

PLAINTIFF'S
EXHIBIT

NSC-370

PROCEEDINGS
OF THE
**National Safety
Council**

NINTH ANNUAL
SAFETY CONGRESS

LIBRARY
NATIONAL SAFETY COUNCIL
 168 N. MICHIGAN AVE.
CHICAGO, ILL.

PART I.—GENERAL MEETINGS

Held at the
Auditorium
Milwaukee, Wisconsin
September 27—October 1
1920

CONTENTS

	Page
Annual Meeting of Members.....	5
Public Mass Meeting.....	33
General Round Table Session.....	51
A. B. C. Session.....	67
Health Service Section.....	85
Banquet	167
Safety Bulletin Luncheon.....	185

For the convenience of members the Proceedings this year are printed in separate volumes as follows:

Part	I	General Meetings	Part	XII	Electric Railway Section
Part	II	Education Section	Part	XIII	Metals Section
Part	III	Employees' Benefit Association Meeting	Part	XIV	Mining Section
Part	IV	Employees' Publications Meeting	Part	XV	Packers' and Tanners' Section
Part	V	Engineering Section	Part	XVI	Paper and Pulp Section
Part	VI	Public Safety Section	Part	XVII	Public Utilities Section
Part	VII	Women in Industry Section	Part	XVIII	Rubber Section
Part	VIII	Automotive Section	Part	XIX	Steam Railroad Section
Part	IX	Cement Section	Part	XX	Textile Section
Part	X	Chemical Section	Part	XXI	Woodworking Section
Part	XI	Construction Section			

A limited supply of complete volumes including all of the above parts is available.

National Safety Council

Annual Meeting of Members

Milwaukee, Wisconsin

September 27, 1920

PRESIDENT RALPH C. RICHARDS, Presiding Officer

THE meeting convened at 10:30 A. M., Mr. Ralph C. Richards, President of the National Safety Council, presiding.

PRESIDENT RICHARDS: Ladies and Gentlemen, we shall begin the deliberations of the Ninth Annual Safety Congress with prayer by the Reverend Father Noonan, President of Marquette University.

INVOCATION

REVEREND H. C. NOONAN: Almighty everlasting God, Author and Protector of life, give to all the delegates assembled here for the Ninth Annual Congress of the National Safety Council a full realization of the priceless value of Thy divine gift, human life, its worth for time and for eternity, and our responsibilities in regard to the safeguarding of that life. Give to each citizen of our country a full understanding of his duties in regard to the conservation of the life of his fellowmen—a duty, alas, too often neglected at the present time. Give to the state a full sense of its responsibility in regard to the conservation of the lives of its citizens—a duty that it has by virtue of its function to conserve the rights of its citizens and to promote the common welfare.

Mayest Thou, our Father in Heaven, strengthen the workman in his firm resolve to avoid negligence and recklessness and that disregard for safety devices wisely planned which has led so often to hazard to life and limb, to the great sorrow of families and to the immense economic loss of civil society.

Give to our employers a determination to humanize industry, and give to them the determination and the fixed resolve to secure through their superintendents and foremen that instruction for workers which will enable them to perform their work properly and without hazard.

Ninth Safety Congress

by the Divine Spirit rest upon the members of this Congress here assembled today. May it guide your deliberations so that that priceless human life, may be safeguarded better in the future; and may all who are here learn to realize the duties that are incumbent on the various members of civil society in regard to the protection of life, through the saving grace and assistance of Him whose dominion over life remains supreme, the Author, Conserver and Protector of human life, Lord and Master. Amen.

PRESIDENT RICHARDS: Our friend, the Mayor of Milwaukee, who has so much officially and personally to make this Congress a success, the assistance of the many other citizens of Milwaukee, is here to express a word of welcome on behalf of this great city. It is my privilege and pleasure to present Mayor Hoan.

ADDRESS OF WELCOME

MAYOR DANIEL W. HOAN: Mr. President and Ladies and Gentlemen: I am truly should feel pleased as well as proud to have this opportunity of welcoming to Milwaukee this great Congress. There are many reasons for that. We are, of course, especially pleased that the inception of your organization took place in this city and that you have thus added to the city's laurels which helped to make Milwaukee famous; but more important than that is the fact that you are interested in a most important subject.

At the present time the number of accidents and deaths seems to be increasing at a rapid pace. What can be more pleasing to the average parent or to the average citizen than to know that we have assembled in this country so large a convention of representative people who are investing their energy, their time, and their funds into an endeavor to relieve the lot of the other fellow a little bit better and a little bit lighter. Very early in the year of 1908, I was employed by the State Federation of Labor of the State of Wisconsin as its attorney to conduct a fight for workmen's compensation act, and in the course of that study I learned that this act would undoubtedly lead to the initiation of a great deal of care and caution in factories to eliminate accidents. At that time, we laid before the legislature of Wisconsin this argument among others,

I am pleased to say that this fight which I had the pleasure of conducting ended in placing on the statute books of Wisconsin the first workmen's compensation act in the United States of America, an act which has served as a model for those adopted by other states.

Almost coincidentally with the enactment of this law, the National Safety Council was organized in the State of Wisconsin and in the City of Milwaukee. We are highly pleased because this movement, which has developed so wonderfully, was organized here, and that you are able to bring to this city from all parts of the country approximately 4,000 men and women who are individually, as well as the companies and the cities they represent, interested in wiping out the many accidents and deaths which occur because of the lack of proper care and caution.

I will say to you that your convention is bringing and will be bound to bring lasting benefits to our community. I trust and hope, and I believe that you will receive the co-operation here which is necessary to make this Safety Week the most successful of any you have thus far conducted; and I believe we will make good in having no deaths in Milwaukee during the week you are in session here.

Let me say in conclusion that no doubt the most important part of your work is education. You have brought to Milwaukee this message of care, caution, and safety in a way that brings it home to us as individuals. Therefore, we want to say that we appreciate your coming here, we wish you the greatest success in the future; we hope that this convention will not only be the greatest but the most successful you have ever held, and we trust that you may keep on growing until it is practically impossible for any preventable death to occur in the United States of America from accident. I thank you.

PRESIDENT RICHARDS: On behalf of the Congress and the members of the National Safety Council, I wish to thank you, Mayor Hoan, for the hearty welcome you have extended to us.

PRESIDENT'S ADDRESS

R. C. RICHARDS, PRESIDENT, NATIONAL SAFETY COUNCIL,
CHAIRMAN, CENTRAL SAFETY COMMITTEE, CHICAGO AND
NORTHWESTERN RAILWAY COMPANY, CHICAGO

It is immensely gratifying to the responsible officers and committeemen of the Council to see from this great gathering of men and women that interest in this movement for the conservation of the lives and limbs of the people of this country is increasing by leaps and bounds,—a movement that, as has been said by Slason Thompson, the well-known railroad statistician, has borne better fruit in a few years than was attained by legislative enactment in thirty years, is entitled to receive and maintain the interest of all good citizens; and when you look over the program and read the names of the men and women who are to take part in the general and sectional meetings, you can, I think, realize how important these Congresses have become. There is no movement in the world that is of more importance than the Safety Movement, and there is no movement that is in greater need of men and women of vision and enthusiasm, of men and women of education, training, knowledge, ambition, experience, and wisdom—and as you know, we get knowledge from books and from the experience of others, but wisdom only from our own experience—of men and women who are willing to devote a part of their time, without thought of compensation, for the benefit of humanity.

We must remember, in carrying on this work as in everything else, that men and women are valuable just in proportion as they are willing to work in harmony with others, so we should always be willing to co-operate with others in this great work even if our ideas and theirs sometimes differ; the essential fact remains that human safety depends ulti-

Ninth Safety Congress

on wise, personal initiative and direction, and this Council should just be able to supply that initiative and direction. There is nothing that will bring such rewards to you and to me in the way of Congress that we have done what we could for the benefit of humanity giving to the Safety Movement the time and thought we should; we want to remember that no man wins his greatest fame in that which he has given most of his time. It is his heart's play spell that brings him immortality. So let us adopt the Russian proverb, which runs thus: "If every one gives a thread, the naked will have a shirt"; each of us will give a little time and thought to this matter and at an accident a day, a week, or even a month, we shall help to put out the accident business.

Most of you know, the first general gathering of safety men was held in Milwaukee, in October, 1912, on the call of the Association of Iron and Electrical Engineers, or rather by Lew Palmer, who was Secretary of the Safety Committee of that Organization, and to whom all credit is due for starting this Organization; and let me tell you, in those days, those who welcomed the call were dubbed as dreamers by the wise and practical men who were then in the large majority, as faith in a new era was a rare quality; then we could have called a conference in a telegraph booth and had plenty of room, but at the close of our last fiscal year we had 4,051 members, a net gain of 290 over last year, representing 10 million employees whose yearly dues amounted to \$146,602.11, and at the date our membership is 4,104. The Council is no longer an experiment—it is an established institution, carrying on a most important duty for the Nation,—the conservation of the Nation's most priceless asset, the health and limbs of its people.

We are to carry on this work and keep going forward,—and the minimum standard still we are commencing to go backward—we must furnish assurance of the Council with sufficient funds to do the work, not only efficiently but attractively and efficiently. Unfortunately, during the last year the Council has labored under the same difficulties in the matter of increasing costs for service and materials that all other enterprises, as well as all individual citizens, have met with, and you will be asked to approve an increase of one-third in the membership dues, the particular reason for which will be explained to you later by our old friend, W. H. Cameron, Chairman of the Committee on Business and Administration. The financial statement as published in the NATIONAL SAFETY NEWS of October 20, 1920, is not what we would like to have it, but you all understand why expenses have been more than during the preceding year. They are not going to decrease during the coming year if the activities of the Council are to be continued. Any information about the cause of the increase in the expenses will be furnished by Mr. Cameron or by any member of his Committee, or by any officer of the Council.

In addition to carrying on the usual activities of the Council in the issuing of Bulletins, Safe Practices pamphlets, and other safety literature for carrying on the safety propaganda, furnishing speakers for meetings, in connection with the National Safety Congress, and special service to members, many other things have taken

place in the work of the Council during the last year to some of which I desire to call your attention.

A reciprocal arrangement has been made with the Canadian National Safety League for the use of each other's bulletins, literature, etc.

An agreement with the Safety Institute of America by which we joined forces in New York City and established a Local Safety Council with a paid Secretary.

Memberships in the American Engineering Standards Committee were taken out to secure the interest and assistance of that Committee and of the Engineering Societies in carrying on the safety work.

The organization of the Engineering Section of the Council, and if Doctor Chaney's statement that sixty per cent of industrial accidents can be prevented by proper engineering methods is anywhere near correct, the Engineering Section has a great field to work in. We know that life in the industries is often hard and dry, but they are like great corn fields; see that we plant flowers in them, and not only should we make accidents less frequent but make our working places more attractive and comfortable. May the harvest of the Engineering Section be even greater than its enthusiastic and most capable Chairman, Mr. C. P. Tolman, hopes and expects.

The proposed consolidation of the Engineering Section with the American Society of Safety Engineers, which is now being considered, will if consummated, make the Section stronger and more effective and will, we believe and hope, bring greater support, standing, and effectiveness to the National Safety Council.

The NATIONAL SAFETY NEWS, with which you are all becoming acquainted, is a most useful organ of the Council and has great possibilities for obtaining the publicity we need, and it is believed that the advertisements will make it self-supporting. The Council is greatly indebted to its efficient Director of Publicity, Louis Resnick, for its success.

New Local Councils with paid secretaries have been organized during the year in New York, Chicago, Minneapolis, St. Paul, Syracuse, Buffalo, Wilmington, Del., Grand Rapids, Mich., and last but not least, Milwaukee, making with similar local councils previously organized in the Central Mississippi Valley, Cleveland, Kansas City Division, The Metropolitan Safety Council, Oregon and Columbia Basin, Rochester, and the Western Pennsylvania Division, sixteen with paid officers. How useful and valuable they are in carrying on the work and creating and maintaining interest in it, not only in the industries but with the public and in the schools, you know as well as I. The Milwaukee Local Council has demonstrated what it can do, not only in accident prevention work but also in looking out for and attending to the comforts and entertainment of our members and in helping to make this Congress a success. There are three classes of people in the world; The Wills who accomplish everything; The Wont's who oppose everything; and the Can'ts who fail in everything. I think we all agree that the Milwaukee Local Council belongs with the Wills, and on behalf of the members of this Organization, I wish to ex-

Ninth Safety Congress

to the Milwaukee Local Council and to the Citizens of the City our thanks and appreciation for what they have done.

On this subject of local councils, I want to call attention to what we also have twenty-one other Local Safety Councils without exception. They are Baltimore (Md.), Bellingham, (Wash.), Detroit and East St. Louis (Ill.), Everett (Wash.), Erie (Pa.), Hampden (Mass.), Indianapolis (Ind.), Northern California, and Lehigh Valley, which, by the way, had one of the most successful safety rallies that has been carried through anywhere), New Haven (Conn.), Nebraska, Philadelphia (Pa.), Seattle (Wash.), Solano County (Calif.), Tacoma (Wash.), Texas, Tri-City (Granite City, Ill.), Waterbury (Conn.) and Worcester County (Mass.).

For inspiration and enthusiasm—and you know that every great triumph in the annals of the world is the triumph of enthusiasm—may the members at this Congress bring about during the coming year the organization of many new local councils to carry on the work of accident prevention and the elimination of thoughtless and heedless employers and employees; and if all employers could only be made to understand that every time an accident occurs in their industry it not only means a loss of time and loss of money for the injured man, greater risk to the employees, but also less efficiency in the organization and reduction of production because a green man has to take the place of an experienced man, if employees would also remember that it is they who get injured and not the boss, that before the Safety First can save money for the boss it must

Save life and limb

Prevent pain, suffering, sorrow, and destitution

Prevent making widows, orphans, and cripples

Bring the men home at the end of the day's work safe and sound

Make the operation of the industry safer and more regular
I, I think, get better co-operation from all parties interested in the work in the industries of the country, and reduce the number of accidents by leaps and bounds.

Teaching of safety in the public and parochial schools and in colleges—in my opinion, the most important thing the National Safety Council has to do, and the quickest and best way to spread the safety idea and prevent accidents, not only in industries but in the streets and in public places. Nearly all accidents are preventable, not, as we often think, inevitable; and if we can inculcate in the mind of the young man it is impressionable,—just as it is taught the religion of the church and the three R's,—that it must be careful, that life, vision, and the most valuable asset it has with which to make the battle of that when they are once lost they can never be gotten back, we can do it, in my opinion, more than can be accomplished in any other way to make safety the vital interest in the life of every person would be. We should remember that the next generation of men and women who will be the brains and brawn of our industries will be

the boys and girls who are now in our schools, and if they come out of the schools and into the industries with an understanding of the principles of safety, there will be a different record of accidents than that made by the present generation of chance-takers—both employers and employees—and human life and limb will have a different value, and the National Safety Council will attain the standing, not only in this Country but in the world, that it should have.

The pioneer work that has been done by Dr. Payne and Mr. Whitney along this line is entitled to the grateful thanks and appreciation not only of this Congress but of the whole country, and some day they will receive the recognition to which their work entitles them.

Many cities, communities, and school districts—Milwaukee among the number—are now teaching safety in the schools or are organizing to do so. In 1917, Wisconsin passed the following law:

PREVENTION OF ACCIDENTS: (a) It shall be the duty of each teacher in a Public School in the State of Wisconsin to devote not less than thirty minutes in each month during which such School is in session to instructing the pupils thereof as to ways and means of preventing accidents.

(b) The State Superintendent of Public Instruction shall prepare and publish at the expense of the State a book conveniently arranged in chapters or lessons for the purpose of the instruction provided in this section, and shall furnish a copy thereof to each teacher required to give such instruction.

(c) The members of the Board of Education, School Directors, Trustees, or other bodies or persons having control of the schools of a township, village, or city, shall cause a copy of this section to be printed in the Manual or Handbook prepared for the guidance of teachers, where such Manual is in use.

Unfortunately, that law seems to have been generally overlooked, if, indeed, the school authorities in the State even knew of its enactment. But now we hope it will not only be enforced but that safety will be taught in the schools not only for thirty minutes each month but every day, and in the manner so practically outlined by Dr. Payne in his book on "Education in Accident Prevention," or in some other systematic and proper way, at the same time the pupils are taught their letters, arithmetic, spelling, and grammar. It seems to me that this Congress should put its stamp of approval on the teaching of safety in the public and parochial schools. I am sure that money expended by the Council for that purpose will bring the largest and quickest return of any money ever expended by us for any purpose, not only in substantially reducing the number of deaths and injuries but in bringing the National Safety Council to the notice of the public.

The remarkable increase in the number of power vehicles and the accidents resulting from their operation on the public highways is bringing home to every one the necessity for doing something to eliminate accidents from this cause, and it is hoped that the Public Safety Section

Ninth Safety Congress

will present some plan of action that can be adopted generally throughout the country, which will be effective in bringing about a reduction of such vehicles.

Plans now being prepared by a Committee organized by the representatives of manufacturers, owners, operators, public officials, and traffic experts interested in the manufacture and use of such vehicles and the control and regulation of traffic on public highways, will be furnished not only to the schools started by the Council to educate youths and all persons operating cars, how to do so safely, but also to the public generally, will we hope bring about a great reduction of accidents from that cause. It takes eight or ten years to educate a man to operate a locomotive engine, but any one, without any experience or instruction, drunk or sober, is allowed to drive one of these cars through the most congested streets of our cities. There should be some law that would prevent any one from operating a car until he or she has passed an examination demonstrating that he is capable of doing so with safety to others, for the greater danger to society is that a careless man or woman runs on the streets, in the vicinity of our homes and industries, is the risk of being hurt by some careless, or reckless person. We should bear in mind that a large number of these street accidents result not from careless operation of automobiles, but from heedlessness or recklessness of the pedestrian who needs as much as the automobile driver.

It is gratifying to be able to report the increasing use by members of the Council of the bulletins, Safe Practices pamphlets, Calendars, and other literature published by the Council. That they are more effective and useful is evidenced by the increasing sale of extra copies to members. Last year our total sale of that character amounted to \$34,597, of which about one-third was realized by the voluntary payment by members for copies of the bulletins of the last Congress. In August of this year there were sold 10,000 bulletins, by far the largest number in any month in the history of the Council. Much credit for popularizing the bulletins is due to the Secretary, who has special charge of that service, and if members of the Council would interest themselves more in this matter in the way of suggestions and ideas as to the subjects to be illustrated by the bulletins, better results would be attained.

One thing which the Council lacks is reliable and accurate statistics of the number of accidents and the reduction of the same. There are, however, no dependable statistics except for the mines and railroads, and these come to us so late as to lose much of their value. If some scheme could be worked out by the Council through its different sections or in any other way to furnish and publish such statistics, it would fill a great want and be of great benefit to the accident prevention work, as conducted by the Council.

During the year we lost by voluntary resignation the service of Mrs. Hunt, our Treasurer, the oldest in length of service and most devoted employee connected with the Council. All of us regretted that when moving to California she found it necessary to resign, and our

thanks are due to her for efficient and honorable service. On behalf of the members of the Executive Committee, I wish to express to all the officers and employees of the Council our thanks for the loyal service rendered during the year just closed. The Council owes them a debt of gratitude for the work they have done.

