get the most work done in the shortest time. We have provided for this and it is surprising how quickly the most inexperienced chairman transacts the business under our plan. We have held over 600 meetings among our divisions since January 17, 1930, and the minutes reflect speed and efficiency.

There is only one right way to conduct a meeting and that is to follow parliamentary procedure. Our procedure is:

1. Roll Call
2. Minutes
3. Unfinished Business
4. Reports of Sub-Committees of Members
5. Review of Accidents
6. New Business
7. Adjournment

Members soon learn to bring up items in their regular places. Each item is sys-

tematically—which means quickly and intelligently—handled. It is received, considered and disposed of with dispatch.

Brief, but complete, minutes are typewritten after each meeting. Obviously, this provided a permanent record of the transactions but what is more important, it enables the chairman to systematically follow through to completion all projects started. He simply cannot lose track of a single item when following the procedure.

A "Memo for Chairman" or guide for conducting the meeting is used by the chairman. This form lists the order of business and provides spaces for listing from previous minutes all items to be considered. This listing is done by the secretary or chairman before the meeting. The chairman then goes into the meeting with only the live or current items which are disposed of in rapid succession.

A copy of the minutes is available for all members enabling them to be quickly disposed of without being read.

I suppose you are thinking, just as our managers thought, that you don't have enough accidents nor are there enough items to talk about. You will be surprised in this regard, however, just as they were. Our committees find more minor injuries that could easily have become infection cases, more dangerous places, more unsafe practices, more chances to improve lighting, ventilation, sanitary and general housekeeping conditions than our managers ever dreamed existed. They have suggested many cost cutting ideas and ways and means of improving plant conditions that have saved our company money.

No manager, regardless of his ability, can see with his two eyes what 26 eyes can see. No manager can know all the plant conditions every minute of the day for they are constantly changing. As he walks through the plant, he may think he knows just how everything is going but he doesn't. It takes the eyes and thought of many to keep plant and employees in a safe and efficient operating condition and therein lies the value of the safety committee.

"But, what does a committee do at its first meeting?", you ask. Well, we have provided for that, too. The committee work is divided into three major activities—accident prevention, fire prevention and health promotion. Two weeks are devoted to each in succession. At each meeting the committee cleans up the items left over from the previous meeting and under "New Business" lays plans for the next two weeks' activities.

For example, your committee will meet perhaps for the first time next week and the subject will be "Accident Prevention." Following the regular order of business, the roll is called and the hour and members present noted. There are no minutes to dispose of since this is the first meeting.

The next item is "Unfinished Business"; there is none. There are no "Reports of Sub-Committees or Members", so that item is also quickly passed over. Then we come to "Review of Accidents." Here we have something to talk about. The accident reports and record book kept by the first aid attendant are brought in. The names of the injured employees, nature and extent of injury, medical treatment and time lost are noted. Then, the accidents are discussed and cause and responsibility determined and recommendations to be made to the manager arrived at. (The reason for recording the details of the accident is to build up an experience and a foundation for your future educational work.)

The next item is "New Business." Remember, we have met to begin our safety activities by laying plans for a two weeks' campaign of accident prevention. The committee chairman has, previous to the meeting, listed a number of items on 3x5 white cards which he now divides equally among the three members. These items, he tells the members, are to be investigated during the next two weeks and a report made on same at the next meeting. They include, slippery floors, unguarded grinding wheels, use of goggles, elevator gates, unsafe clothing, use of acids, obstructed aisles, nails in barrels, etc.

And so, with these items to be attended to, the meeting adjourns to meet two weeks

hence. The members have a definite task to perform which can be done at spare moments before the next meeting.

At the next meeting, they will have minutes, unfinished business, reports of committees, review of accidents, etc. Under "New Business" they will discuss the second major problem "Fire Prevention." A similar list of items covering fire hazards is given to the committee. Under this item, a chief of the Fire Brigade may also be selected for approval by the manager or a recommendation be made for an inspection of the sprinkler system and fire extinguishers before cold weather sets in. And so, the committee has disposed of all accident prevention items and starts on a two weeks' campaign of fire prevention.