We can I think look forward to the coming years as bringing greater usefulness, increased activities, and reputation to the Council as one of the important agencies of the country, aiding in its advancement and importance among the nations of the world. It is a man's job and let us all do our share in such a way that we may be proud that we are members of the Council. How little the men who founded this organization a few years ago, without a thought of financial reward, and who devoted their time, thought, and money to making it a success, realized what a great movement they were organizing and how quickly the industries and the public would appreciate what they had done and sustain them. Would it be unreasonable, in view of our progress and success, to look forward to the time when instead of having four thousand members we will have forty thousand, that through that increased membership and broadening interest in the safety movement we will be able to reduce fatal accidents from many thousands a year to hundreds and injuries from millions a year to thousands; that we will build for ourselves a beautiful green marble temple to be used for offices and meetings of the Council, and in that temple we shall find a vast auditorium, the most beautiful in the world, large enough to accommodate all members in attendance at our annual Congresses; and on the walls of that auditorium we shall find the emblems of our different sections, trades and industries, public and private, and portraits of the men and women who have rendered great service to the Safety Movement, and above the Chairman's seat our emblem, the green and white cross, and around that emblem in letters of gold our motto UNIVERSAL SAFETY, INDUSTRIAL, INDIVIDUAL AND PUBLIC; that around the auditorium there will be smaller rooms for the meetings of each section of the Council, one of them a little larger and more beautiful than the others, to be assigned to the Section having accomplished the greatest results during the year in preventing death and injury and conserving the Nation's most priceless asset—the lives and limbs of its men, women, and children. Let me hope that the Steam Railroad Section will be the first to occupy that most honorable place. Some of us who are growing gray may not live to see the Vision come true, but surely the younger generation will. Pray God it may come in my time.

PRESIDENT RICHARDS: The next business of the meeting will be the report of the officers of the organization. Mr. General Manager, we will have your report.

REPORT OF THE GENERAL MANAGER

The year just closed has been a most favorable one for the development of the Council's work and the growth of the safety movement. The scarcity of labor has spurred effort to conserve man power in industry, a

National Safety Congress

increase in deaths from automobiles has greatly stimulated public safety. Possibly this year more than in any previous it has profited by the accumulated effort of the past years, by the wide publicity and recognition which the Council there are unmistakable signs that the new year before us possibilities, greater opportunities for development and service next year.

PUBLICITY

One feature of the Council's work which has attracted much attention has been the development of the Publicity Department and the publication of the NATIONAL SAFETY NEWS. The enlargement of the monthly letter into the twenty-page weekly magazine has offered a most popular and effective medium through which the Council's office is able to serve the members. The popularity is evidenced by the many letters of appreciation which are received and by the subscriptions from member companies for extra copies, twenty-five to two hundred to be sent each week to their

The SAFETY NEWS promises to meet a long felt need of the members by offering a popular medium through which the members may be kept informed regarding the development of the Council's work and the progress of it, but more important still, by offering in its editorial content an opportunity to interpret the various phases of the Council's work, helping the members to keep abreast of the work, to appreciate the work which are significant and determining, and to anticipate the future of development. The Publicity Department, through the columns sent to 500 newspapers and 650 magazines, has secured a large amount of publicity, all of which has helped materially in increasing the membership for the Council and in stimulating general interest in the innovation of accepting paid advertisements in the NATIONAL SAFETY NEWS, which has made possible the publication in its present form accepted by our members with almost unanimous approval.

LOCAL COUNCILS

At the last Congress seven cities had local councils with Pittsburgh, St. Louis, Rochester, Cleveland, Kansas City, Portland. During the past year nine other cities have been added to this list: New York, Chicago, Minneapolis, St. Paul, Buffalo, Wilmington, Del., Milwaukee, and Grand Rapids, Michigan. The important development of these local councils has been the increasing of the industrial activities along more systematic educational

The work of the schools for safety supervisors has led to the development of schools for foremen instead of general meetings. A course is now offered with printed lessons prepared by the Council's

headquarters' staff. These schools have been much appreciated by our industrial members, because they offer a definite training for the men who can do most to promote safety in a plant.

PUBLIC SAFETY

The past year has witnessed a marked increase in public safety work in all of our local councils. A definite plan of organization has been worked out and adopted by the local council managers at their quarterly meetings. The Vigilance Committee, consisting of one to two hundred representative citizens, has proved to be one of the most effective means of developing public opinion and securing law enforcement. Each member of the Committee is pledged to report to the chief of police all violations of safety rules.

CHAUFFEURS' SCHOOL

The chauffeurs' schools which have been conducted by four local councils, and during the coming year will be conducted by all local councils with paid staffs, have proven to be most popular and successful. These schools are attended largely by drivers of trucks. The course of instruction includes six or eight lessons covering the more important points of safe practices and mechanical safety.

LESSONS FOR CHAUFFEURS

A committee has been organized by the Council, consisting of some forty experts representing various industries and organizations which are vitally interested in automobile hazards. This committee is now completing a series of twelve lessons covering all the essential points on automobile safety. These lessons will be used in the schools for chauffeurs, and from present indications will be given wide distribution by insurance companies, automobile clubs, and automobile manufacturers. These lessons grew out of a widespread demand for some definite information—some authoritative standards based on the best experience in automobile safety.

SAFETY WEEKS

In many cities safety drives and safety weeks have been conducted with marked success. These drives have done much to stimulate interest in public safety, by demonstrating what can be done through an organized effort in arousing public interest. There has been a marked increase in requests from our members in large and small cities for information regarding safety drives, automobile safety, and plans for organizing public safety. The alarming increase in deaths from automobiles is doing more than all other causes to awaken cities to the need of organized effort.

SCHOOL SAFETY

The Education Section has conducted an aggressive campaign this year to promote safety instruction in the public and parochial schools, a com-

plete report of which appeared in the July 19 issue of the NATIONAL SAFETY NEWS. The sectional officers have secured the co-operation of members of the Council in practically every important city, also state superintendents of schools, state industrial commissions, the National Educational Association, and a number of railroad and insurance companies.

The Publicity Department has secured much publicity in the educational journals and in newspapers served by the Associated Press and the other big news agencies. Nine thousand copies of Dr. Payne's syllabus have been sold or distributed by the publishers and 20,000 copies of his address at the 1919 Congress have been distributed by the Education Section. Dr. Payne has made addresses in a number of large cities and has done much to interest educators. Reports received indicate that some twenty-nine cities have adopted Dr. Payne's plan in the schools, and hundreds of other schools are teaching safety after their own plan. A large number of schools all over the country have promised to include safety instruction, beginning with the opening of the fall term.

The remarkable success of Dr. Payne's plan in the cities where it has been adopted and the recognition which it has received from educators promise much for the development of school safety during the coming year.

ENGINEERING SECTION

The Engineering Section, authorized by the last Congress, has been organized and has made valuable contributions on the engineering side of accident prevention through its two meetings; one held in New York in April and one in Chicago in June. To this Section has been assigned all of the Council's work in industrial safety codes. This code work is under the general direction of the American Engineering Standards Committee, of which the Council is now a full member, together with the national engineering societies, government departments, and half a dozen other national organizations. The Council has been appointed sponsor for the codes on Power Presses, Paper and Pulp Mills, and Construction Work. In accordance with the procedure of the American Engineering Standards Committee, the Council has, through the Engineering Section, organized a Code Committee including representatives of other interested organizations, to formulate each of these codes, and active work is now being started. The Council will also be sponsor or joint sponsor for several other important codes including one on Blast Furnaces and one on Rolling Mills, together with one or more in the mining and other industries.

SAFETY EDUCATION IN TECHNICAL SCHOOLS

The syllabus previously prepared for technical schools, entitled "The Principles and Practice of Safety," is being used more and more by the principal engineering colleges. Papers and discussions at Engineering Section meetings have brought out a general agreement between engineering educators and safety engineers that safety should be taught to all engineering students as an essential element of engineering efficiency and

industrial management; special courses for safety engineers may be hoped for a little later in some of the more advanced institutions. The University of Illinois includes safety as one of the essentials of shop management which are taught to its mechanical engineering students,—the shop having a regular safety inspector, bulletin boards, and safety organization. The Council is recommending this method to other colleges.

THE LIBRARY

The Library has continued to grow in scope and in usefulness to members. The development of the Publicity Department and the NATIONAL SAFETY NEWS has opened a new and enlarged field of usefulness for the Library. During the past twelve months 3,178 reference subjects have been looked up in response to special inquiries—an increase of 465 over the preceding year. More than 18,000 pieces of material have been catalogued, ranging from books to newspaper clippings, each one of them representing a source of information for our members and staff, which is available when wanted. During the past year the Library has prepared a booklet entitled "A Safety Engineer's Library", several articles for the NATIONAL SAFETY NEWS; articles for library periodicals, and one for "Factory"; and the Librarian, as Associate Editor of "Special Libraries," prepared a special Safety Number of that publication. Traveling libraries of recent safety literature are regularly circulated among our local and field secretaries. The Library had an exhibit at the last Safety Congress and at the "All American Exposition" recently held in Chicago, and has furnished exhibits for many other national and local meetings.

SERVICE TO MEMBERS

The size and number of bulletins, both general and sectional, have been the same as during the preceding year, except that bulletins for the new Rubber and Meat Packers' Sections have been added. The improved quality of the bulletins is evidenced by the sales of extra copies—over double the quantity sold last year.

The monthly Safe Practices pamphlets also have been continued, and the sales of extra copies have been greatly increased over last year. Two sectional pamphlets have been issued.

BUSINESS DEPARTMENT

The membership of the Council at the close of the fiscal year was 4,051, a net increase of 290 over last year. The business department is conducting a more thorough campaign for memberships than has ever before been conducted. Monthly letters with samples of bulletins are now being sent with successful results to 15,000 industries having over 100 employees. The 1920 Calendar proved to be popular with our members—160,000 were sold as compared with 149,000 of the 1919 Calendar.

STAFF

The following changes have been made in the staff: Frank Morris, Field Secretary, resigned to take the position of Secretary of the Syra-

Ninth Safety Congress

ii. Miss Kathryne Hunt resigned as Treasurer. W. H. Hunted Business Manager and on the resignation of Miss Hunted to act as Treasurer also.

—C. W. PRICE, General Manager.

REPORT FOR FISCAL YEAR ENDING AT JULY 31, 1920

Balance Sheet as at July 31, 1920 and 1919.

ASSETS

	Year Ending July 31, 1920.	Year Ending July 31, 1919.	Increase.	Decrease.
	\$	\$	\$	\$
.....	3,635.62	9,064.00		5,428.38
able	18,498.95	13,873.12	4,625.83	
pplies.....	6,950.70		6,950.70	
Local Coun-				
.....	350.00	350.00		
s (Local				
.....	1,961.41	600.31	1,361.10	
.....	22,488.12	32,062.00		9,573.88
ld Secre-				
.....	350.00	999.61		649.61
stmaster.....	228.47	401.87		173.40
			12,937.63	15,825.27
Assets.....	54,463.27	57,350.91		2,887.64
ld Equip-				
.....	12,685.32	10,000.00	2,685.32	
.....	3,835.59	939.69	2,895.90	
			5,581.22	2,887.64
			2,887.64	
	\$70,984.18	\$68,290.60	\$2,693.58	

LIABILITIES

	Year Ending July 31, 1920.	Year Ending July 31, 1919.	Increase.	Decrease.
	\$	\$	\$	\$
.....	14,532.55	2,618.12	11,914.43	
(Local				
.....	2,353.35	839.82	1,513.53	
.....	16,885.90	3,457.94	13,427.96	

Annual Meeting of Members

19

Accrued Expense	275.00	275.00	
Deferred Credits	589.32	2,045.00	1,505.68
Surplus	53,283.96	62,787.66	9,503.70
		13,702.96	11,009.38
		11,009.38	
	\$70,984.18	\$68,290.60	\$2,693.58

**Statement of Gross Revenues and Expenditures
Fiscal Year Ending at July 31, 1920**

GROSS REVENUE

Membership Dues—	
Active	\$144,297.11
Associate	2,305.00
	\$146,602.11
Sales of Pamphlets, Bulletins and Miscellaneous Receipts.....	34,597.96
Gross Revenue, 1919 Annual Congress Exhibit.....	10,414.20
Gross Revenue, 1920 Calendar.....	28,375.20
Gross Revenue, NATIONAL SAFETY NEWS.....	2,651.18
Interest on Investments.....	1,269.52
Surplus Used	9,503.70
	\$233,413.87

GROSS EXPENDITURES

Salaries of Officers and Staff.....	\$ 69,380.81
Rent of General Offices.....	6,724.13
Office Printing and Supplies.....	3,043.80
Postage	2,248.63
Telephone and Telegraph.....	1,848.80
General Office Expense.....	1,970.33
Exchange	430.88
Taxes and Insurance.....	305.10
Depreciation on Office Furniture and Equipment.....	1,409.47
Library Expense	631.73
Shipping Room Expense.....	74.81
Membership Solicitation Expense.....	4,625.51
Field Work, including salaries.....	21,373.71
Publicity Department, including salaries.....	5,913.21
Traveling Expense	2,505.91
Expenses of various Local Councils.....	1,888.91
Cost of Miscellaneous Publications.....	14,085.81
Weekly Bulletin Service.....	28,152.41
Sectional Activity Expense, including printing bulletins.....	11,731.31
NATIONAL SAFETY NEWS.....	2,241.01

Safe Practices Pamphlets.....	2,875.38
1920 Calendars	15,739.71
Annual Congress Expense.....	8,602.58
1919 Annual Congress Proceedings.....	11,689.77
1919 Annual Congress Exhibit.....	9,679.86
Sundry Activities	4,248.70
	\$233,413.87

W. H. FRATER, Treasurer.

We have examined the above comparative Balance Sheet of the NATIONAL SAFETY COUNCIL as at July 31, 1920 and 1919, and the statement of Revenue and Expenditure for the year ending July 31, 1920, have compared them with the books and vouchers and have found them correct.

September 1, 1920

ARTHUR YOUNG & COMPANY,
Certified Public Accountants.

PRESIDENT RICHARDS: We shall next hear the report of the Chairman of the Committee on Business Administration, Mr. Cameron.

REPORT OF THE COMMITTEE ON BUSINESS AND ADMINISTRATION

MR. W. H. CAMERON: You have received the Treasurer's Annual Report of moneys received and disbursed by the National Safety Council, as well as auxiliary statements showing the condition of your financial affairs to this date. It remains to me to say only a few words about the financial policy of the Council during the past year.

The continued increase in the cost of doing business has brought serious financial problems to the Council. While its income and membership have materially increased during the past year, you will have noticed that it has been necessary to use a portion of the reserves to pay expenses. Under the direction of your Executive Committee, a Special Committee, composed of Past-Presidents of the Council, made a thorough investigation of the methods of conducting its business in the hope that it could suggest some method of curtailing expenses. After much serious consideration this Special Committee recommended to your Executive Committee that it was warranted in continuing its program of enterprise, initiative, and progress. Therefore, the expansion and development of the Council's industrial and public safety work in the field, and augmenting the production of publications through the engineering and editorial staffs at headquarters, have continued.

In spite of the fact that the increase in the cost of doing business has resulted in large increases in the price of every commodity used in the Council's activities, the membership dues of the Council have not been increased for a period of over three years. It will be apparent to every business man and executive that the Council should have a larger

working capital and reserves with which to finance the new educational projects agreed upon from time to time, and to establish upon a stronger commercial basis the large expenditures it must make to maintain and improve its service. When it is remembered that the cost of materials and other items have increased from 100 per cent to 300 per cent, it seems to me that as progressive business men you should be willing to pay a slight increase in the dues to assure your officers that financial support of which they stand in great need in conducting and maintaining their service.

Your Executive Committee is submitting to your Board of Directors a recommendation that an increase of 33½ per cent in the amount of dues in all classes of membership be effected by appropriate amendment to the By-Laws, to be effective upon all new memberships and renewals of all memberships expiring after December 31, 1920, and it recommends that you consider the service rendered in the past; the assurance of an expanded and improved service, and the obligations of the Council which lie ahead of it, and approve such increase in dues if, in the judgment of the Board of Directors, it should be deemed advisable.

We have every reason to be optimistic. The accident prevention movement fostered by the Council has stood the test of pressure put upon the industrial managers and, in spite of a slight slackening of effort here and there, your Committee believes that organized educational and technical Safety work has now become an integral part of the operations of industry.

The time will soon come when every community will have its organized Safety Department to care for the lives and health of every citizen, and five years from now we should have 15,000 industries on our membership roll and 100 locals where we have one today.

Let us pledge ourselves to express our patriotism in the preservation of the lives of the men who are fighting the battles of industry!

PRESIDENT RICHARDS: We shall next have a report from the Chairman of the Committee on Local Councils and Publicity.

REPORT OF THE COMMITTEE ON LOCAL DEVELOPMENT AND PUBLICITY

MR. W. E. WORTH: The development of local councils has been a matter of very great interest to your committee. As stated in the report of the General Manager at the time of the last Congress, seven cities had local councils with a paid staff. During the past year, nine other cities have been added to this list.

The success of the activities as outlined in the General Manager's report is due in a great measure to the very high caliber of the men it has been possible to attract to the work of secretary. These men not only were representative of the industry from which they were recruited but have shown in our work a very strong leadership and organization ability.

The public safety movement which has gained considerable impetus during the past year can only be made to function successfully through

the medium of these local councils; by that method we have a local group giving very close attention to the problem.

A large amount of money is necessary to carry on this very important work which contributes in a great measure to industrial safety by the training of citizens while outside the industry. It is sincerely hoped that some means can be developed (and considerable thought is being given to the subject) whereby funds for carrying on this public safety work can be arranged independent of the funds necessary to carry on industrial safety. Just how this will be done cannot be said at this time, but it is gratifying to know that industrial managers and others are rapidly realizing the importance of public safety and its contribution to industrial safety, and it is hoped that they can be induced to get behind the community movement in a way that will bring not only results but the necessary money to carry on the work.

The development of the NATIONAL SAFETY NEWS from a four page leaflet to a substantial and husky young magazine during the past year marks a new step in the contact not only between our members but between the members and our headquarters' staff and those actively engaged in assisting them.

The development of this magazine was the result of over four months' thought on the part of your committee and the headquarters' staff. Serious consideration was given to the matter and when it was finally decided that there was a need for the magazine, it was enlarged only after determining that the advertising contained therein would pay for the expansion.

Considerable thought was given to the question of the kind of advertising to be accepted, and the conclusion was that only that which was legitimate and for the purpose of promoting safety would be considered at this time.

Through the medium of this magazine there will not only be a continuation of the service rendered formerly by means of bulletins, weekly news letters, etc., but we shall be able to include therein information relative to the extraordinary activities of our members. We shall also be able to keep you informed of the progress of the National Safety Council and of the safety movement in general, visualizing that progress in a way not heretofore possible. The spontaneous response from members has materially helped to make the magazine more attractive. In so far as we know, there has been only approval of the editorial policy which is definitely determined and closely watched.

Your committee hopes to expand and improve the NATIONAL SAFETY NEWS, and will welcome constructive criticism, as much as we have welcomed the appreciation expressed. It is hoped every member at some time will send in a contribution and help make your magazine one of which we can all be proud.

The committee sincerely desires your co-operation and calls your attention to the fact that the National Safety Council is your clearing house, the magazine is your medium for expressing your ideas, and only

as you give expression to these ideas, can we determine how best to serve you.

PRESIDENT RICHARDS: We shall next hear the report of the Committee on Service to Members. The Chairman not being here, Mr. H. L. Robinson will kindly come forward and present the report.

REPORT OF COMMITTEE ON SERVICE TO MEMBERS

Your Committee on Service to Members begs to report as follows:

Twelve Safe Practices pamphlets have been issued during the past year, and it is believed that the previous standards set for these pamphlets have been improved. During the coming year it is proposed to devote a certain number of these pamphlets to Sectional subjects.

The bulletin service has been continued as in the past except that more assistance has been received from the various Sections, thirteen of which are now issuing Sectional bulletins.

The NATIONAL SAFETY NEWS made its first appearance in July. It has been published weekly since and is considered a great improvement over the old News Letter. The issuing of a regular publication by the National Safety Council has been considered for a number of years by the Executive Committee, and it now looks as if this problem had been solved in a satisfactory manner. This publication is self-supporting through the advertisements which it carries, and it is believed that it can be continued on this basis.

The Film and Lantern Slide Service has been continued and members are reminded of this valuable service which is available for all without charge except for transportation.

The Library and Information Bureau has been more popular than ever and more than 3100 inquiries have been taken care of during the past year.

In closing, your Committee wishes to call the attention of this Congress and the membership at large to the very loyal and efficient service given this branch of the work by those employed on the Headquarters Staff.

F. P. SINN, Chairman.

PRESIDENT RICHARDS: I should like to say that if there is any matter brought up in these reports that you desire to discuss, we shall be glad to have the matter brought forward.

We shall now call on the chairman of the Committee on Standardization and Technical Development, Mr. DeBlois.

REPORT OF THE COMMITTEE ON STANDARDIZATION AND
TECHNICAL DEVELOPMENT

L. A. DE BLOIS: At the outset, the work of this Committee promised to be of great importance to the Council, all feeling that much could be done in the development of the more technical side of accident prevention and

that the adoption of codes of safety standards by the various states, the Federal Government, engineering societies, etc.—separate codes which were frequently divergent—introduced a situation which would require immediate attention. It so happened, however, that what was probably the most logical development took place—the formation of an Engineering Section of the Council, thus relieving the Committee on Standardization and Technical Development of the greater part of its probable duties.

Under the old Committee on Technical Development a canvass has been made to ascertain what technical development was under way in each section, for it was generally felt that a very important part of the future development of the Council's work lay in technical fields.

As was to be expected, the majority of our sections, their officers being men whose time was taken up largely by their regular work, had been unable to accomplish much work of this character, although the Chairmen were unanimous in expressing a desire for further technical development.

Some time prior to the Cleveland Congress, both the Mining and Metals Sections had under discussion the employment of paid secretaries, with the possibility of such men being technically educated and able to bring about technical developments in accident prevention as applied to their respective industries. One of the functions of the Committee on Standardization and Technical Development became, therefore, that of closely following the investigations being made by these two sectional chairmen.

The Mining Section experienced difficulty in getting its members to commit themselves definitely to an increased financial obligation which would permit the employment of a paid technical secretary. Two letter ballots were sent out but while the replies indicated favorable response, there was not sufficient information to justify the chairman in assuming that the majority of his members would favor the plan and provide the necessary funds. In the case of the Metals Section the majority of the members were opposed to contracting further financial obligation.

For the time being at least it is evident that technical development for the sections must come largely through the Engineering Section itself and this perhaps is the logical solution of the difficulty.

The complicated situation existing as regards Safety Standards has already been mentioned. It is not necessary to take the time of the Meeting to explain the steps that have led up to the placing of this work in the hands of the American Engineering Standards Committee, aided by the National Safety Code Committee of which Dr. E. B. Rosa is Chairman. It is sufficient to state that the nationalization of safety codes is now well under way and that the National Safety Council, through its Engineering Section and its participation in the various Committees concerned, is well represented. It has been appointed sponsor for a number of safety codes and it has the right to feel, I believe, that it has done much of concrete value to solve a most difficult situation in a manner which gives great promise of uniformly excellent results.

PRESIDENT RICHARDS: The Chairman has forgotten to have the minutes of the last meeting approved. It is one of those formal steps that must be

taken. The minutes have been published, you have all received copies, and a motion that they be approved is in order.

(A motion was duly made and seconded that the minutes of the last annual meeting be approved as published. The motion was carried unanimously.)

PRESIDENT RICHARDS: The next item is the report of the Nominating Committee. As the Chairman, Mr. Christy, is not here, I shall ask the Secretary to read the report.

REPORT OF NOMINATING COMMITTEE

SECRETARY S. J. WILLIAMS: This report was printed in the NATIONAL SAFETY NEWS of August 9, 1920. These are the nominations for election as Directors for a term of three years to succeed those of the Directors whose terms expired this year.

G. L. Avery, Secretary, The Avery Company, Peoria.

W. L. Chandler, Assistant Secretary-Treasurer, Dodge Manufacturing Co., Mishawaka, Ind.

L. A. DeBlois, E. I. du Pont de Nemours & Co., Wilmington, Del.

J. M. Eaton, Industrial Manager, Lincoln Motor Company, Detroit, Mich.

H. L. Gaddis, Grosse Ile, Mich.

Charles R. Hook, Vice President and Asst. Gen. Manager, American Rolling Mill Co., Middletown, Ohio.

G. H. McClain, Superintendent, Employees' Service Dept., Proctor & Gamble, Cincinnati, Ohio.

Earl B. Morgan, Employment Manager, Curtis Publishing Co., Philadelphia, Pa.

J. A. Oartel, Director of Safety, Carnegie Steel Company, Pittsburgh, Pa.

Dr. F. D. Patterson, Chief, Division of Hygiene & Engineering, Pennsylvania Dept. of Labor and Industry, Harrisburg, Pa.

A. D. Risteen, Director of Technical Research, Travelers Insurance Co., Hartford, Conn.

L. B. Robertson, General Motors Corporation, Detroit.

Dr. E. B. Rosa, U. S. Bureau of Standards, Washington, D. C.

Charles B. Scott, General Manager, Bureau of Safety, Chicago, Ill.

George Oliver Smith, Henry L. Doherty & Co., New York City.

R. P. Tell, President, National Brake & Electric Co., Milwaukee, Wis.

B. F. Tillson, Asst. Supt., New Jersey Zinc Co., Franklin, N. J.

C. P. Tolman, Chairman, Manufacturing Committee, National Lead Company, New York City.

E. B. Tolsted, Independence Bureau, Philadelphia, Pa.

Dr. R. S. Vitt, Coroner, St. Louis, Mo.

W. E. Worth, Asst. Manager, Industrial Relations Dept., International Harvester Company, Chicago.

H. M. Webber, Chicago Telephone Company, Chicago, Ill.

A. W. Whitney, National Workmen's Compensation Service Bureau, New York City.

Dr. C. H. Kohler, Minneapolis, Minn.

B. C. Bail, Willamette Iron & Steel Co., Portland, Ore.

B. C. Christy, International Harvester Company, Chicago, Chairman.

C. H. Blakemore, Chairman Safety Commission, Norfolk & Western Ry., Roanoke, Va.

H. P. Coffin, Secretary, Oregon & Columbia Basin Division, Portland, Ore.

Holger Jensen, Manager, Compensation & Liability Div., Maryland Casualty Co., Baltimore, Md.

Robert A. Shaw, Safety & Hygiene Dept., Ford Motor Co., Detroit, Mich.

[At this point a nomination was made from the floor, but no action was taken upon it for the reason that the by-laws require that all nominations other than those presented by the nominating committee (which shall be submitted to the members sixty days in advance of the annual meeting) must be made in writing by not less than ten members to the Secretary of the Council at least thirty days prior to the date of the annual meeting, and notice of such nominations must then be given by the Secretary to all members of the Council not less than twenty days in advance of the annual meeting.]

(A motion, duly made and seconded, instructing the Secretary to cast one ballot for the nominees named in the report of the Nominating Committee, was carried.)

SECRETARY WILLIAMS: I report that the ballot is cast for the nominees as presented by the Committee.

PRESIDENT RICHARDS: The next order of business is the report of the Committee on Resolutions. Mr. Robertson is the Chairman of that Committee. We shall be very glad to hear from Mr. Robertson.

MR. L. B. ROBERTSON: In order to carry out the recommendations of the Business Committee as made by Mr. Cameron, and the recommendations of the Executive Committee, we have prepared and will now offer some amendments to the by-laws.

AMENDMENTS TO NATIONAL SAFETY COUNCIL BY-LAWS

Change Article III. Section 1 to read:

CLASSIFICATION OF MEMBERSHIP—Membership in the National Safety Council shall be divided into six classes, namely, honorary members, active industrial members, active individual members, associate members, local members, and service members.

Change Article III. Section 2 to read (first and third paragraphs):

QUALIFICATIONS OF MEMBERS—Active industrial membership shall be open to any person, firm, corporation, or organization interested in forwarding the objects of the National Safety Council.

Associations, the membership of which is made up of persons, firms, or corporations eligible to active industrial membership in the National Safety Council, shall be eligible only to honorary membership or to active industrial membership in the lowest grade.

Active individual membership shall be open to any individual.

Associate membership shall be open to any individual.

In Article III, Section 4 after the paragraph on dues of associate members insert the following paragraph:

On and after January 1, 1921, the dues of active industrial members shall be in accordance with the following schedule:

Average Number of persons employed

Preceding Year or Number of

Miles Operated Preceding Year

Dues per year

1 to 150	\$ 20.00
151 to 600	40.00
601 to 1200	60.00
1201 to 2000	80.00
2001 to 3000	100.00
3001 to 5000	120.00
5001 to 10000	160.00
10001 or more	200.00

For Insurance Companies, in accordance with the following schedule:

Income	Annual Dues
Up to \$ 100,000.00	\$ 20.00
Over 100,000.00 and up to \$ 250,000.00	40.00
Over 250,000.00 and up to 500,000.00	80.00
Over 500,000.00 and up to 750,000.00	120.00
Over 750,000.00 and up to 1,000,000.00	160.00
Over 1,000,000.00 and up to 1,500,000.00	240.00
Over 1,500,000.00 and up to 2,000,000.00	320.00
Over 2,000,000.00 and up to 3,000,000.00	480.00
Over 3,000,000.00 and up to 4,000,000.00	640.00
Over 4,000,000.00 and up to 5,000,000.00	800.00
Over 5,000,000.00	1000.00
And for all other insurance companies	140.00
For organizations not covered by the above schedules	20.00

The dues of active individual members shall be \$7.50 per year (\$10 after January 1, 1921) except where such members are designated by an active industrial member as provided in Section 5.

The dues of associate members shall be \$5 per year.

The dues of each active industrial, active individual, or associate member shall be paid annually in advance for the year beginning with the date of his acceptance as a member.

Government departments may subscribe to one complete unit of service—two sets of workmen's bulletins and one set of other regular publications—at \$15 per year (\$20 after Jan. 1, 1921).

At the beginning of Article III, Section 5, insert the following:

Each active industrial member shall designate for each \$15.00 of dues (\$20.00 after January 1, 1921) one individual employed by or affiliated

with such active industrial member. Such individual shall thereby become an active individual member without the payment of additional dues.

In Article III. Section 5 change the second and third paragraphs to read

Each active individual member shall be entitled to one vote at meetings of the National Safety Council.

Each active industrial member shall be entitled at meetings of the National Safety Council to one vote for each \$15.00 of annual dues (\$20.00 after January 1, 1921).

Associate Members shall have no vote.

In article III. Section 5 change the fourth paragraph to read:

Only active individual members shall be eligible to hold office in the National Safety Council.

In Article III. Section 5, change the fifth paragraph to read:

Each active industrial member shall receive for each \$7.50 of dues (\$10.00 after January 1, 1921) one set of workmen's bulletins.

Each active individual member shall receive one copy of all regular publications issued by the Council for executives, such as the magazine, and Safe Practices pamphlets. An active individual member shall not receive nor be permitted to buy workmen's bulletins. An active individual member shall be eligible to membership in any section of the Council, provided he meets the special membership requirements, if any. Each active industrial member and each individual member shall be entitled to the services of the library and information bureau.

Each associate member shall receive one copy of the National Safety Council's magazine, and may purchase other publications of the Council, except workmen's bulletins.

If there are any questions that any of you would like to ask as to these amendments, I will be very glad to answer them myself or to ask Mr. Cameron to answer them if I am not able to give you the information.

FRANK C. PERKINS (Buffalo, N. Y.): I would like to ask under what head would come municipal employees.

MR. ROBERTSON: Under the governmental head. Any individual in the employ of the government can get the membership for his personal use for \$10.00, which entitles him to receive one copy of the weekly magazine and one copy of all regular publications, not including workmen's bulletins.

MR. PERKINS: I was wondering whether there was not a larger income possible from the various municipalities by having dues graded according to the size of the municipality, the population, or the number of employees they had, so that there may be several appointed by the municipality in the various departments, all of whom would be particularly interested in safety. As Commissioner of Public Affairs of Buffalo, I believe we would be willing to do everything we could to forward the financial condition of the Council, and I believe other municipalities could possibly come forward with a little larger amount than has been suggested.

MR. ROBERTSON: That was discussed last night again in the Executive Committee meeting, and we felt that for the present, in view of the atti-

tude, of most governmental bodies as to expenditures of this kind, \$20.00 was about as much as we could reasonably expect. Then the individual memberships, if they wanted to designate them, would be \$10.00 each. In that way, your public works could join as a municipal department and you could then pay a membership fee of \$10.00 each for any number of your men that you desired.

Are there any other questions? If not, I move the adoption of the amendments to the by-laws as read.

(The motion was duly seconded and carried.)

PRESIDENT RICHARDS: The amendments to the by-laws are declared to be adopted.

We will now have the resolutions.

MR. ROBERTSON: The members of Resolutions Committee feel that in coming to Milwaukee we have been especially fortunate because of the many things that its citizens are doing to entertain us, and because of the beautiful place that has been provided in which to hold our meetings. We feel that the following resolution should be adopted:

RESOLUTION

RESOLVED, That a vote of thanks be extended to the City of Milwaukee for its warm welcome to this convention, and

RESOLVED, That a special vote of thanks be extended to the Association of Commerce, the Division of Safety and Sanitation, Mr. R. P. Tell, Mr. E. H. Fitzgerald, and the individual one hundred chairmen and members of the committees who have so faithfully and efficiently made and carried out all of the arrangements for Safety Week and this convention, and

RESOLVED, That a special vote of thanks be also extended to the general office staff for their faithful and efficient work during the past year.

I move the adoption of the resolution.

(The resolution was adopted by a unanimous vote.)

PRESIDENT RICHARDS: Is there any new business to come before the meeting?

There are some safety men here who have been doing good work for the movement during the year and they might report some progress if they will. Is Mr. C. B. Scott here?

C. B. SCOTT: As I look back on the past year, I am not so much impressed with the successes of that year as I am with the difficulties and the failures which have confronted me. Especially is this noticeable when I remember that the safety movement is now a decade old, or more, and that I have been trying my best to carry on the work of accident prevention along the lines of standard practices and along proper lines as laid out by this Council. I feel that the greatest difficulty I have encountered during the past year, the one thing that stands out prominently as the cause of the failures that have been made, has been more than anything else a failure to obtain practical, heartfelt, earnest support of executives and those in a supervisory capacity in the industry with which I have been

connected. I believe that if I could tell you how you could overcome the apathy of superintendents and foremen, how you could secure the real backing of the executive of your concern, I should say a word that would be most valuable on this occasion. I can't do that; I can only say to you that your work can be best strengthened and success can be best assured by securing the things that I have mentioned and by getting the backing of your executive and the support of your supervisory forces.

PRESIDENT RICHARDS: The Chair has been furnished with a number of names of distinguished gentlemen here to be called upon in this matter of reporting progress, and among them I find the name of Mr. Robert A. Shaw, Department of Safety and Factory Hygiene, Ford Motor Company.

ROBERT A. SHAW: The report that I would bring to this convention today is that we are making progress because we are backed by our chief executive, Mr. Ford, and also because we have a superintendent who goes out to investigate when a man is hurt in the plant; besides him, the other superintendents, the assistants, and I go out. That, I feel, is the great thing which is helping us in our accident prevention work.

I would not attempt to tell you of our activities in various departments. We have a yearly report made out and printed for your information if you desire to look at it at our booth in the exhibit room.

After various things have been tried, we have found that it is necessary to bring the moving picture into our plant and show men safety pictures, not in the evening but after their day's work—show pictures of safety which pertain to their work. We also run the evening entertainment for departments and try to stir up interest among the superintendents of those departments so that they will come. After they come, we get every man in their departments. That is necessary in order to get the men to attend. We are now trying to get every new man to attend the moving pictures. That is fine business in safety work and we hope to continue along that line.

PRESIDENT RICHARDS: Our old friend, Isaiah Hale, of the Santa Fe is here, and I know he will say something.

ISAIAH HALE: Mr. President, I would say nothing that might detract in any way from the force of Mr. Scott's remarks, but if there is one thought that dominates my mind today it is that there never has been a movement started for the common good which has been so little appreciated and so thoroughly misunderstood by the very men that were trying to help it as the "Safety First" movement.

PRESIDENT RICHARDS: It is up to us to make them understand it, and, believe me, it is a man's job. It takes a seven-footer like Hale to do it.

I wonder if Mr. R. J. Young is here.

ROBERT J. YOUNG (Chicago): We haven't had the trouble that our friend Charlie Scott has found in the past year of not having the executives back of the movement, because we find that our president and vice presidents are ready to go over the top if there is a weakening shown anywhere along the line. Although last year we made the best record that we have yet been able to establish, showing a percentage of less than one per cent of men injured, this year we have made an eighteen per cent reduction over last year.

PRESIDENT RICHARDS: I see sitting over there next to R. J. one of our old friends, Mr. Avery. We would like to hear from him. He was up here in 1912.

G. L. AVERY (Peoria, Ill.): Since the National Safety Council movement was started here in Milwaukee, we have taken over a plant here. We started out with an eighty-four per cent loss ratio on premiums paid for accident prevention, and I am very happy to report that by preaching safety in the plant we have reduced that to nine and nine-tenths per cent at the present time so far this year.

It is really interesting to note various things when safety is called to your attention. Driving up here from Peoria, the first thing we noted was a wrecked car alongside the railroad track. The railroad engine had had more back of it than the car had. The second thing that we noted as we went to pass a truck was that it was on fire. We pulled out our fire extinguisher and put out the blaze. The next thing was a smash-up in Rockford where a street car and public bus had met, and the bus, being the lighter, got the worst of it. There is an old saying "When bones and metal meet, bones lose." Sometimes we don't think of the safety things until such things come to our attention by force. If those things happened on that road in one afternoon, what is happening all over the United States?

The suggestion that Mr. Scott has made as to the executives simply means that we must get their attention. Possibly things along safety lines do not come to their attention unless they are put to them from the angle of production. One accident laying off a good man stops production. There are many good ways of getting to the executives. Don't always do it in one shot. Do it on the golf course or at the annual picnic.

There is one thing in particular that I would call to your attention, and that is that the outgrowth of this National Safety Council through its Health Service work brought about the formation of the American Association of Industrial Physicians and Surgeons. The Council is to be congratulated that they have connection with this American Association of Industrial Physicians and Surgeons. They meet with us tomorrow and the next day. The industrial physician is one of the greatest assets that we have in furthering the safety work.

Public Mass Meeting

September 27, 1920

GEO. P. HAMBRECHT, Chairman
Chairman, Industrial Commission of Wisconsin
Madison, Wis.

CHAIRMAN HAMBRECHT: The duty has devolved upon me to call to order and to preside over this session of the National Safety Council at its Ninth Annual Congress. When my good friend, Price, suggested this to me, I was somewhat in the position of the old maid that was kissed for the first time—a little embarrassed but, nevertheless, pleased. I was embarrassed because presiding over a meeting is not exactly my forte, but pleased at the opportunity of taking part in so magnificent a movement as that which the delegates of the National Safety Council are here to forward.

You are not a stranger here in Milwaukee. I believe it was said several times this morning that eight years ago when you started, the meeting might have been held in a telephone booth without overcrowding. I am somewhat reminded of the situation I was in when I first left home to be gone for a couple of years to try to make my way in the world. When I came back, the comment of my mother was, "My, how you've grown!" I feel like saying, when you come back to Milwaukee after eight years of absence, "My, how you've grown!" You've grown in numbers, grown in enthusiasm, and grown in determination of purpose. There is enough dynamic force in this audience before me this afternoon, if kept at the present pitch of enthusiasm and determination, to reduce the accident frequency in the United States ten per cent this coming year. I wonder if we realize what that means.