At the third meeting, the reports will be heard on the fire prevention items, and the next two weeks activities on "Health Promotion" will be planned by following the same procedure as adopted for accident and fire prevention, which included distribution to members of the 3x5 cards containing items to be looked into. Then the complete six weeks' program is repeated over and over until the end of the year.

Let me repeat that the committee will find plenty to do which can be accomplished with very little time and effort. And may I repeat, also, that your plant will be thoroughly inspected at least once every six weeks for accidents, fire and health hazards. You will constantly be kept informed as to plant conditions in a manner that will be extremely helpful and profitable.

Of course, as a project of the safety committee, you will want to organize your Fire Brigade—a group of employees trained to act quickly and intelligently in time of extreme emergency.

Many plants today have no one trained to care properly for an injured person. People get caught in extractors, get badly burned, are overcome by heat and suffer various kinds of accidents in plants where no employee is trained to relieve their suffering and get them in proper shape to receive further medical or surgical attention. It is obvious that at least one man and one woman should be thoroughly trained in first aid. In some of our plants we have a half-dozen people trained to act intelligently in case of emergency. First aiders will do much to keep employees on the job who otherwise would stop work because of a minor injury or illness.

This, gentlemen, is how you can start your safety program. Don't think that because you have a small plant you do not need a committee set-up as we suggest. One of our Detroit plants has less than 20 employees at the present time and yet they have such a committee, that meets religiously every two weeks, and I receive their minutes just as regularly. This particular plant has not spent one cent for accidents since 1929, although the employees face practically the same hazards as those in our larger plants. Usually the financial loss resulting from accidents and fires works a greater hardship on the owner of a small establishment.

In closing, let me say that it is the experience of most of us that it is folly to ballyhoo safety in your plant because the excitement soon wears away. Begin your work quietly, but systematically and forcefully. Get hard-boiled, if necessary, but organize the work so that during 365 days of the year, thought is being given to this very important phase of plant operation. It is the keeping everlastingly at the problem and never letting up for a minute that brings the ultimate dividends from safety activities.

Mr. GORR (Bridgeport, Conn.): How did the Baxter group become interested in safety in the first place. What was it that carried them into this work?

Mr. HAVEN: In the first place our President, Mr. Howard F. Baxter, has been a safety enthusiast not only in connection with his own laundries but also in the Grand Rapids Safety Council. Secondly, he has recognized the fact that there is a great economical value in safety and that there is a great saving to be effected both for the employees and the company. In other words, he is well sold on safety and knows its value.

V. C. KELLEY (Safety Engineer, Commercial Casualty Insurance Co., Chicago, Ill.): That is my problem. Interesting the president or the general manager. If I

can get him interested my worries are over, that is, if I can sell him I have no trouble in putting the necessary safety activities into effect.

Mr. HAVEN: This has been a problem that for a good many years has commanded the attention of the Safety Council Managers and Safety Council Engineers. There are two approaches.

I heard Gus Krugen of the American Can Co. in a debate one time say that safety does not start at the top but at the bottom. He believes that the proper approach, if you can't interest the management, is through the employees, pointing out the value of safety to them. Once you get the proper mental attitude towards safety in the employees then you can safely say that it will spread and the first thing you know the manager says, "What is all this that is going on out here?" Then you have the employees getting him enthusiastic rather than the safety engineer getting him enthused.

Mr. GORE: The trouble with the safety man in the ordinary plant is we can't depend on him for any help when we go to him. The fellow at the top is the one with whom we have to start if there isn't a personnel man. If you don't go to him he will think that you are going to stir up trouble and dissension among the employees, and pick every possible flaw in whatever he does. That has been my experience.