I remember two years ago I was called upon as Chairman of the Industrial Commission of Wisconsin to appear before the Finance Committee of the Wisconsin State Legislature to show cause for asking for an appropriation of \$100,000 more than our previous budget in order to further the interests of the safety movement; and very properly they took the Commission to task and required us to show what we were going to do with the money and what we expected to accomplish if it should be given to us. At that time I drew a picture for them which is a very small picture of the accident frequency even in Wisconsin, because our picture covers only the industrial field. I told them that the year previous there were 226 deaths caused in the industrial plants of Wisconsin.

sin; twenty-one men so seriously injured that they never could work again, called permanent total disability cases; 1,387 permanent partial disabilities, where there were amputations of fingers, hands, arms, feet, and legs; and 13,361 temporary injuries, disabilities lasting from one week to three months. I said I knew that with an increased determination on the part of those charged with responsibility even in a small degree as state officials are, by getting the co-operation of others who are only too willing to help if they are met half way, I knew that the accident frequency in the state of Wisconsin could be cut down at least five per cent, and I hoped ten per cent. I said that if the minimum would be accomplished, this is what would happen by giving the money necessary to put into the field men who can apply practically the principles that we all talk about and upon which we all agree. I said, "You will save by a five per cent reduction twenty-two human lives, men who will be alive a year from now. (We all know that accident statistics and ratios go on with mathematical precision.) You will save two men from permanent total disability; you will save 138 men and women and children from amputations of limbs; you will keep out of the hospitals 1,336 people."

The legislature responded magnificently and unanimously, endorsed the proposition for safety, and instead of a five per cent reduction, through the magnificent co-operation of the Safety Department of the Commission, the employers of the state and the labor organizations through which the Commission works, an eight per cent reduction was accomplished in the past year.

PURPOSE OF BUSINESS IS SERVICE

A short while ago, and perhaps now, if we were asked what was the main purpose of business—if we were asked, "Why do men get together? Why do they prosecute a business venture?" the answer would be, "To make money." When you have said that, you have exhausted the purpose of business. I want to tell you that there is a far deeper purpose in business today than making money. When we stop to think of it in its final analysis, it means this: That the captains of industry, the best trained minds in the world, the men peculiarly fitted for leadership, are bending their energies and their might to accumulate for themselves and their associates from the world store all that they can. But we are getting away from that idea, and the leaders in industry, those endowed by their Creator with ability perhaps beyond that of their fellows for far-sighted shrewdness and business ability, owe it to themselves and owe it to their associates and owe it to their State to be of service. That is what we are here for this week. We are here to see to what extent we may go outside of the sphere of our own immediate, selfish interests in order that we may be of service to our fellowman, service unselfishly rendered; and, although it is not done for the reward, the reward is sure and certain.

A few years ago, industry was confronted with a condition that industrial executives knew was serious: they were not getting out of industry all that they should. Through the evolutionary changes in the relation

of employer and employee as it existed when personal acquaintance was easily maintained, and as it became when the growth of business organization made such personal acquaintance next to impossible, they found that the production per man was not what it should be; roughly speaking, it was only one-third. They were getting hand service. Efficiency engineers were brought into the problem in order to combine, if possible, the intellect with the hand, to make the head aid the mechanical operation. The efficiency engineers rendered good service in industry in assisting all, from management down to the lowest paid laborer, to use their heads as well as their hands; and they increased production. Production got to be about two-thirds, but we still feel there is something lacking.

I want to say, and I think it is true, that until we can get a practical application of the Golden Rule in industry so that we can get the heart service combined with the head service and the hand service, we will not get three-thirds. But when we do, then we will get full production.

I heard this morning, in the business meeting, a remark by one of the delegates that impressed me rather forcibly. It was that there is very little thanks in this movement for those that are engaged in it. That is true. If you are in this movement because you think you are going to reap some reward or that a monument may be erected to you because of faithful service, you are mistaken, because the results of your work and mine are so intangible that they can only be determined by a comparison of accidents this year with last year by cold-blooded statistics, and very few persons pay attention to that. The very persons whose lives you may have saved because of safe practices that you have put into your plant may be the first to condemn you. If you go out and rescue a man from drowning and bring him in, he will remember it as long as he lives because you have done something there that he can see. In the safety movement you can't do that. Lots of people wonder if it is worth while, and only those that have confidence in the final results, which show in cold-blooded statistics that they have decreased accidents without hope of reward, can remain in this service.

Back of every movement that attracts public attention, we always find a strong personality or personalities. There must be leaders who have vision, leaders who are willing to be misunderstood for long periods of time in order to get their neighbors and associates interested in the same thing they are interested in; but if we did not have these strong personalities, men who are willing to stand and fight alone for a long time, realizing the necessity of getting others to join them, movements would not succeed. We are very fortunate this afternoon in having with us two men who have been pioneering in the movement for safety long before the National Safety Council was born into existence, men who stood alone driving at the idea of safer practices.

The first speaker of the afternoon has done splendid work in the railroad line, working as he has for the New York Central Lines in the accident prevention field, attracting attention to himself and to his road, and getting the public to see the necessity for and benefits of safe practices. He is with us this afternoon to give us the benefit of his ripe experience, begun, as it was, at a time when it was unpopular to say

some of the things that we are all thinking of today. I have great pleasure at this time in introducing to you Mr. Marcus A. Dow.

SAFETY SERVICE

MARCUS A. DOW, GENERAL SAFETY AGENT, NEW YORK CENTRAL LINES,
NEW YORK CITY

It ought to be a comparatively easy matter to secure the co-operation of the employer in safety work, because there is abundant proof of its value to the employer from a dollars and cents standpoint. All that is needed is to procure from the National Safety Council some of the hundreds of records of its members, who have proven in a very conclusive way, that safety work pays in dollars and cents. But these figures, convincing as they are, do not in themselves alone awaken in the heart and mind that spirit which is really needed on the part of not only the employer, but on the part of the employee as well, if safety work is to attain the fullest measure of success. Therefore I shall not speak of the financial inducement for safety work, but rather shall I say something of the thought of service to mankind, of service to the state and to the Nation, which every American who is made to understand the deeper and more vital aspects of accident prevention work can render.

I am sure that there could not be an employer, a superintendent, a foreman, nor even the humblest employee, who could fail to put his heart and soul into real safety service if he could but understand what a privilege it is for any man to have the opportunity to serve his fellow men and his country by helping to prevent accidents. If you should ever by any chance happen to stand on the bank of a river and should see another human being struggling in the water, and you should hear the agonized, frightened cry of that person for help, and at once all of the spirit of bravery and chivalry and sympathy for humanity that lies in human heart spurred you to action, and before you knew it you had your coat off and you were in the water and, after a hard struggle, you brought an unconscious form to shore and laid it on the bank, and you saw it revive and breathe and live again, you would thank God that you were there and that you were given the enviable privilege of saving that life. And you could not help having a wonderful feeling of justifiable pride that you had done something worth while; that you had answered the call of humanity and that when the test came you had measured up to the full requirements of a real man. A life saved is a life saved. It makes no difference whether a drowning man is pulled out of the water just in time to save him or whether in a less spectacular way, through a system of training and education, he is kept from falling under the wheels of a locomotive, or whether by the application of approved safety devices he is kept from being ground up in the gears of a machine. The result is the same. It is a life saved. And it is because hundreds of big men—employers in industry—have responded to the call of humanity that many lives have already been saved. For every reduction that has been made in an accident record on any railroad or in any industrial plant means that lives have been saved, just as truly as if they were

snatched from a watery grave a few seconds before life would have become extinct.

The opportunity for safety service gives you the same great privilege it gave to the man on the river bank who heard the cry for help. In other words, real safety work is a service of the heart—a service which calls for that spontaneous, ever-ready, never-let-go, determined effort that you would irresistibly put into the saving of a life which you knew would be lost without your best effort.

SUCCESSFUL SAFETY WORK IS NOT BASED ON PRETENSE

Specialized safety work has now been carried on in plants and on railroads throughout the country for a number of years with varying degrees of success. There have been some few employers who have not acquired great success, because even though they pretended to inaugurate accident prevention work in their plants, they were not good safety men at heart. Successful safety work is not based on pretense. There have been those who believed that all that was necessary for them to do was to post a few safety bulletins in their plants and let it go at that. The spirit of Safety did not pervade their establishments because they were not good leaders and did not make their employees feel that they were sincere. Experience has proven that success in safety springs from a service of the heart, and an ability and determination to concentrate every energy, every resource necessary, upon the obtaining of results. It has proven that success in accident prevention, just like success in anything else, will come to those who compel it—that they will achieve success who believe they can achieve it and who will put their whole hearts in the effort to attain that end. You will find that the spirit and the attitude toward safety work of any employer—of any railroad official—will be reflected in every corner of his plant and on every mile of his road. You will find that if he is a safety man at heart accidents are reduced—that the majority of his employees are co-operating with him to that end—and yet his plant is working on the highest plane of productive efficiency.

The employer who would render conscientious safety service must first of all make his plant or his property as reasonably safe, well guarded, well ventilated, and well lighted as engineering revision within his means will permit. But he must also understand that engineering revision, or the correction of improper and unsafe conditions, forms only a part of the work he must inaugurate. It has often been said that the majority of accidents are due to carelessness of the individual employees involved in the accidents. I do not think that is altogether true. At least all accidents caused by carelessness are not entirely the fault of the man who was careless. The fault may have been with the man who hired him; or it may have been with the man who trained him for not having told him how to work safely and for not having pointed out the unsafe things he must not do. Or it may have been the fault of the other men who worked around him, who worked carelessly, and whose ways and habits he followed, because he was in a careless, chance-taking environment. And so a better statement and a more truthful one is that the majority of accidents are of a character which can only be eliminated

when all of the employees and all of the officials co-operate in the task of creating an atmosphere of carefulness—an atmosphere of safety.

GOOD LEADERSHIP THE SECRET OF PROSPERITY

Here is where the greatest opportunity of the employer, the superintendent, or the foreman lies. He must become a leader in the safety movement. Ever since the time when history first records the deeds of man, human beings have followed a leader. Good leadership has been the secret of the health, strength, and prosperity of communities the world over from time immemorial. Likewise has poor leadership left in its wake untold misery, hardship, and sorrow. The employers, therefore, who *are* good leaders, who not only apply the principles of mechanical safeguarding, but who also by their enthusiasm and by their consistent preaching and teaching of safe practices succeed in creating an atmosphere of safety, an atmosphere of carefulness and co-operation for safety in their plants, are the ones who will procure continuous and gratifying results in accident prevention. It has been said that eternal vigilance is the price of safety. Assuredly as far as the supervising officer or the foreman in any industry is concerned his vigilance should extend so far as to see that the men under him are taught specifically how to do their work in the safest possible way and that they are closely supervised to see that it is done only in that way. You may recall that old opera, "Robin Hood" and, if you do, you may remember that song entitled "The Armorer's Song" in which there are a few lines running like this:

"The sword is a weapon to conquer fields
I honor the man who shakes it;
But naught is the lad whom the broad sword wields,
Compared to the man who *makes* it."

It is obvious we must look to the men of the rank and file to wield the weapons that will destroy those habits that are inimical to the safety of themselves and others. But how much more important is the duty of the superintendent and the foreman, the men who are in charge, to make, to forge, and to place into the hearts and minds of the men under them those weapons of knowledge and of inspiration with which their unsafe habits may be overcome.

A DEFINITION OF "SERVICE"

To attain success in accident prevention, then, this is the character of safety service that must be given by those in authority on any railroad or in any industry: not only to correct the unsafe things but also by their enthusiastic support to create an atmosphere of safety among the workers; not only to eliminate the unnecessary hazards, but also to build up a fine safety morale among the employees by their personal effort, by word of mouth, by personal contact and by that irresistible force that will come from a true service of the heart—a service performed because you believe in it, just as you believe in your religion.

We've heard a lot about efficiency, about the welfare of man, about humanitarian effort, and about Safety. These are all embodied in the one concise, terse, and yet chock-full-of-meaning definition—SERVICE.

If you, Mr. Safety Supervisor, tackle your problem with a determination thoroughness, and patience that will insure the elimination of every possible accident cause, you do something more than merely earn your salary. You do something worth while. You contribute in no small degree to the things our boys who went over there fought and suffered and died for—the comfort and security of your fellow men. You render SERVICE.

If you, Mr. Foreman, by your leadership, your initiative, your enthusiasm, and your sincere, never-ceasing effort, create an atmosphere of safety among your men, in which atmosphere the germs of carelessness cannot live, you do more than increase production in your department. You do that, too, but you also contribute to the great scheme of things which makes the world progress and become better. You give SERVICE.

If you, Mr. Workingman, without fear of ridicule or criticism, and spurred only by your devotion to duty, leap to the side of a chance-taking comrade who is about to perform some act that will jeopardize his own safety or the safety of a fellow employee, and with a friendly word of warning get him to correct his unsafe practice before an accident happens, you do something more than save a casualty expense for the company you work for. You too help to create that atmosphere of carefulness in the plant, thereby increasing the safety of every employee in the establishment. You participate in a most commendable form of human endeavor. You contribute unselfish, praiseworthy SERVICE.

How about the employer? Does he not, too, through his conscientious safety work, render this same form of commendable service? Let us consider for a moment and see.

ACCIDENT PREVENTION IS VITAL IN THE LIFE OF THE NATION

Accident prevention has passed the stage of a crusade or reform movement. It has been proven in hundreds of industries to be a practical, workable plan for increasing efficiency, conserving man power, and eliminating financial waste. It is today a vital thing in the life of the nation. It is a great economic necessity. It is something that every employer must get behind and support, because of all the shortcomings and faults that we as a Nation can be accused of, there can be none so utterly inexcusable, none so unpatriotic, as a lack of effort to stop all unnecessary wastage of human life. The prevention of a single accident that would prevent the crippling of even one single human being has never been more worthy of attainment. The killing of many thousands of men in the industries of the country each year, and the maiming and crippling of a great many thousands more, was a most lamentable thing five years ago. Today, as we contemplate the great human wastage caused by the world war wherein millions of lives were sacrificed, we cannot help but be impressed with the thought that preventable accidents cease to be a liability merely upon the industry that produces them, but that they are in fact a great, appalling calamity to the Nation. The employer, therefore, who by his steadfast adherence to the safety principles, now

so thoroughly developed and well defined, and who, by his unrelenting, systematic application of those principles to his business succeeds in lowering the accident record of his plant, accomplishes much more than merely saving the dollars such attitude inevitably will save. He does more even than to minimize pain and suffering. He helps to annihilate discontent, distrust, and indifference among his workers. Above all else, in these times when the country and the world have been drained of a large proportion of its finest manhood, the American employer who conscientiously strives to prevent accidents renders to his country—the finest country in all the world—a great and glorious service.

Real Safety Service today demands the co-operative effort of men and women in every walk of life. The opportunity for this service is by no means confined to the fields of industry and transportation. In fact the managers of industrial plants cannot afford to ignore the insistent call in every community for their moral and financial support of plans for the promotion of public safety. The rarest flower ever planted, if surrounded by a bed of noxious weeds, does not attain a healthy growth and burst forth in its fullest bloom of radiant beauty. Neither can the seed of industrial safety bring forth the best of results in a factory that is surrounded by a community where public safety is forgotten and where the weeds of carelessness and indifference are permitted to flourish unchecked. The co-operation of the employer, therefore, is needed in accident prevention effort in a broader sense than merely putting up safeguards in his own plant. It is needed by the community in establishing an atmosphere of safety in public places. It is needed in the influence he can wield to bring about the teaching of the fundamental principles of self-preservation to the children in our public schools. It is needed in the co-operative effort to impress upon the drivers of automobiles a sense of responsibility in safeguarding the lives of not only children but of adults as well by eliminating reckless, thoughtless driving. It is needed to teach the children and the adults to use care while crossing the public streets to eliminate that same class of accidents.

In the city of New York alone in the year 1919, 888 human beings were killed by being struck or run over by moving vehicles in the streets of that city. Seven hundred and forty-three of these death-dealing vehicles were automobiles. During the previous years there was only an average each year of 187 passengers killed in train accidents on all the railroads of the United States. In other words, in the single city of New York there were more than four times as many persons killed by vehicles in the streets as there were passengers killed in train accidents on all the railroads of the entire country. Therefore, it seems to me that there rests upon us just as great an obligation to eliminate community carelessness as there is to eliminate carelessness in the industries and upon the transportation lines of the country. The opportunity for safety service is indeed unlimited, the field is unbounded, and the insistent call for that service is not to be denied.

The safety movement is a great progressive, forward movement in which there can be no turning back—no retreat. In the great battle of the Argonne Forest a young American captain, while leading his men

in a charge, was shot down by a machine gun bullet. Mortally wounded, he was picked up by two enlisted men and carried to the rear. His lieutenant stooped down with pencil and paper to take down his last words. Raising his head slowly and painfully, he opened his eyes and pointing a shaking finger toward the front, he said, "Lieutenant, the command is Forward," and then his head fell back upon the ground and he was—dead.

Men and women of America, the command today is "Forward." Forward for country, forward for loyalty, and for good citizenship, for right and for justice, aye, and forward for Safety.

CHAIRMAN HAMBRECHT: We have listened to a splendid presentation of the responsibilities of all of us, on whom devolves in a small or large way responsibility for accident prevention.

"Had we only known!" would have prevented every accident that has ever happened—"Had we only known!" Unfortunately, the knowledge comes after the injury. True, this knowledge is collected, tabulated, and used to present to others that they may know how accidents are caused and thus prevent repetitions.

Perhaps no one is better qualified to speak on the subject of how accidents may be prevented than one whose business it is to check up the happenings of accidents and to know, even though too late for the case that caused the trouble, how others may be prevented.

The next speaker on the program has devoted the best years of his life in the accident prevention field, and he is at present the medical director of the Equitable Life Assurance Society of the United States, New York City. Knowledge comes to him of the way in which accidents have happened and by him is given out to others for the purpose of showing how repetitions may be prevented. I now have pleasure, in introducing to you Dr. Franklin C. Wells.

HUMAN CONSERVATION—A NATIONAL NECESSITY

DR. FRANKLIN C. WELLS, MEDICAL DIRECTOR, THE EQUITABLE LIFE ASSURANCE SOCIETY OF THE UNITED STATES, NEW YORK CITY

Off Land's End, England, there is an old house with two signs upon it, or one sign with two sides. On one side you read, "This is the first house in England." You go around to the other side and you read, "This is the last house in England." It all depends upon your angle of vision and where you stand as you read that sign, what that sign means to you. It all depends upon the way you look at a subject what that subject means to you. The world has progressed by men who have looked at things differently. A young man was one day going down the streets of Rome. As the afternoon sun sent a glint of light, he saw, as he passed a butcher's stall, the head of an ox on that stall, and as the sunshine came he got a glint, a refraction of the setting sun in the crystalline lens of that dead ox, and from that Galileo gave us the telescope because he looked at things differently.

There is a great audience here that represents a great deal. Thank God, from whatever places we have come and how we may look at the

business of life through different glasses or different views or angles of vision, we are one in the fact that human life must be saved and conserved where life is lost by accident or by disease. America knows how to get together just as this great gathering here today is getting together. When America entered the war, she was given the wonderful privilege of sending one boat a week to Liverpool on one condition, provided she would paint that boat with convict stripes. Thank God, America got together and she sent not only one boat a week to Liverpool but she sent 500 boats a week, and instead of painting them with convict stripes she painted them with the stripes of the Red, White, and Blue, and they have been going ever since. That is because America knew how to get together, and there is a great deal in knowing how to get together.

You have heard of the experience of Mrs. Mark Twain. Mark was sometimes, as you have heard, more expressive than elegant in his language, especially when he happened to hit his thumb-nail with a hammer. It troubled his wife very much, indeed, and she didn't know what to do until finally she went to a neighbor, and the neighbor said to her, "I'll tell you how to break Mark of that awful habit of using those bad words. The next time you hear him saying them, you go up to his face and stand right before him, look him in the eye and repeat every word he has said just as he has said it word for word, and he will stop." She didn't have long to wait. The next time she repeated the words as Mark used them. When she had finished, Mark simply looked over his glasses at her and said, "Well, Mother, you got the words all right but somehow or other you didn't get the tune."

There is such a thing as America not only getting the words but getting the tune, and I thank God, for nothing else that I have heard perhaps today or that I might get out of a convention like this that means much would be worth more to me than that magnificent address we have just heard from Mr. Dow on the fundamental principle of service that lies at the bottom of all humanity and of all human life. The conservation of life is needed in America today.

A little boy went to his mother when the first baby sister arrived, and looking at that little infant baby sister, he said, "Well, Mother, she may be all right, but do we need her?" There are questions before America today on a great many problems that we wonder if we need. The manhood of America and the best thought of America are working on some of the questions confronting America today for America's solution. From the life insurance standpoint where I have digged and delved for some thirty years, oh, how we are seeing the results of the lack of conservation of human life in so many of the avenues of life. What is the matter with America today? Do we need it?

BIG QUESTIONS REQUIRE CLEAR THINKING

During the war an angry allied general was heard to remark, "This war will last forty years longer—one year more of fighting and thirty-nine years of rolling away the barbed wire entanglements that have been thrown up." Those barbed wire entanglements are symbolical of some

of the great questions confronting America today, questions that need clear thinking because they are big questions. Big questions demand clear thinking. No man can think crooked and walk straight, and no nation can think crooked and walk straight. Germany tried it for forty years—forty years of crooked thinking that led the world into hell. Russia is trying it today—trying to build a nation without a constitution—crooked thinking.

Lord Gilbert Chesterton, in a little book he wrote for our boys when they went across the ocean, made the remark that the wittiest saying ever made by an American was by Artemus Ward in the nineteenth century when he said, "It ain't so much people's ignorance that does the harm as their knowing so many things that ain't so." America knows today, but she knows a great many things that are not so, and we have been doing some crooked thinking on a good many subjects.

You go into a life insurance office and watch the mortality statistics as they file by, and you will be convinced that it isn't only the accident that does it; back of the accident there is some influence at work that may cause the accident that you don't stop and think about at all. It isn't the things that surround a man that make that man great or that make that man small, it is what that man has within himself; and the things that surround a nation never make it big and never make it small, but the things that that nation surrounds, what it holds within itself, its inside machinery, its capacity to think, the character of its people, make it great or small—not its neighbors, not the things that surround it. What you are physically, mentally, and morally determines what you are in the world and what you do. What are you? What are the American people today? How much is America worth if we stand here today and judge that worth or that value on a physical platform or standard?

WHAT IS A MAN WORTH?

A few years ago we had a visit in this country from a very interesting foreigner who was a heathen, a Chinaman, and his name was Li Hung Chang. As he came to this country he brought with him his Chinese and his heathen customs. Some of you will remember one of those customs that struck the American people very ludicrously—the method of Chinese introduction. Old Li Hung Chang met any one with his Chinese custom; he looked them in the eye and asked two questions, "How much are you worth?" and "Where did you get it?" That is the Chinese method of introduction. Instead of shaking hands and saying, "How do you do? I'm glad to meet you. How's the wife and baby?" he said, "How much are you worth?" and "Where did you get it?"

A chemist heard the old Chinaman ask that question and he said, "I'm going to call the old Chinaman's bluff," and he took a pad of paper and a pencil and began to figure, and he came to the conclusion that a man who weighs 150 pounds when he is dead will sell for \$7.50, and that was the chemist's estimate of what a man was worth. He added, though, "If you weigh 200 pounds you will bring \$8.50."

The law puts a value upon a human life, \$5,000, but the old question

comes ringing down through the years, "How much are you worth?" It is well for America to ask the Chinaman's question, "How much are you worth?" if we look at it from a physical standpoint. A man is worth what he is and what he does. You employers of labor take a man and you don't ask what he is, you don't look underneath the outside covering and go to the inside machinery to ask the condition of the machinery there. You say, "What can you do?" You watch his production. If a man can produce, you don't ask what is on the inside. I have been selecting men for some thirty years of my life and I have learned this: That you can't tell the inside of a man by looking at the outside. You can't tell the condition of the inside machinery by simply looking at the outside of the man. If you want to know the value of a watch, take off the cover, examine the wheels and cogs and springs inside, find their condition; the jeweler will tell you what the watch is worth. We are all composed of machinery on the inside—wheels and cogs and springs. We have a pump, we have filters, we have a great laboratory, we have a great pair of bellows, we have a telegraph system on the inside of this wonderful machinery. What is the condition of that machinery today?

In your own case, do you as captains of industry and employers of labor know the condition of the machinery of your men working for you in your plants today? If you don't, I want to tell you that you are losing millions of dollars from non-efficiency and non-production by men who have disease creeping over them insidiously. They do not know it themselves, but it is seen in their production, it is seen in their lives, and you do not know it until the man drops. There is a cause, and you must go back and have that inside machinery watched and examined if you would maintain production, if you would maintain the physical efficiency of your men. Watch that inside machinery just as you would watch the motor power of your automobile or the motor that runs the elevator of your building. That is the life insurance standard. We take the man who applies for insurance and examine the machinery to see if that man is going to live probably his allotted life. And then we find out one other thing, we ask one other question: "How is the man that has this machinery using it from day to day?" because we die daily. There is no such thing as sudden death; causes go back over the years insidiously creeping on until the man drops. We say it is a sudden death. No, it is not, it goes back over the years, it comes down through the years. America is honey-combed today with insidious diseases, diseases that are sapping the kidney, the heart, and degenerative diseases that ruin the health. Our business men today at forty years of age are dying twenty-five per cent faster than they died fifteen and twenty years ago. I can understand how this machine might wear out when a man is three score and ten or eighty years of age. We expect the machine to wear out then, but one thing we can't understand from our standpoint in life is this: Why is old age today putting its bony and clammy hand on the man of forty throughout this land and saying to him, "Be old at forty years of age with degenerative diseases of the heart and the kidneys and the nervous system." -Forty years of age!

POOR HEALTH A CAUSE OF ACCIDENTS

That is one cause for the large number of accidents you are having in your factories. Your men have disease. They do not know it, but it unsteadies the hand and the head and the heart and the eye. I don't wonder that there are so many accidents in the factories, because we do not watch the inside machinery as we should. Watch the human machine, watch it by a physical examination, watch it by a regular physical inspection not to fire the man out of his job but to adapt the man to the job that he can fill. Watch the men in your employ and give them a fair chance. Physical efficiency is the rock on which all good government rests, and the government of America must rest on our physical efficiency if the foundation of moral and military well-being, as well as the physical well-being, of this land is to endure. Two plus two make four, not some of the time but all of the time, and a sound mind and a sound body are the mathematics of health not some of the time but all of the time. It is an important question, it is a barbed wire that must be removed in this land, and it needs clear thinking because what our land will be tomorrow depends upon what it is today.

War suddenly drops upon us and then we are led to realize how important, for the preservation of our own liberties even, is a sound mind in a sound body. It is the man that makes the efficiency of the gun. If that man is anemic, weak of heart or defective of eye, narrow-chested or weak of limb, that gun might as well never have been made.

Rome went through that experience. Rome knows all about it. The manhood of Rome was her walls, and as long as that manhood of Rome was intact Rome was safe. As long as her young men lived in the open, breathed the air of the everlasting hills, the walls of Rome stood there against all invaders, but when through typhoid fever and malarial fever and venereal disease the manhood, the walls of Rome, was weakened, the Gauls and the Vandals made mighty short work of her.

We realized that a little while ago. If I told you that thirty-three per cent of our young men in this land five years ago were so defective that they couldn't meet the standard of Uncle Sam, you wouldn't believe me; yet we find that to be a fact. All the armaments in the world, or all the steel that the Bethlehem Steel Company could produce, never could keep one enemy from our shores if the man behind the gun is a physical degenerate.

A year and a half ago we had an invader come to this land. We thought little of his coming. We had been warned but we made little preparation for his coming, and it took 500,000 new graves in America to awaken America to the fact that we must prepare to meet this invader. Influenza had been here before. Influenza had been elsewhere, and yet we waited until influenza came to lock the barn door, and then we issued warnings preparing people how to meet influenza. An invader! And it is coming again and we are going to see the effects of influenza. Get ready for it.

THE CONDITIONS THAT CONFRONT US

If I could take the people of this land and divide them into families, what a large household we would have. I would like to take the people

of this land to bring this before your attention. I would like to divide the people of America into households and set them together, solitary, if you will, but in families of seventy-one each, large families, perhaps. And then I would tell you that every year from every one of those homes in this land one person would die; two people in every one of those seventy-one families in this land would be confined to the bed all the time; thirty would be sick with adenoids, with heart disease and degenerative diseases, with insanity and indigestion and impaired hearing, malaria, tuberculosis, typhoid fever, and hookworm; twenty-five would be in what we call fair health, they would be the ones that would be walking around and saying, "Thank you, I'm not enjoying very good health,"—they would be the ones who would have excesses of all kinds, coffee and tea, overeating and undereating, lack of sleep; and only thirteen in every home in this land, with seventy-one persons in each home, could you put your hand upon and say that they are in robust health.

Back of all that we can go to the schoolhouse, and there we find that Uncle Sam tells us in our school life that seventy-five per cent of the 26,000,000 boys and girls in this land today have physical impairments that are interfering with their normal development. That is a mighty important statement because what America will be tomorrow depends upon the boy and the girl of today. You and I won't be here then. Your boy will be here and your girl will be here, and will find a large proportion physically defective, physically imperfect.

Japan realizes this great danger, for with a population of about 70,000,000 she has some 16,000 school physicians to keep her boys and girls in school in good order. America, with a population of 110,000,000 has about 1,500 school physicians to look after the boys and girls in this land.

Back of the schoolhouse we find the home, and back of the home we find the mother and the baby, and there is the very center of American manhood because the home is where manhood is made. We find that we have been so interested in our haste and speed mania for making money that we forgot to make manhood, and we find here facts that are staring us in the face today. Three hundred thousand little babies die the first year of life, most of them under two months of age. Twenty thousand new mothers die every year from diseases that are easily preventable in this land. One hundred and fifty thousand of those little babies are two months of age and under—two months old and under! Dying because the new mothers do not know how to take care of them!

When the Titanic went down the world stood aghast and said, "Oh, what wonderful bravery!" as men lined up on the deck and said, "Women and children first to the boats of safety," and they let them go. Women and children first on the sea, but women and children last on land when it comes to the storms of malnutrition and disease that beat upon the home and take the baby and the new mother.

THE APATHY OF THE PUBLIC

It has well been asked in this land, "Suppose men who are making automobiles should get together and fabricate a twelve-cylinder engine

that costs \$5,000 and put it on the market, and at the end of two months that machine had to be sent to the scrap heap, how long would that concern do business?" Babies come into our land; at the end of two months and often before, they are carried out, and there is very little interest manifested in that question unless it happens to come into your home. Herod slaughtering the infants doesn't seem to be in it with some of our social conditions and our infant mortality in this land. This is a significant thing: The higher the percentage in this land of new mothers who are obliged to go out and work for their daily bread and to support their babies, the higher does the percentage of disease and mortality rise, showing that what society is taking out of motherhood in the production of money she is paying for in the impoverishment of manhood and youth.

If the test of a city is the chance of a child, the test also of a civilization is the care and attention it gives to the homes of its land, demanding that its mothers and babies be not sacrificed in pest-holes of malnutrition, in social conditions that are sapping our very life.

We hear a great deal about the high cost of living. We hear very little about some of the causes that are producing the high cost of living. We hear a great deal about advising our people to make two blades of grass grow where only one grew before. We hear very little about advising some of our people about some of the causes underlying productive efficiency which are tremendous causes of the high cost of living. Crime and insanity are two tremendous causes. We hear very little about the fact that one dollar of prevention will save ten dollars in toll for crime and disease later on. We are paying in this land about \$600,000,000 a year for crime, \$200,000,000 a year for insanity—a tax on every man and woman and child in this country of about \$9.00 for these things, to say nothing of our bad housing, bad sanitation, labor turn-over, tuberculosis, and typhoid fever.

AN INDICTMENT OF AMERICAN INDIFFERENCE

When I came here today, I was handed a little pamphlet and as I read it I thought what an indictment it was against America that America should allow such a thing. Last year there were 225 lives lost every day through accidental means, 82,000 in one year. Of this number, 22,000 occurred in the industries, 60,000 may be termed public accidents on streets and in homes, and over twenty-five per cent of these were children under ten years of age, and over four-fifths of all accidents, your own pamphlet tells us, are of a preventable nature. What an indictment against American civilization that we allow such a thing as that today! What an indictment when one dollar of prevention will save this country millions of dollars in the end in crime, disease, crippled men, loss of life, and loss of limb.

If the growing of two blades of grass where one grew before is good philosophy, the saving of human life, the making of better men, stronger men physically and mentally and morally, the better building of the foundation of home and of state is, in my opinion, a better philosophy. No question is settled until it is settled right. The building of jails

will not rid a town of crime. No victim of insanitation was ever cured by simply a sanitary method being installed after the victim was dead.

To be an imperial nation we must be an imperial people physically, mentally, and morally—a nation that will stand up and say, "We place manhood first," and a nation founded on the principle of the Ten Commandments and the Golden Rule.

A large percentage of your accidents are caused by defect of the human machine. Watch the human machine, and if you have never in your factories or in your establishments gone down underneath to the cause, do it now; look to the condition of the machinery and have it thoroughly inspected; have every man in your employ inspected regularly; and get that man's confidence so that he will be glad to have it done. Do it, as Mr. Dow has said, because it is a service, and service lies at the foundation of our structure everywhere. It is true that service can be extended into every walk of life. That is absolutely true. The only gauge, or test of any civilization anywhere is its estimate of humanity. It is high or low, receding or advancing, according to its standard—not money standard but manhood standard. If its people are cheaply and poorly cared for, no amount of physical wealth in the country can make it great, and if its people are honored and considered its best asset and its richest treasure, no lack of worldly goods, of gold and silver, can make a nation small. You say that is impossible and that is an ideal. Gentlemen, to America nothing is impossible. America can do what she will, and the things in life worth while are the things that cost, and health costs. You can buy shoddy cheap, you can get a paste diamond for a dollar, you can get plated ware that is inexpensive, but if you want to buy that piece of silver that will serve you through life and that is marked "Sterling," you must pay the price. A noxious weed will grow over night, but see what nature pays for the oak, centuries of twisting and turning and twining to give it fiber so that it will stand the storm. A stagnant pool is made in an hour, lying by the roadside, but the little stream that does the world's work comes one hundred miles down the mountainside, beating itself against the rocks of opposition, losing itself in the sea.

When it comes to man, God's handiwork, God's greatest creation, no waiting was too great, no experience too long, a thousand lower species were devoured in the making, and then when He turned him out as his crowning creation He said to the world, "There is a man," and He has labored ever since to keep that man on the up grade.

This new law of eugenics that you hear about today is as old as the cradle of the race. If a man would retain his vitality and strength down to three score years and ten and to old age, he must pay the price, the price of good health, and that is the price America must pay if she would be strong mentally, physically, and morally. I believe America is going to pay that price. I believe that down through the years to come we are going to see a new era and a new element shall demand health for the poor, strength for those who do not have it and cannot perhaps obtain it themselves, until America shall lead the world in good health, in safety—not safety first but safety always—until America shall be as a city on a hill whose light cannot be hid.

CHAIRMAN HAMBRECHT: The delegates in attendance owe a debt of thanks to the officers of the National Safety Council for the splendid numbers they have prepared for this afternoon's program in the addresses of Mr. Dow and Dr. Wells. They have been inspirational in the last degree. Even if you should hear no more of the meetings and business of this Congress you will be able to carry back to your homes enthusiasm and determination that will live with you throughout your work.

I just want to add one thought to what has been said, and it runs as a golden thread throughout the thought left by both addresses. The question has often been asked of you, as it has of me, "Isn't there some plan by which all of these splendid ideas may be carried out? Haven't you some suggestion?" For 6,000 years the plan has been worked out for you and me. We do not need to seek a plan. What we need to do is to apply the only successful plan in human relations that has ever been devised, and that is a practical, every-day application of the Holy Scriptures. Back in the Garden of Eden the first industrial relations problem confronted man and the query was put then and has been ringing down the ages with many times an incorrect answer, "Am I my brother's keeper?" Until we can answer that affirmatively and give it practical application, we cannot hope for better industrial conditions. That sentiment was again announced by Solomon when he said, "A man that hath friends must shew himself friendly," and it has been again expressed since in its final form, and in the form that we must give practical application if industrial relations correctly applied will bring us to a successful goal, that "whatsoever ye would that men should do to you, do ye even so to them." When that plan has been worked out in industrial relations and is given a fair chance of application in American industry, we need have no fear of the results.

General Round-Table Session

September 28, 1920

FRANK E. MORRIS, Chairman

Secretary, Syracuse Safety Council, Syracuse, N. Y.

CHAIRMAN MORRIS: The subject of this meeting is "New Ways of Keeping Up Interest in Safety". The reason that we have so many baldheaded men here this morning is because they have been scratching their heads so hard to think of some new stunt to put over. I was in a plant just last week where the superintendent asked me, "Well, now after we have gone through all of this stuff that you have been talking about, what do we do next? We have had those committees, and we have had those bulletins. Now we want some new stunt to wake our fellows up." That is what we are going to hear about this morning—new ways of keeping up interest in safety. I want every man or lady that has some new stunt to get up and tell us what it is.

MR. THOMPSON (Eastman Kodak Company, Rochester, N. Y.): I assume that none of us is a presidential candidate and we can avoid generalities. I find that new ways of keeping up interest are easy to obtain providing you have plenty of friends among the employees. They will develop the new ways, maybe by a chance word in a conversation when the subject under discussion is not safety at all. You may be discussing politics or a new recipe for home rule. The safety engineer that can think out new ideas day after day, week after week, has got past his class altogether. He is a wonder. He should be either General Manager or in a museum.

When I speak of a department I do so with the thought that it is four walls containing brains enough to meet any situation. That is, provided you get them working. I haven't got the brain for continuous production of new ideas, and I don't need to have. I have an inexhaustible supply from the man on the job. The safety man's task is to select the useful ideas from the useless, and he has to be mighty diplomatic about it. We do get some dizzy ones, oh, boy! Some fellow will come along and give you an idea that would bust up the organization if you carried it into effect, and you have to be careful about that. Sometimes you will have a foreigner come to you and try to explain his idea in broken English. He may be a Pole, Swede, Russian, or a Democrat.

I wish my friends in the audience would use a little discretion. Priests, of course, that you can tell a safety man by the way he scratches

his head. Frank Morris has had long experience in safety engineering. Price's words gave me a new idea. When I see a man scratch his head I follow him around. He has either got an idea or he has got cooties.

One man spoke to me the other day casually and said he had thirty-two years' experience among dangerous machines and never had had an accident. That gave me the idea of giving our careful men all the praise possible in our bulletin service.

Another day at noon hour I heard the girls discussing a lingerie sale. You know how the conversation goes—from lingerie to shoes, from shoes to slipping and tripping hazards. We have had several accidents from high heels. French heels are all right for a ball or church or some social event, but they have no place in ordinary work. I would rather walk downstairs on a pair of roller skates than on a pair of those French heels. Did you ever notice that they are set in the middle of the foot, the idea being to give the foot a small appearance? If you take that shoe off you will sometimes find a great big hoof underneath, at least I am told so. If you put on the bulletin a nice picture of a high heel shoe with a neat foot in it, you will have no lack of interest.

I am fortunately placed so far as new ideas are concerned because if all else fails me, all I have to do is go and see Jack Robertson and I will come back loaded for bear.

I won't try to prove that we have got the best bunch of people in the world to work with. I frankly admit it. I would like to hear the next speaker and I hope he is a Democrat.

CHAIRMAN MORRIS: Major Thompson's recital of the different nationalities reminds me of the story about the fellow who started to work in the electric maintenance department of a company. He was working out one day and he went up a pole and came down arushin'.