Mr. HAVEN: Your problem is one that has troubled the insurance representative and the safety engineer for many years. How you are going to sell that manager is really an individual problem. There are a number of approaches. You know them just as well as I. I wish I could give you the answer to the question, but I can't. In some way we have got to sell the manager whether it is with a game of golf or a fishing trip or the profit and loss side of the ledger or some other way. I have no one answer, however, that will fit in all cases.

Mr. KELSEY: I have learned a few facts that I think are going to help me in the future. They were brought up in part by Mr. Stone when he told us that the cost of every accident to the company is four times as great as the cost of medical and compensation.

Mr. HAVEN: He means serious accidents.

Mr. KELSEY: That is just the beginning of the story. For every compensable accident there are 29 non-compensable accidents. The cost of these accidents is probably as much in lost time or damage to machinery as are the compensable cases. Then added to these 29 there are 300 accidents which do not involve any personal injury whatsoever. These last cost the company through the slowing up of production, spoilage of machinery, or in the laundry business, dry cleaning business, and linen and towel business, the ruination of the customers' goods, such as in fire or tearing.

An accident prevention program should include the elimination of all accidents and if the foreman is careful in his work not to damage material, he should also be as careful about injury to his own person and the injury of any of his fellow employees. I think this will help put the idea over.

Mr. HAVEN: I should like to have Mr. Baxter who is the "boss," the one they have to sell, tell you his reactions or his point of view on what is necessary to sell the "boss" on safety.

CHAIRMAN BAXTER: That is a very pertinent question, isn't it?

We have faced this problem within our own organization. Our policy of management is centralized principles, but decentralized responsibility. We do not go to a plant manager and say, "You must do that." We don't do that with regard to supplies or methods or types of machines nor do we do it with regard to safety. We realize that if we dictated, before the division manager, as we call him, had really been sold on the use of a supply, a method or a piece of equipment, we would destroy his initiative and the success of our proposal. We instead adopt a program of educating him to the advantages which will accrue to him in the profits of his own particular plants.

This profit, of course, is his compensation provided he adopts a certain piece of equipment or a method or, in case of safety, he carries on a definite safety program. That problem then is directly similar to the question you asked, and we have sold it by the use of just straight dollars and cents. If we can show a manager of a plant that his profits are going to be more provided he puts in safety right along with production and sales, etc., he is going to devote some time to it. If we can prove to him from the records of profit that they have increased by such and such an amount of money by doing this, it isn't going to take any influence or any big club on our part to get him to adopt a safety program.

The difficulty, which is greater with you people in your problem and which we do not have to face, is the fact that the individual laundry owner is not in a position to get a reduction in the premium at once. Unfortunately most business men want to see some money coming in right away, rather than two or three or four years from now when their experience would entitle them to a lower rate. In that connection I feel there are possibilities for the National Associations or some local Associations in the industries that are represented here to take very definite steps that can show that immediate return. Because of our size the insurance companies are perfectly willing to write a type of insurance that will give us an opportunity to save money ourselves.

The insurance that we have is a special type of insurance. We are our own insurers up to one thousand dollars in any accidents. Above that the losses are paid by the company with whom we insure. Immediately there is a direct return to any manager of a plant, because he must pay the cost of a little accident that takes place, and if it can be proved to him that he can effect considerable saving in those costs by putting in a safety program, which is quite easily proved by your own records or records that can be obtained, he saves himself that money. If he gets his periodical report, thirteen periods in the year, and he sees a large amount \$450, for instance, in there as a charge against his profits it isn't going to take him long to put in safety programs.

If I might make a suggestion, I believe that some program should be worked out, perhaps by some insurance company or some group of laundry owners either local or national, that would make possible the placing upon a group of laundry owners, dry cleaning plants or both a certain portion of the costs of their accidents. Then they will welcome from the monetary standpoint a simple safety program such as the one we have and which has proved so satisfactory with us.