GEORGE FALK (Henry L. Doherty Co., N. Y.): Some time ago, in fact it was last November, one of the natural gas companies with which I am connected, along with a few other companies and the company which insures all of them, started to put on a safety campaign. This campaign came just at the time when I was scheduled to be in another part of the country, and because of my inability to be on the job at the time of this campaign, I had to think up some other way to try to get the idea across to our men. You may know that the men in the natural gas field have practically all of their work outdoors, and so very seldom do they get in the shops or warehouses where our bulletins are displayed. I had to get some other way of getting the message to the men. I believe very thoroughly in the bulletin as a method of getting the safety idea across. I decided to get a bulletin to the men in their homes every day, and I arranged a series of them for each day of the week of that campaign. They were on ordinary government postal cards. Then I sent out a couple more as follow-ups. I heard favorable comments on these postal-card bulletins.

Then I set about arranging for a series of twenty-three to be sent out in the course of the year. Those are now being sent out every two weeks, that is one every two weeks. Most of them are printed on government postal card stock. They are worded as concisely as possible, and some of them have simply slogans or catch phrases on them. There are six

of them that are illustrated, some with photographs that I have taken myself of injured men or of damage done to property in our own plants. Others are illustrated with pictures which I got from the National Safety Council.

I am trying with these bulletins not only to reach the man himself, to get the safety message to him, but I am also trying to reach all the members of his family, for several reasons. First, I want the members of the family to realize that the man is in a dangerous occupation, and then they will get into the habit of saying to him the last thing before he leaves home, "Now you be careful", because I realize that the last thing that is said to a man by those at home has a tendency to stick in his mind, and if I can get them saying that I will feel that I have accomplished a good deal. Further than that, I want all the members of the men's families to get the safety message for their own sakes, and that is for two reasons. First, we want them naturally to be free from accident and free from sickness. These cards appeal to the men and to their families to avoid sickness as well as accident. We want them to be well and strong for their own sakes, but we also have another reason. We want them to be perfectly well so that they will not be on the minds of our men while they are at work, because if while a man is working or while he is on the job there is some one at home who is sick or injured, his mind is very apt to be on the condition of that suffering one, and he is very apt to do something that he would not ordinarily do or else neglect to take some precaution that he should take and so perhaps cause an accident or property damage.

I have heard some very favorable comments on this new series that I have gotten out and I really feel that we are accomplishing our purpose with them. If anybody else can get any good out of the idea I will be only too pleased.

ROY S. BONSB (Director, Industrial Bureau, Tanners' Council of the U. S. A., N. Y.): After several serious accidents, we found upon investigation that they were due to a quarrel that the man had with his wife before he went to work in the morning. Somehow or other, women have a great influence over men, and that force is not made use of by very many safety men—I mean they do not get the women interested in safety by having teas and the like. Get the women together on some afternoon, say, once a month, and tell them, in the way they can understand, the importance of keeping John on the job and sending John to work with a smile. It is also very important to let them see how John makes the daily bread. I have found through actual experience that it pays to get these women together and show them where their husbands work and under what conditions they work; get them and keep them interested in the safety of their husbands. That is a very simple thing. It doesn't cost much, and if you can have a reel of moving pictures and have your nurse or your doctor give them a little talk on hygiene, it gives them a very interesting afternoon and helps to reduce labor turnover and absenteeism because you have got the woman pushing the man along.

G. H. McCLAIN (Procter & Gamble Company, Cincinnati, Ohio): I remember that way back in my boyhood days I was told that there was noth-

Ninth Safety Congress

r the sun. I am inclined to believe that, but I do believe we e of the old things that we are well acquainted with and ound and get something that looks new. If it looks new it urpose.

sted in safety in our plant. This summer I thought I would g that hadn't been tried before. It wasn't new but it hadn't o I worked up a little competitive safety campaign. We contest among three of our plants. We advertised it and orms of publicity beforehand in order to get the employees cious seat, enthusiastic and waiting for it. I went down and silver loving cup and had photographs taken of it and we round, and in all sorts of ways we got them up on their ve started in on this contest with a bang on the first day of morning I would send out of my office a casualty list, or the all the plants and it was posted on the bulletin boards. Our ervice directors at various points used all sorts of ways to tion to it—flags and banners and special posters and things

Before those fellows knew it, they were very anxious to ulletin board to see who was going strongest among the three ore the end of the month came, those three plants made a of them went through without a lost-time accident, which usual, and no plant had done that before, which consequently e silver cup. The good work is still sticking with them. They ow to make it a good year on safety.

owed of another stunt that we pulled off one time with another h which I was connected. We rigged up a little display. You hat the psychology employed by window-trimmers in attract- s the use of something unusual, something instructive or edu- aething that is a bit out of the ordinary. We stop and look, op and look, then the fellow that trimmed that window has purpose, because that is what he wanted to do. We can use ychology of window-trimming in our plants on this question g in safety.

large number of punch-presses, and we also had a nice up-to- that wasn't being used to wrap up those fingers and stop in- [thought she should be, so I thought we would advertise the r, one in a negative way and the other in a positive way. I little room with several booths on one side. We used about a punch-presses in this exhibit. On the other side we had the same lay-out. We started along with a punch-press and ork. We had a man there actually. He was a wooden man a pretty fair man for a wooden man. The next booth showed with a cut on his finger. Next, the boy near him was wrap- with a dirty rag. The next booth showed this man's machine is cap hanging on it. That was the end of that series. The meant that the man was at home with his hand in a sling, note was there saying that he had been off the job four months stor had a difficult time saving his hand. Of course we drew gination.

On the other side we showed the same thing only the man, instead of letting his finger be wrapped up with a dirty rag, went directly to the nurse, was fixed up and was back on the job the next day. We wanted every man in the plant to see that demonstration. We invited them to come; they all went around and looked at it.

We had what we call a family week in the plant, and we invited every mother and child and near relative to come and see what "Dad" was doing on the job. We set aside certain afternoons continuously. We had a little party, the plant was all dressed up, and we had a regular time. At the end of this visit through the plant, which took up all afternoon practically, yours truly was there with his safety exhibit, and I talked to those women very seriously, as I can talk to women, and I impressed upon them this: That we did not have one-tenth the influence on those men that they had, that the management of the plant wanted to do everything that was legitimate and right, but unless we had their co-operation we couldn't do the job one hundred per cent effectively, and that they must do two things every morning when they sent their husbands to work: One was to be sure to tell him to be careful all day long.

CHAIRMAN MORRIS: I happen to know how well that stunt of McClain's worked out—using little manikins to illustrate what an accident can do to a fellow.

MR. OLCUTT (General Electric Company, Ft. Wayne, Ind.): I should like to tell you something about the "No-Accident Week" program that we put on over at Ft. Wayne last year. We conceived this idea: We had a man in the plant who was a pretty good comedian and a pretty good sort of fellow to make up. We went to him and said, "Will you work for us for a week in the safety game?" He said, "I'll be glad to." We laid out a program of action for him and advertised it quite well before we started by bulletin and especially by using this little scheme: Each day we put on the bulletin boards a question that was reasonably answered by no, but we used for the answer "n-a-w", which would be pronounced naw. No one of the employees knew what was coming; we had them all guessing. We put it on Monday and the first question was "Blue Monday?" And the answer was "Naw". They were all guessing what was coming. There had been a recent strike, and they said we were trying to rub it in because they lost out on the strike. We advertised each day with a slogan like that. The other advertising was taking pictures of what happened to our actor the day before. On Monday he appeared in the machine tool making department, made up as he was, about ten o'clock. He went up to a grinder to grind his knife. He didn't have on any goggles or any thing of that sort. It wasn't long until he had a severe eye case. One of the fellows said, "That fellow came in without any pass. We have to show our passes when we get in." They said, "He spoiled our record for the week." He was taken to the dispensary and doctored up.

The next day he appeared on the street where the traffic was severe and got run into. He had to be carried in and laid out. The following day he appeared in the carpenter shop and stepped on a nail. A carpenter thought it was a real case and actually pulled the nail out of his shoe.

The following day was probably the most interesting. This man had

pened to be minus two fingers, so we arranged a little bulb under his arm with some red ink in it, and he went around to the castings shop. There was a big colored man there handling castings, and while this fellow was handling the castings he let one fall. He had his fingers painted to look as though they had been cut off. The old colored man said, "My Gawd, but dat' awful!" He was doctored up. On Friday he limped around the plant on crutches with a sore eye and a sore foot and a couple of fingers off and he was about all in. He got into one of the testing departments and while he was monkeying around the high-tension switch he got a severe shock. Several of the men who had been trained on resuscitation grabbed him and began to work on him.

This fellow was a good actor, he was no ordinary fellow, and each day there appeared on the bulletin boards pictures of what had hapened. We kept a careful account of our accidents before that week and afterwards, and we found that our lost time for the week that we were on this campaign was a little less than one-third the average for the four previous weeks. That was in a plant employing little less than 6,000 people. The number of cases requiring surgical attention was reduced a little less than fifty-four per cent. We felt that we had really called to the attention of the men the fact that we could conduct that plant for a week without so many accidents and it proved that it isn't necessary to have as many accidents as most of us are having.

It seems to me the safety business is getting to be more and more a matter of advertising and education.

MR. SNYDER (Postum Cereal Company): We have been carrying on a safety drive in one of the auxilliary plants of our organization during the last month. We have been interested in finding a plan by which we could reach the employees daily to bring up the idea of safety. One thing that I thought of and carried out rather successfully was an illustrated poster—illustrated by actual photographs taken each day of serious conditions in the shop. We took these photographs, using for our subjects the men in the shops themselves. In one case a man was coming up in the elevator and he stood too close to one edge and got his shoulder caught. It was not serious, of course, but it might have caused a serious accident. I secured that man and took him to an elevator and had him pose for a picture. Each morning all the men in the plant came to the place where the poster was located and read the accounts of the accidents. Seeing the pictures, they would be impressed by the views of their fellow-workmen. All through the day, traveling up and down the elevators, wherever they were, they made remarks about how John got caught on the elevator. Of course that reminded everybody of it. Whenever we had an accident of any kind we always had a picture of that accident and by use of the men themselves as subjects we were able to create a great deal of interest.

Our pay roll is made in checks, and we send a little message around on the back of each check stating that they received that check because they were able to work.

Bulletins were often placed up stating that certain accidents might oc-

cur, and immediately the word went around that they had better be careful or a real accident of that kind might happen.

We had the doctor come around and on his little satchel was the wording, "Where is my trade going?" The idea was that carrying on a safety campaign brought such successful effects that the doctor had gone out of business.

The Committee was very successful in carrying on our safety drive for the month. I give a great deal of credit to the pictorial bulletin with actual photographs taken in the shop every day.

(The proceedings were interrupted by the entrance of Proto and Toto, the professional safety clowns.)

PROTO, THE SAFETY CLOWN: Our object is to go around to about 105 different schools in Milwaukee and suburbs for the purpose of teaching the children safety. We first touch upon crossing the streets, telling the children how to cross the streets, when to cross the streets, and where to cross the streets. Second, we warn them against playing with matches and fire, hopping vehicles, and we warn them against rusty nails, broken bottles and playing in the streets. We give them about a ten-minute talk in each school which is very effective, we think.

There is a set of poems that goes with these safety points.

Goops cross the streets with their eyes shut tight;
They never look to the left nor the right.
They hurry along and stub their toes
And often fall and break their nose.
Don't be a goop!

Goops play with matches and think it is fun,
Nor think of the danger until it's done.
They play with fire 'til it's too late,
So burnt hands and fingers are often their fate.
Don't be a goop!

Goops follow wagons and hang on behind;
They hop on street cars and never will mind.
They often get hurt in stealing a ride,
While some, we are told, are known to have died.
Don't be a goop!

Goops throw bottles out in the street;
They kick jagged tin cans out with their feet;
They leave old fence boards lying around
With rusty nails upturned in the ground.
Don't be a goop!

Goops will find that to play in the street
Is lots of danger to their tiny feet.
They coast and they skate and they frolic and play,
And often get hurt in that very way.
Don't be a goop!

Ninth Safety Congress

MORRIS: These two clowns are going around to all of the Milwaukee. If you can get the school child to go home and you are going to get that child's father and mother. You are able to reach the father in the plant, but if you can reach the child you will reach the father indirectly.

One stunt was worked in Syracuse, New York, before school summer. The author of the idea is Mr. Frank Redmond of Syracuse and he is going to put it on in three short minutes.

REDMOND (Solvay Process and Semet-Solvay Companies, Syracuse): I am going to talk to you just as I do to a room full of children.

How many children here know how to spell safety. Hands everybody that knows how to spell safety. I want to show you a way of spelling safety, so I want to get the boys here this morning to spell the word for me letter by letter. What is the first letter?

There is the 's.' (Drawing on board.) "Now, what is the second letter?"

the 'a'. The third letter?"

fourth letter?"

last letter?"

What is the last letter?"

When he completed drawing was the head of a woman, obviously a mother.)

MORRIS: I want to tell you that that took pretty good with the children in Syracuse. Mr. Redmond gave us about ten days of his time to go from one school to another, and we got a great deal of favorable comment from the children to the parents.

BREADY (Assistant Instructor, Service and Safety, Pennsylvania Railroad, Wilmington, Del.): We have had for years, on the Southern Division of the Pennsylvania Railroad, a practice of visiting all schools in that division and talking to the students. We used an organization, which is perhaps not known to all of the members present, which is active in the state of Delaware, known as the Parent-Teachers Association. The teachers of the schools met once a month and the parents of all students of the schools who wished to attend. It was the practice to have a safety representative present at that teachers' meeting. The railroad has encouraged it and has done much to enlarge the movement. They think that the future is a matter of getting the new generation to grow up in the habit of being so careful so that they will be naturally as careful as they are polite in giving their caps to a lady on the street. Things can be done with the present generation although they are set in their ways. But the great thing is to get the parents

to talk to children because they will have more effect than a representative whom they do not know who comes to their school and talks to them. We believe if that movement of the Parent-Teachers' Association could be spread in every state through which the railroad passes, it would be an excellent step in the right direction.

CHAIRMAN MORRIS: It is very fine to have the parents talk safety to the children, but my experience has been that something a little finer is to have the teacher tell it to the children. I can tell my boys things in the family that don't get over, but let the teacher tell them and it is all right. "It must be so, the teacher said it was so." If you can work it both ways, it is all the better.

GROVER G. KINGSLEY (Halcomb Steel Company, Syracuse, N. Y.): We pulled off a little stunt in Syracuse which will probably be a permanent thing, judging from the success it has had. There are two plants situated side by side, the operations of which are identical. Therefore, the hazards are practically the same. We have put on a safety contest between those two plants. Each plant has a separate committee, the organization of which is the same. The contest runs for six months, and at the end of that time the losing side has to pay for half the cost of the dinners for the winning side. The company pays the other half because the men will realize that there is a distinct benefit coming to the company and the company wants to recognize it in that way. The prize is the free dinner to the winning side.

In publishing a record for this contest we have what we call a "Who's Who in Safety." The accidents in our plant are charged directly to the foremen, because we believe and the foremen have been educated to believe before the contest started, that accident prevention is their job, or at least part of their job. We publish the names of all the foremen in the plant who have gone through the entire month without a loss by an accident, and under the comic phrase, "Those who spilled the beans," are the names of the foremen who did not go through the month without a lost-time accident. We have gotten very good results from this method despite the fact that there has been some bad experience in other plants, some fellows claim, in regard to publishing names.

MR. C. B. BARTLETT (Geuder, Paeschke & Frey, Milwaukee, Wis.): I am secretary of the general safety committee of our plant. I am also chief production man. Now we have just made a record of 104 days in the punch-press department without an accident of any kind. We just closed the week from September 17 to September 24 without an accident of any kind in a plant of 1,350 people working 800 machines.

There is one thing I want to get over. If there is anything at all worth while in the plant it is production. Our output during that record without accidents is the highest in our history. Our safety committeemen throughout the plant are foremen. You never get a safe shop until you get your foremen to recognize that a productive machine must be a safe machine and a productive man is the man who is a safe man.

The first thing that a man gets when he reaches our shop for a new job is a letter from the president on safety work. The second thing that happens when he goes to the job is that the foreman explains how to run

the machine he is to work on. The third thing is to have a fellow watch him; and the fourth is that he is fired if he doesn't keep that machine safe. Even through the troubles of these last months with all of the production difficulties that we have been laboring under, that plan has been carried out. The first thing you have to establish in any shop to have it safe is that the boss means business.

In our shop we have forty bulletin boards up, and the thing that heads those bulletin boards is "Universal Safety", the National Safety Council emblem.

We have got to get down and play true with our people. We are playing universal safety not for a sentimental reason. I am not decrying sentiment, but there is something else. We are universally safe for the simple and sole reason that it is good business to the man, to the company, and to the community. If you men who are general safety committeemen can go back and get more of that thing into your plants, you are going to have more success in your work than you have ever had before.

CHAIRMAN MORRIS: How many men in that punch-press department?

MR. BARTLETT: We have 150 punch-presses and 100 draw-presses. We went 104 days without a scratch, and we had the best production in our history.

MR. STRICKLAND (N. Y. and Queens Electric Light & Power Co.): Since the subject of sentiment was touched upon, I would like to speak for just a moment on that. We have in connection with our work the Employees' Association where the men can come once a month and see, for deflection, a little entertainment and have cigars and shake hands with friends. I think that sentiment has an awful lot to do with safety.

MR. CORR (Hocking Valley Railroad): It may be interesting for you to know that while the safety agent is in Milwaukee we have a safety run. It seems strange that we should pick out a time when the safety agent is going to be away to have a safety drive. There is a reason, and the reason is this: I have found on our railroad that there was some inclination to look at safety matters and put them in this category: "Oh, well, that's the safety agent's job." So we are trying a new idea (perhaps it isn't new to some of you)—a safety drive with which the safety agent has nothing to do whatsoever with the exception of checking up and seeing what the foremen are doing.

We had a conference with our general manager and his staff. We tried a salesmanship game. We tried to resell the safety idea to those members of his staff. Those men on the staff then went to their subordinates and said, "We are going to conduct a safety drive." They went into it and explained it.

There are two things that are causing accidents on our roads. One is defective equipment or defective conditions. That is the safety agent's job to get rid of it. The other is unsafe practices, which is responsible for about eighty-five per cent of our accidents, and I believe that about seventy per cent of the eighty-five is due to lack of discipline and supervision. For instance, I get a report in my office of a section man who is injured while getting on a moving motor car from the side or the front. The rules require that man to get on in the rear. I do not hold him re-

sponsible for the accident, but a tracer of the report goes out and by the time he has got that injury report filled out, he has indicted himself. The foreman is absolutely responsible for the accident, because he didn't hold that man to the rules or discipline him beforehand.

I went into a shop some time ago where a man was injured by having a tire slip on a rod and burn him very badly. I went to the general foreman of that plant and I said, "How about this accident of John Smith?" He said, "The poor fellow ought to have been burned worse than he was." Over in that shop we have a long rod, which has a crook in the center and the men carry the tire on that crook. These fellows were using a straight rod or bar with no crook; the tire slipped down and burned one of the men on the wrist. Investigation of that case proved that the foreman in that plant had permitted the men for six months to use a straight bar, and the man who was injured was not accountable for that injury or accident. It was due to lack of discipline and supervision. We are trying to sell the safety idea from the top to the bottom in our organization, not from the bottom up to the top.

MR. L. A. DEBLOIS (Manager, Safety Section, E. I. du Pont de Nemours & Company, Wilmington, Del.): Mr. Chairman, I think this is an excellent time to drive home harder the principal point that the last speaker made. We saw, some of us, yesterday a motion picture film, and in one of its captions it said that ninety per cent of all accidents are caused by carelessness. The average safety man starts out first with the idea that eighty to ninety per cent of accidents are caused by the carelessness of employees. In my opinion there isn't a single precept in the whole safety movement that has done as much harm as that. If you are going to cure your wife from the habit of chewing gum you don't start by telling her that her nose is crooked. It is wrong to start your men by telling them they are responsible for the accidents.

In our own analysis, half the accidents at least that we attribute to carelessness of our men, or formerly attributed to carelessness of our men, are due absolutely to either the carelessness of the foremen or the carelessness of the management. I say management because the management is itself responsible for the discipline exercised by the foremen. The foremen are the agents of the management.

Our troubles today are not so much the troubles of the carelessness of the men as troubles of lack of supervision, and they are laid right at our own doors. If we can do one thing in the safety movement that would mean more than anything else it would be to teach new men who are coming into the safety game—I suppose there are hundreds here—not to go at the men and blame them for the accidents. Begin, as the last speaker said, from the top and work downward. Cure the faults of the management, cure the faults of lack of supervision, and assume at once that safety is a part of the productive effort of that plant and that if productive effort is without the safety effort, then the management is falling down.

MR. AL KROES (Employers Mutual Liability Insurance Company): The foremen of today are looked upon as the fellows to push safety. That may be all right. We all have been taught that the foreman should be a

real safety enthusiast, but I am here to tell you that some of them are still in a state of coma. I wish that every foreman and every superintendent could have heard Mr. Dow's eloquent address on safety service from the heart, because that, in my opinion, is the real solution of the problem.

I have been engaged by my company in a moving picture campaign which has been very successful. I have been in about forty-seven cities in this state and Minnesota and I have reached about 110,000 people. I tell you those safety entertainments are well received. To give them one must not only have a reel of moving pictures, but some one with a little pep must be there to put enthusiasm into the fellows. He must not always talk about the employee being careless; he must bring in the foreman a bit and show the men they are not the only ones responsible for safety. Safety is an abstract proposition to them. They can't see it and we must do something to make it attractive to them.

MR. C. W. PRICE (General Manager, National Safety Council): In line with this thought, I would like to say that in going about the country I find two things are complained about by various safety engineers in regard to what ails the safety movement in their plants. One is, "How can we work up interest?" That is in a plant where they do not know anything about it. But among plants where they have done safety work and have been doing it possibly for five years, they often say, "How can we keep up interest in the thing? It seems to be lagging. How can we put some new pep into it?"

This story is a partial answer to that question. In the McKeesport plant of the National Tool Company, near Pittsburgh, is a man by the name of Cornelius. He is the general manager of that plant. Cornelius every month goes down into the departments, stands up on a block and says, "Men, during the past thirty days the following have been injured," giving their names. If there is a serious injury he spends some time describing it. "So much time has been lost by you men in this department. So much has been lost in wages. So much money was lost by the company. Now, boys, that money doesn't mean anything to the company. It didn't hurt us a bit. We don't go without a single meal. Our children don't go without any new dresses, but that loss means everything to the men that were injured. That man that lost his eye is going to lose three months time. It means a great deal to his family. I want to say to you as the general manager of this plant that the company is willing to go the limit in spending money to keep you men from being injured, if you boys will come with us."

Do you know what that has done? That has put new enthusiasm, new spirit into that organization which has been doing safety work for years, and it has made a remarkable record in reducing accidents.

MR. BARTLETT: I would like to tell you what we did when we had the last accident that happened in the shop. It happened about eleven o'clock in the morning. We went out, pulled the switches on all the motors, shut the department down, took the superintendent, the general superintendent, (the chief office man wasn't there or he would have been present) and went out and called all the men together. We called them

out on the floor, took them to the machine, showed them what caused the accident (which was due to pure carelessness) and told them we were proud of what they had done but we never could make a one hundred per cent safety record unless they did their part.

MR. SATTERFIELD (C. & O. R. R.): Consider the employees in our industries and on our railroads. Does the old employee, the veteran employee, take the same interest and pride in teaching the new element in the industrial world and in the railroad line that he would have you take in teaching his boy?

I haven't yet forgotten the days when I attended school, and if I sat behind a boy older than myself who could dodge the instructions of the teacher, he encouraged me very much to do the same. The same is true, as I see it, in the school of safety.

MISS NESTA EDWARDS (Menasha Woodenware Co., Menasha, Wis.): I feel sorry for anybody that gets kicked around. Here is a poor engineer trying to get safeguards and sometimes he cannot get authority to install certain guards. Why fuss and row with the foreman or the superintendent? Simply go to the Vice-President of the firm and say, "See here, we can't agree. He won't give in and I won't give in. What are you going to do about it?" Make him be the judge; he is the man back of the institution. If he says it is unnecessary to guard the machines, let him say "Unnecessary by order of Tim Jones, Vice-President." Then you can say, "All right, if we have an accident we will give you this." That was done in a certain firm that I know of and that Vice-President said, "Hold on! I don't know that I want to sign my name to an order like that." You can get them to come around that way.

MR. GORDON HALL (Michigan Mutual Liability Company): We have been conducting motion picture shows in twenty-seven plants by means of a portable projector. We cover up the windows and use a cloth screen 6'x8'. We catch the men at noon during their lunch hour. We precede the pictures with a five-minute talk on accident prevention and show the relative standing between the various departments. We have shown the pictures to 15,200 men. In thirty to sixty days after we started this showing, a general reduction of fifteen per cent in accidents was the effect. Whether that was luck or the result of personal education of the individual man on the job remains to be seen after we have conducted a series of additional pictures covering a longer period of time. I believe in getting the man on the job.

MR. HEIST (National Cash Register Co., Dayton, Ohio): As soon as an employee begins work, we give him an illustrated lecture on health and safety. I use about one hundred slides in that lecture and by teaching through the eye we reach the employee in a way that it would be impossible to reach him in any other way.

We get such results as this: Employees who come away from those lectures send us suggestions and criticisms on our methods of protection for the health and safety of the employees. We receive a number of them in our hygiene department for attention to cuts and bruises before they start their work, after they have attended one of those lectures.

MR. ISAIAH HALE (Safety Superintendent, Atchison, Topeka & Santa

Fe Railroad, Topeka, Kans.): So far as a new idea goes, I arise here only to hark back to Mr. Cott's remarks about supervision. If I believed in theosophy, it would be very easy for me to believe that at some former period we were all sheep, or some of us goats, and to that extent we are still following our leaders. We have no right to expect any one else to be any more interested than we are. I want to remind you, if you are going home from here determined to put on this supervision as a stunt, you must remember that there is more than one horn to that dilemma.

A few weeks ago I was riding on one of our trains, and coming into a town about eight o'clock at night I saw two Mexican laborers lying between the tracks asleep. One had his head resting against the elevation of the track and the other actually had his head on the track. The flagman 200 feet away gave not a thought to going over and exercising a certain supervision over those poor devils that had grown up like Topsy—without any training or home influence and had never been taught anything. I went on to the end of my trip and got there at six o'clock in the morning. I went over to see if I had a message. In the meantime I had stopped at the first division point about nine o'clock at night and called the superintendent's chief clerk and asked him, when that flagman came in, to call him in and remind him that he overlooked a wonderful chance to do some good to some poor fellow who needed it. The first message that was handed to me was a telegram from the superintendent that extras 3508 and 3118 had run over and killed two Mexicans asleep on the track, simply proving that the bard was right when he said that "man's inhumanity to man makes countless thousands mourn." Don't forget the individual man's responsibility as a supervising officer.

MR. CLAWSON (Pennsylvania Lines, Dallyport, Pa.): I used to talk sentiment and everybody used to yell, "Hot air!" But there is something in sentiment. However, if you show a man that he is losing money he will get on the job. Some of our companies do not realize that, but if you show them where they are losing money, they will get busy right away. Show a workman where he is losing money, and he will also get busy. So that amounts to more than sentiment. You want to cut out some of that sentimental stuff and show practical figures. We worked the sentiment game, we worked the moving picture game, we worked a lot of those different games, but as soon as we showed them where they were losing money they tightened up immediately.

MR. RAWLINGS (Oregon Short Line, Utah): We have had some trouble getting men to wear goggles in our shop. I started in the other day by getting a little box which people keep their glasses in at night. I had it tastefully decorated on the front with "Safety First". When I found a man grinding without his goggles, I immediately took him to this little box and let him open it and then I asked him what he thought about the glass eyes for color. In many cases it wouldn't quite do. Then I told him that we were having a lot of trouble getting the right shade of glasses to fit the men. It has done more good than anything I have been able to do in the shop to get the men to wear their goggles.

MR. FREE (E. I. du Pont de Nemours & Co., Wilmington, Del.): The first of last March we started something that may not be new to you,

but it retained the interest of the foremen and the men. We made a record of every minor accident as well as the more serious ones, the department in which it occurred, the foreman under whom it occurred, and the man to whom it occurred. That record was mimeographed and sent to the foreman each day. We do that now. It shows how the accident could have been prevented.

MR. STRICKLAND: I am going to tell you what I think of the value of continuing education in safety, and I am going to give you just a reason. Recently our company decided that owing to the unrest of the times and the shortage of help, we would cut out the safety meetings during the summer months, and we did it. We also cut out our general safety meetings, with the result that we felt it in a very marked degree.

MR. SUMMAY (American Car & Foundry Co., Chicago): During the winter months in Chicago we have the Local Safety Council to help us out; they give banquets. I went to our manager and asked him if I could take the foremen down there to attend one of those banquets. He said, "It will cost a good deal of money, won't it?" I said, "When you get anything that is good you have to pay for it." The foreman doesn't know what a good thing is yet. The result is that they haven't gone any further than they have. We took thirty-four of our foremen down to that banquet, and the next day we had the unanimous opinion from those men that it was one of the best things they had ever seen. It was something new to them. It cost a little money, but during the month our accidents decreased about fifty per cent and our production increased by a large percentage.

MR. E. C. CARPENTER (Northern Ohio Traction & Light Co.): Just prior to our annual picnic we were having a good deal of trouble in lighting accidents. We had photographs taken of men violating orders. At that annual picnic we showed the pictures of those men with their cars. We had the pictures flashed on the screen. The other boys never got through kidding those fellows and we had a decided improvement in the records.

CHAIRMAN MORRIS: The question often comes up as to whether those fellows resent that.

MR. CARPENTER: No, they didn't, and they improved their conduct very much.

MR. J. D. JAMES (New Jersey Zinc Company, Franklin, N. J.): I have heard a good deal about the different ways and methods of conducting safety first movements. We have tried all kinds of schemes in carrying on this work in the last nine years. We have put guards all around dangerous places, covered all belts, pulleys and so forth, and we are far from getting good results, at least from getting the results we want. We have bulletin boards and we have departmental boards with the names of the foremen. We show a record of every accident that happens to each foreman in the plant. The foreman in direct charge of the department where the accident occurred has to give an account and offer some reason for the accident. In that way we hold the action down to the foreman.

We had some difficulty in getting the men to wear goggles. We got

after the foremen to see if they couldn't induce the men to wear their goggles. The men would put their goggles in their pockets instead of using them when they should. The foreman tried different kinds of goggles, giving the men different kinds all around and passing the goggles around to see which suited the best. They decided on one kind and the fellow that had that kind wouldn't let the other fellows try it at all because he wanted them himself and would use them. The other fellows said, "If you get goggles for us like that fellow has we will wear them." We got those goggles and now the first thing the men do in the morning is put the goggles right on.

MR. R. A. SHAW (Ford Motor Co., Detroit): If you don't want to use a man's picture or name in connection with an accident, take the tools he used and put them on the bulletin board. If a glove got caught in a machine you can put the glove on the bulletin. These fellows will figure out the matter for themselves. It is a silent teacher. They will talk about it among themselves and that will drive the lesson home.

ADJOURNMENT.

A, B, C Session

September 28, 1920

SIDNEY J. WILLIAMS, Chairman
Secretary and Chief Engineer, National Safety Council
Chicago

CHAIRMAN WILLIAMS: Most of you men remember that for the last two years the Council has been putting on at the Annual Congress what we call an A, B, C session. The idea was that the various sections are getting more and more specialized along their technical lines, and there ought to be a chance somewhere on the Congress program for the new man in safety to start right at the bottom and learn the four or five essential things that experience has worked out as being necessary in every safety organization. So we put on these sessions in St. Louis, last year in Cleveland, and here today. We find that not only the new men come, but there seems to be some powerful attraction that brings a lot of the old-timers back here to hear the gospel again. I am really not surprised because I am absolutely serious when I say that I don't think there is another program in this Annual Congress or any other that has such a combination of men that know the safety game from the bottom up as Bill Worth, Frank Morris, George Fonda, Tom McKenney, and Dave Beyer. They are all headliners.

Mr. Worth will talk to you first on "The Essentials of a Plant Safety Organization."

W. E. WORTH (International Harvester Company, Chicago): In the essentials of safety organization (and I prefer that term rather than "plant safety organization"), I tried to find out what the essentials really were. I discovered this morning that I overlooked one and that was this community or mass singing. It is not included in my paper, which I have written by the way, because in attempting to approach the subject from a new view-point I thought I might miss something, but I want to add now that item of singing. I think it is a great thing.

THE ESSENTIALS OF A PLANT SAFETY ORGANIZATION

**W. E. WORTH, ASSISTANT MANAGER, INDUSTRIAL RELATIONS,
INTERNATIONAL HARVESTER COMPANY, CHICAGO**

As only fifteen minutes have been assigned for the presentation of this subject, we will attempt to put before you in a comprehensive man-

ner the prime essentials of a safety organization as they appeal to the speaker after many years of experiment.

Let us first agree that this discussion will apply to any safety organization, regardless of whether it is a factory, railroad, mine, or other unit of our complex industrial scheme.

SEVEN PRIME ESSENTIALS

Webster defines essential as "constituting or making that which is most important in a thing". Our question therefore is—what are the most important things in a safety organization? To the speaker, there appears seven prime essentials, and they are given in the order of their importance, namely:

1. A sincere desire on the part of the management to reduce accidents
2. A willingness by the management to spend sufficient money intelligently to achieve results
3. A realization by the management that constant and intelligent effort is necessary
4. A man supervising the work who truly believes a safer operation is possible
5. An organized group of superintendents, foremen, and workmen, all working to a common end
6. A definite policy and procedure adopted by management and men, and that policy and procedure adhered to
7. Unflagging enthusiasm

If these seven prime essentials are accepted as a basis for your conduct, the mechanics of organization can readily be determined. Briefly, these are:

Committees of foremen and workmen, organized for the sole purpose of assisting in carrying on the safety propaganda. These committees should meet at stated intervals to discuss accidents and ways and means of prevention. Considerable discussion in the past has not settled the question of whether there should be joint committees of foremen and workmen, or independent committees. Either will produce results.

Plant inspection by committees. The committees should be given the privilege of making inspections (either jointly or independently) for the purpose of determining the possibilities of improvement in the methods of operation. Many valuable suggestions are received through the medium of these committees.

The work of the safety organization should be based on standards. Have a proper standard for men, methods, and machinery. From lack of proper standards arise accidents.

There is a cause for every accident. Find it. If men, educate them; if methods, correct them; if machinery, surround with proper safeguards. It is very important that you devote considerable time to these three factors. Regardless of the enthusiasm you may arouse for safety work,

if the three above mentioned factors are not controlled, definite results cannot be had.

Educate the foremen as well as the workmen. The foreman is your mainstay in accident prevention. (I shall not dwell on this important factor as it is the subject of the next speaker.)

THE NEW MAN

In the process of education of the workmen, particular attention should be given to the new man. He should be given a thorough schooling in safe practices by the foreman or one of the older employees in his department. Too much attention cannot be given to this work.

An analysis of the personal injuries and damages to machinery will show (at least it has been my experience) that a very large percentage of the cost is the result of failure thoroughly to instruct and introduce the new employee.

Safety committees should have as members men who understand the various languages spoken in the plant, thereby conveying what you are trying to accomplish by spoken word to all the employees. Creating enthusiasm for safety work among those employees who do not speak the English language is of very great importance. When once they are convinced that here is a service which will benefit them personally, it is surprising the results that can be obtained and the suggestions which they will make. For that reason, it is, as before stated, very important that you have competent men speaking foreign languages on safety committees.

Bulletins should be interesting and easily understood. In addition to the bulletins which you receive from the National Safety Council, you can well afford to give considerable thought and time to devising bulletins of local and plant interest. Make these bulletins dignified and illustrate them in a way that is effective.

Safety signs should be liberally used. Make the wording brief and give it a "punch". The argument may be advanced that these signs are not read. The fact remains, however, that the secret of advertising is repetition. A multiplicity of signs results in a continuous affirmation of the importance of playing safe. Affirmation and repetition result in contagion. It is therefore important to use as many signs as consistent.

Every practical suggestion should be put into effect. If a suggestion is not used, it will pay you to spend sufficient time properly to explain the reason. If it is not convenient personally to explain to the employee, then an acknowledgment of the suggestion and an explanation should be made by letter. However, it is much more satisfactory to discuss the matter personally with the man. An employee will very soon discontinue making suggestions if he is not acquainted with the fact that his suggestion has been considered. On the other hand, if the suggestion is acknowledged even though not used, it will be an inspiration to make suggestions in the hope that some day he will make one that is practical.

Comparative statements of injuries can be used to great advantage in creating departmental or works competition. There has been considerable discussion in the past as to the basis for computing these statements. That, however, is a matter which should be worked out to the best advantage in your particular industry and condition. If it produces the desired result, the method of computing the statistics is immaterial.

Every accident, particularly those of a serious nature, should be thoroughly investigated and the cause determined. Accidents which are the result of the failure of men, material, or methods, should be brought to the attention of those concerned, and wherever possible bulletins should be issued telling the cause and how the accident might have been prevented.

Solicit the assistance of the folks at home, the principals, teachers, and children in the school, and of the community as a whole. The work within the plant is materially affected by the conditions existing outside the plant. You can well afford to give a reasonable amount of time to the education of the citizens in your community. This will be reflected in the conduct of the men in the plant.

Continually bring to the attention of your employees that it is not necessary and is very foolish to take a chance. The chronic chance-taker should not be allowed to associate with men and women who are making a conscientious effort for a safer operation.

Diversify your methods of appeal. If it is true that "variety is the spice of life", so also is it true that variety maintains enthusiasm in this work. At no time can the organization charged with the responsibility of a safer operation consider that they have reduced accidents to a minimum. You must keep everlastingly at the work.

HOW TO ADVISE THE MANAGEMENT

Behind the mechanics of a safety organization there lies the spirit of the movement. Your manager is primarily interested in producing a profit out of the business and he is a busy man. It is your duty, therefore, to keep him advised by means of proper statistics and reports of the benefits arising from this organized effort to make your plant a safe place in which to work. Keep him advised of the human side of the work. The benefits therein are numerous and unending. You must ever maintain in him a sincere desire to reduce accidents. Show him the importance of spending money to safeguard dangerous places and correct improper practices. We have not time here to go into details as to how this can be done. Your good judgment must guide you.

Demonstrate to the management the need of constant effort—"Eternal vigilance is the price of safety". You, or whoever may be supervising the safety work, must absolutely believe in the work, and maintain your own enthusiasm as well as the enthusiasm of your co-workers. Keep your supervisory group working for a given result. Running around in a circle may be good exercise, but we get nowhere. It is therefore neces-

sary to give them a definite goal for achievement. If the goal is reached you can always set a new mark.

Give careful thought to your policy and procedure. Once adopted, follow through, changing it only when you are convinced the change will mean improvement. There are many ways of maintaining enthusiasm. You can develop them out of your experience, but enthusiasm *must* be constant.

The men who are making the goods that pay the wages and produce a profit necessarily give first thought to production. You can best serve them, therefore, by acting as their advisor and standing ready to serve. By so doing and by making constructive suggestions as to safe practices, you can build a safety organization that will produce the desired result—namely, a minimum of accidents by a safer operation without interference to production.

THE FOREMAN—THE DETERMINING FACTOR

FRANK E. MORRIS, SECRETARY, SYRACUSE SAFETY COUNCIL, SYRACUSE, N. Y.

I think we are all agreed that the foreman is the determining factor. If he is not in the plant where you are working, then I think your first job is to go back home and sell the big boss, the man at the top. In the other session which we just held previous to this meeting, it was very clearly pointed out that if the big boss was sold on this proposition, the foreman would be the determining factor.