In connection with that, I was talking with a safety engineer for an insurance company just today. He stated that a number of years ago they had a certain good sized risk the head of which couldn't be interested. This particular safety engineer said, "All these little accidents indicate a serious situation and a dangerous one as far as we are concerned." He went on to say that they had to be stopped. He insisted upon a meeting of all the important men and he insisted that the general manager be there, although he didn't want to come to the meeting as he was too busy. It was most important, however, that he should be there. That started the ball rolling and the general manager became interested in safety and inaugurated a safety program. Now he calls there every once in a while and he is extremely welcome.

Just within the last month or two he called there again and the general manager said, "You know these are rather depressing times. I can't express my thanks to you for making me realize the necessity for this program. We set aside that particular year a regular premium and we tucked that away and we bought Government securities with it, and do you know how much we have salted away there in honest to goodness cash today that is mighty helpful under present business conditions? It is over \$200,000. If you hadn't done that and gotten us started we wouldn't have that \$200,000, and we probably would have had less surplus."

Of course, in this case you have a large risk, one that insurance companies are willing to accept under certain conditions. I believe, however, a similar approach

to a group of plants could be worked out with just as satisfactory results. We have been able to work it out in our particular group. Does that answer most of the questions? Were there any other matters that you would like to take up?

J. E. HOLMQUIST (Director, Engineering Department, Laundry Owners National Association): During the past year I probably visited pretty close to 400 laundries. The majority of them were on the eastern coast. I also had the pleasure of attending nine state conventions, and I found a great need for safety work. I have been in plants that I was ashamed to call laundries. There was a plant in New York City that the Health Department was closing down on account of ventilation.

The humidity condition, I think, is one of our biggest problems, together with lighting and heating.

As director of the engineering department I am willing to work with any committees on the safety program that you might adopt. At this time I volunteer my services to work along with any committee or any men appointed to work along that line, for we as a national association should probably be doing more than we are.

CHAIRMAN BAXTER: We appreciate that offer of cooperation and we know from other expressions we have received from directors of the national association and from their expressions of a year ago that the most thorough cooperation will come from that group.

V. C. KELSEY (Safety Engineer, Commercial Casualty Insurance Company, Chicago, Ill.): What is your experience in your accident prevention program relative to the destruction of other people's property, that is, property damage and damage to machinery? How noticeable has it been to you that this has been reduced?

CHAIRMAN BAXTER: The damage to machinery?

MR. KELSEY: Damage to machinery or to other people's property that is entrusted to you for cleaning.

CHAIRMAN BAXTER: Are you thinking particularly of the point of four times the actual compensable costs?

MR. KELSEY: I am trying to get an argument that is air tight to present to other people.

CHAIRMAN BAXTER: The laundry industry itself in case of an accident to an inside employee generally doesn't lose much or have to sustain much loss of goods belonging to a customer. It might be a few sheets, shirts, or something of that kind so I am afraid we can't strengthen your argument very much from the point of view of losses to goods belonging to a customer in the course of production, if you want to call it that.

The greatest indirect loss today exists in the loss of time of the employees, managers, foremen, foreladies, etc., when an accident occurs. There is a decrease in production speed because of the fear and nervousness that continues for a very considerable time after the accident takes place. If an accident takes place among a group of 30, 40, or 50 girls they are not worth very much from the production angle for the rest of the day. They are just all "atwitter" and "afflitter" and extremely nervous. We had one illustration of that in an unfortunate automobile fatality that occurred here in Chicago. I think in about four of the five laundries where they heard of it, business practically stepped for one or two hours. It was extremely unfortunate.

I should say that about the strongest way to support that point is not in the direct monetary loss from damage to equipment or to actual material going through the plant, but rather in loss of morale and increased cost of production for a considerable period of time, and particularly on all types of machines similar to the one on which the accident took place. It can readily be seen that an accident on a press would affect everyone else operating those presses, because they would think that the girl had not been careless and they would expect their own presses to jump out and bite them.

ADJOURNMENT

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