Why is it that the foreman is the determining factor in this safety work? As I see it, it is mainly because the foreman, to the worker, is the company. We cannot appeal to the foreman in the same way that we can appeal to the worker in this safety game, because the foreman is not the man who gets hurt. We have got to appeal to the foreman from another angle entirely. Assuming that the big boss has not put it up to him to prevent accidents in his department, let's further assume that the big boss is not completely sold himself; then you have to sell the foreman and the big boss, first the big boss. You approach the foreman at an entirely different angle; you have got to appeal to his pride in leadership.

One man told us in this other session this morning that when his employers had their biggest production records, they had their best safety records. We ought to be able to take those figures home and show them to our foremen and convince them that if they will have a safe department they can get out more production.

TO THE WORKER, THE FOREMAN IS THE COMPANY

The foreman is the man who tells the worker, the fellow who works with his hands and the fellow who gets hurt, what to do. To the worker, he is the company.

Suppose the company is giving away wood. How is John Jones down

here in the machine shop going to get a load of wood? He goes to his foreman and gets an order for it from the company. If the foreman tells John Jones that he has got to work safely, he has got to be a careful worker, that, to John Jones, is the company's command and he is going to listen.

What are some of the reasons, aside from that, why we must sell this idea to the foreman? We have various figures quoted this week as to how many accidents are due to carelessness of the worker, carelessness of the management and so on, but let's say, just for the sake of argument here, that fifty per cent of accidents that happen in industry are due to lack of education of the worker. The worker doesn't know how to work carefully. Now to convert the worker who is a careless man to be a careful man is no small job. It is easy enough for the children to learn and that is why nowadays we are giving so much attention to the children in the schools, because if we can't get these hard-shells, these rough-necks in the plants, to think of their safety so that they will be careful workers, perhaps we can get the children to be safety scouts and grow up to be careful workmen in fifteen years from now, and then we will have a group of careful workmen. It is a hard job to convert a man who is old enough to go to work in your plant to a new line of thought. If he has been working carelessly all his life or playing carelessly, as the case may be, he is going to work carelessly in your shop because his mind is fixed that way. Habit has got a grip on him, and habits are not easy to break in a man who is old enough to go to work in a plant.

We can guard against some of the accidents, but we will say that fifty per cent of the accidents must be prevented by education. Now who is going to do the educating? The safety engineer? The safety committee? Are you going to bring in somebody from some university to have them teach your men carefulness? You could get the president of Wisconsin University down here into some Milwaukee shop, but he might not be a success at teaching safety to the workers. The educator must have certain qualities; he must be persistent; he must be industrious; he must be resourceful; he must be patient; he must be a leader; and he must know his men. You can't pick out a successful educator in any college in the country that hasn't all of those qualifications.

When you come to analyze your foreman, you will find that he possesses every one of those qualifications; otherwise he would not be a successful foreman. Therefore, the foreman is the man in your plant to do the educating. He is the only man who is constantly on the job. You can't do it, you are not there every day, and he is the only man in the department who knows who the careless fellows are. You go into that shop and start your safety propaganda and you are working on every man in the shop, but every man in the shop doesn't need your close attention. There are just a few of these hard-shells in there that you have got to convert. The foreman knows who those men are. He is the one to do the educating. He cannot pass the buck to the safety engineer, to the safety committee or anybody else. It is right up to that foreman to prevent accidents in his department.

WHY WORKMEN WILL FOLLOW THE FOREMEN

Why is it that the men will follow the foreman's lead on this safety proposition? In the first place, as I say, he is, to the worker, the company, and the worker wants to keep his job. Let's assume that he is satisfied with his job and he wants to stay with the company. Therefore, he is going to do as he thinks the company would like to have him do, not only in the way he does his work, in getting out the production, but he is also going to do it safely if the foreman impresses upon him that that is the way he wants it done. Another reason that a worker will follow the foreman is that the worker wants to excel. When the worker goes through the plant gate, goes through the clock house and punches that card, from that time on, to his mind at least, he is only a member of that organization, he is one of a great mass of workers, and it is his ambition to stand out somewhere, to excel, to stick his head above the crowd so that the rest of the fellows will notice him. That, by the way, is one reason why shop safety committees are so successful—the men do stand out. The worker is going to follow the foreman's lead because of that fact. He wants to come up above the crowd; he is anxious to excel.

Another reason that the worker will follow the foreman's lead in this safety game is this: Because it is so easy, in doing anything in a new way, to imitate somebody else. The word goes around the shop that they are going to have safety in that shop. "Well, that is something new to us, but we will watch the boss and see what he does." Imitation is the easiest way to do any new thing. I dare say that less than half the men in this audience have ever developed a brand new way of doing anything. When we have got something new to do, we look around us and try to see some other fellow doing it so we can see an easy way to take it on. You know some of us are called apes—we do so much of that. This question of evolution, going back to the monkey stage, is one that creates a lot of discussion, but you know the monkeys are the greatest imitators in the world.

I am reminded of a story here. This question of evolution was up at school and a little girl came home and told her mother what was going on. Her mother said, "Well, you don't believe we were monkeys a little while back, do you?" The little girl said, "Well, I don't know whether I believe it or not, but I told the teacher that I heard pa say the other day that you had made a monkey out of him."

If the worker gets this new idea that he has to work from now on in a careful way, he is going to watch the foreman to see what this careful way is. He is going to imitate him.

THE MODERN FOREMAN IS A FRIEND OF THE WORKMAN

Another reason, and I think it is the best one, is that the up-to-date foreman can get his men to work carefully because they are friends of his. As I get older and more bald, and as I study this proposition more

and more, I think that this is one of the strongest points that a foreman has, and he ought to work harder at it. If he is the real, sure-enough, honest-to-God human being that he ought to be, his men will go to hell and back for him.

I have in mind a certain foreman. He comes down in the shop in the morning and he goes down the line. He walks up to the fellow at the lathe and he says, "Charlie, how's the baby this morning? Wife getting along all right?" He says to another fellow, "You're a fine fisherman! Where are those fish you were going to bring me this morning?" On the way back through the shop he stops by old George who has been there a long time. Old George's greatest friend is his old dog. The foreman stops and says, "Have you found your dog yet?" He knows what is worrying old George the most. If a foreman like that lets the word go around in his shop that from that time on his shop is going to be a safe shop, they will all turn in and plug for the proposition because they are friends of the boss.

If I had my choice between a shop that had safe foremen and no guards at all and a shop that was completely guarded and the foremen were lukewarm on this safety proposition, I would take the shop where the foremen were absolutely sold on the safety idea.

HOW TO PROMOTE SAFETY EDUCATION IN A PLANT

GEORGE T. FONDA, GENERAL SUPERVISOR, EMPLOYMENT, COMPENSATION, AND WELFARE, BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

The object of these "A B C Sessions" is obviously to obtain an exchange of ideas among those of us who may have had the opportunity to make observations over a little longer period than some of the others of us. Some of us have been fortunate or unfortunate, depending upon your point of view, to have been in contact with a large variety of the problems which present themselves to all comers in the "Safety Game." If we will give each other our personal experiences, perhaps a stray thought may take root here and there and bear fruit.

In the promotion of safety education in any plant I believe that the first principle which must be practiced by those responsible for the results to be accomplished, is a thorough and complete belief in what is to be accomplished. If those responsible for the safety program in any organization are true believers in their work and do their work conscientiously, much will be accomplished which otherwise would be almost impossible.

You recall the story of Tom Sawyer, who was told to white-wash the fence, and then the gang came along and tried to persuade him to drop the job and go along to the swimming hole. Tom told the gang that he had this important job to do; that nobody else could be trusted to handle it, and proceeded to white-wash rail after rail, standing back and admiring the work and assuming an air of importance. In a very short time all of the boys were interested in the job and had forgotten all about the

swimming hole. Bribes of various kinds started coming thick and fast and soon Tom had an assortment of apples, tops and marbles for the privilege of allowing the gang to white-wash the fence. The work was accomplished easily while Tom looked on, all because of the fact that he believed in his job and was able to sell the idea to the gang.

This story of Mark Twain's illustrates a principle which we can never get away from in promoting Safety.

With the proper foundation established there are other things which follow and let us analyze for a minute a few of the elements. In promoting safety education in a plant there are four principal groups which must be reached. The first group is the new man, and in many industries this man is of foreign birth and almost wholly ignorant of American ways and ideals. He knows little of our language and understands practically nothing of that part of it which applies to his job. The next group is a group of regular workmen who know all about everything and have seen everything there is to see, so therefore cannot be told a thing. In the third group I would place the foremen and supervisors. The fourth and last group includes the managers, superintendents, and assistant superintendents.

With these four fundamental groups to deal with the problem resolves itself into ways and means of reaching each group in turn. The success which you will have will depend entirely upon your belief in what you are doing and the perseverance and regularity with which you attack the job. We have been able to accomplish certain things in the plants of the company with which I have the privilege of being connected and I simply wish to give you our experience for whatever value it may have.

We are reaching the first group, "The Green Men" fairly well, but have by no means accomplished all that we hope may be accomplished. We are fairly successful in this work because we have taken in one plant, for example, some 3,000 men who we know require not only safety education, but general education in the A. B. C.'s of their daily job and we have organized classes right in their department, where the men are taught what it means to be an American Workman. This involves the fundamentals of the English language to start with and builds up into various lines, depending on the kind of work that the men are doing. They are shown the right and wrong way to do their work and how to use the mechanical equipment provided for their safety. When they have reached the point where they can understand the meaning of such words as we know belong in the vocabulary of the Careful Workman, they are taught these things and this is the starting point of an entirely new inspiration in their particular sphere.

After the work is started with the first group, we turn to the second group of the "Can't tell me a thing workman." This fellow is a great safety booster, if you can get under his skin, but in 999 cases you have some tough going to accomplish that.

We have tackled this problem in the regular every-day method of organizing Shop Committees and by constant personal contact with the individuals, we have gradually moulded them around to our point of view and have accomplished very definite results.

There is one very good reason why we have been successful with Departmental Safety Committees and that is that we have recognized the value of competition as it appeals to the average American. We complete the education of all of our committees with a well organized Industrial First aid Meet which is held annually between the various departments of the individual plants, and then after qualifying the best group in a series of preliminaries, we pit them against each other in an inter-plant meet which is a general family affair. Cash prizes are awarded on a liberal basis and a perpetual trophy is held for a year by the plant which wins it.

We feel that about 90 per cent of the keen interest we have always found in our committee work is due to the competitive feature which is kept before the group at all times. The third group, the Foremen, is not particularly hard to handle if you have accomplished anything with the second group. You will find that the up-to-date foreman is interested in the thing in which his men are interested and as soon as he is convinced that the fellows in the shop are doing their share, he will follow along and lend his whole hearted support.

"THE FOREMAN IS MUCH ABUSED"

We all appreciate the difficulties of the foreman of today and we all know that he is a much abused and over-taxed individual. He has a great variety of duties to perform and is held responsible for almost everything that you can imagine inside and outside of the department because somebody next higher up is able to "pass the buck" and get away with it.

I say, give the foreman a chance and show him clearly what you are trying to accomplish and how he can function. If you will do this I know he will respond, as he is just as much interested as you are in making a record for his department. Many times a foreman is willing and anxious to do certain things but he forgets and because he forgets he is misunderstood. Many of us hold meetings of foremen from time to time and we endeavor to tell these important men how they can help put over the safety game and accomplish what we cannot accomplish without their assistance. All these things are very fine but they are soon forgotten and we must constantly be on the job reminding these fellows of the things they can do to help. I am sure that all of us do things at times which we should not do because we did not think, and if some one were near by to tap us on the shoulder and say, "Don't do it, it's foolish", we would observe that it was foolish and would not do it.

Not so long ago we had a meeting of over a thousand foremen and we tried a little experiment which has convinced me that the foreman as a rule is a safety booster, but also as a rule, he is a very busy man and forgets. At this meeting, in making a few remarks to these men I endeavored to point out to them that if they kept constantly reminded of what we were trying to do, we would improve our accident record, and lots of things resulting from carelessness would not happen. In one of the plants we have a fire whistle which blows two blasts every noon at 12:15. This has been going on for some time and the object of it is to

test the system in order to determine whether or not it is operating properly. Every fellow in the plant knows when that whistle blows twice at 12:15 that it is a test of the line and no matter what he is doing, somewhere back in a corner of his brain that message is flashed. In talking to the foremen on this particular occasion I spoke of the fire whistle and suggested that hereafter every time it blows we let it serve as a check on what we have done during the day to promote safety in connection with our particular job. I suggested that each individual ask himself what he had done for the good of the cause, and if he could not answer satisfactorily he should make it a point in the last half of the day to do that thing which would be in the interest of safety.

I was rather interested to know what effect the suggestion would have and two days after the meeting received a letter from one of our real safety boosters, a foreman who had several hundred men under his supervision. He stated that the day after our meeting he was out in one part of the plant shortly after noon and was on his way back to his shop. He had one of his men with him and found a string of cars directly in his path. He was in the act of climbing over the cars when the 12:15 whistle blew and he immediately realized that he was about to engage in an unsafe practice, because the whistle had come to mean something different than it had before. This foreman went on to say that he climbed down off the coupler and proceeded to give his fellow workman a little talk on the subject of safety and to explain to him why he had not climbed over the car. In concluding his letter he stated that they walked around the string of cars and the mere fact that he had given a practical demonstration to one of his workmen, he felt, made him a better boss in the eyes of that particular fellow. I think you get my point regarding the foreman and I say that if you will study him and give him a chance he will come along.

To reach the managerial group is another problem, but without dwelling too much on this particular point I would say that we have been successful in promoting safety education with this group, particularly the superintendents and assistant superintendents, by making them responsible for the organization of their respective safety committees. They meet with the departmental committees regularly and discuss with them the work of the department. Here again real sincere interest on the part of the individual committees is in most cases sufficient to gain the support of the boss.

Get your Accident Statistics down to such form that you can show in simple language what progress is being made in your various departments. I believe that two things are essential in this connection, one of them the Frequency of Lost Time Accidents and the other the Severity of Lost Time Accidents. These statistics can be prepared easily and can be shown in graphic form so that each department can see exactly what progress is being made. I have a sample of the chart which we are using to show the Frequency of Lost Time Accidents and this is posted in each department and the record entered up monthly by the Chairman of the Departmental Safety Committee, based on figures which are furnished him

by the Local Safety Department. You must visualize what you are doing to keep up the interest in the work and if it is easily comprehended, you will get better support from the employees in a given department, with whom your Safety Scouts must come in contact and upon whom they must depend for the record of their respective departments. I have tried to give you some of the outstanding points in our experience and I can truthfully say to you that we are well pleased with the results that have been accomplished, but fully appreciate that the job is never finished and we must "carry on," always going forward and never for a minute losing faith in what we know to be a work well worth all the energy and effort that can be put into it.

GETTING RESULTS FROM PLANT SAFETY COMMITTEES

T. H. MCKENNEY, SUPERVISOR OF LABOR AND SAFETY, ILLINOIS STEEL COMPANY—SOUTH WORKS, SOUTH CHICAGO, ILL.

I feel that "Getting Results from Plant Safety Committees" is largely a matter of choice with the individual industry, the nature of the business itself, in many instances, determining the plan which would prove most effective and be best adapted to the particular industry in question. Therefore, in presenting my paper I will necessarily confine my remarks entirely to the organization and functioning of plant safety committees in the steel industry.—my own experience having been gained in this field of endeavor.

THE FIRST SAFETY COMMITTEE

I believe it is generally understood among the pioneers of the Safety Movement, that the first safety committee was organized in the South Works of the Illinois Steel Company, a subsidiary of the United States Steel Corporation. This committee was organized in the year 1908 and we feel that the formation of safety committees was one of the most important features inaugurated in the progress of organized safety work.

No doubt many of you are perfectly familiar with the plan of organization of the various safety committees of the United States Steel Corporation; however, for the benefit of those of our friends who are not it might be illuminating to take just a moment and touch briefly upon the organization and functions of the various committees of the United States Steel Corporation.

SAFETY ORGANIZATION IN THE U. S. STEEL CORPORATION

ORGANIZATION—The Casualty Inspectors of the subsidiary companies were called together to discuss accident prevention in May, 1906, and the subsidiaries actively engaged in safety work by appointing special men for this purpose, the first Committee of Safety, as aforesaid, being organized in the year 1908, and the present line-up of these committees is as follows:

1. *The United States Steel Corporation Committee of Safety* consists of seven members of the larger subsidiaries, presided over by an officer of the Steel Corporation. This committee meets quarterly, its principal business being the study of all serious accidents and making recommendations as to the best means of preventing a recurrence. These recommendations, of course, are passed along to all subsidiaries of the corporation.

2. *Central Safety Committees* made up of important officials of the various subsidiary companies. They meet monthly and their duties are similar to those of the Corporation Committee, except that the field of activities covers their particular subsidiaries only.

3. *Plant Safety Committees* made up of important officials of the individual plants. Meet monthly, weekly, or as often as occasion demands, with duties similar to those mentioned in the foregoing, except with reference to the particular plant only.

4. *Departmental and Special Committees*, the personnel of which consists of foremen, mechanics, skilled and unskilled workmen. They meet weekly or monthly, according to their own plan of organization, and inasmuch as getting results from this latter named committee forms the basis of the topic assigned to me, I believe that we might better devote to its discussion the balance of our time.

In discussing the efficacy of one plan of organization of the departmental plant committee over that of another, I am confronted with the difficulty of being unable definitely to recommend one particular scheme, owing to the fact that there now exists among the superintendents in our plant a wide difference of opinion as to the organization of its personnel and method of functioning. In other words, there is no unanimity of opinion among the superintendents as to the selection of the personnel of this committee, some preferring the membership made up exclusively of foremen; others exclusively of workmen, and still others, a combination of both, foremen and workmen; and again, we have two or three superintendents in our plant who do not believe in maintaining a standing committee of any kind, but advocate the selection of a committee periodically, and at random, whose personnel consists of either one of the aforesaid groups, and in view of the fact that these departments are numbered among the most hazardous and are maintaining a very low percentage of accidents, both as to frequency and severity, it would make one wonder just which is the best course to pursue in the organization of the departmental and special plant committees. After all, it would appear that it is not just what the personnel of your committee may be, but how well it is functioning, and how completely it is bringing the Safety spirit down to the workman.

A FOREMEN'S COMMITTEE

We have in one of the rolling units of our plant a committee whose personnel is comprised exclusively of foremen. In this department the field is divided into four divisions, each division representing one

unit of that particular department, two committeemen being assigned to each division. The duties of this committee are to investigate general safety and sanitary conditions, and examine each employee as to his knowledge of safety rules. Should an employee not measure up in his knowledge of these rules he is requested to familiarize himself with all rules and regulations pertaining to safety and present himself at some near future date for re-examination. The committee meets twice each month, at which time reports covering their inspections are discussed, recommendations made as to the condition of their mills, and the superintendent or foreman of each particular unit is held responsible for its condition. All recommendations must be acted upon before the next regular meeting.

After two consecutive tours of inspection by members of the committee in their particular division, the committeemen are rotated, in other words, the two men in charge of Division No. 1 are shifted to Division Nos. 2, 3, or 4 as the case may be, thus familiarizing the entire personnel of the departmental committee with the several units in that department. This also creates a spirit of competition, a sort of friendly rivalry, as to who will make the best showing, and I believe is most conducive toward the attainment of the results you are seeking in your accident percentages—the “irreducible minimum.” I might say that is our slogan at South Works, and while we may never hit the mark, nevertheless, that is the target at which we are shooting. Practice makes perfect, and I am glad to say that each year we are coming a little closer to the mark.

A COMMITTEE COMPOSED OF FOREMEN AND WORKMEN

One of the important functions of the safety committee is the investigation of accidents, the careful study and analysis of the causes with a view to making recommendations for preventing a recurrence. Also to establish the responsibility for the accident, and the meting out of merited discipline, if any. A realization of the importance of this phase of the work in this particular department has been responsible for the selection of a special committee whose personnel consists of foremen and workmen, who work in conjunction with the members of the standing departmental committee. It is the honest endeavor of this committee to render a fair and unbiased opinion when establishing the cause and responsibility for an accident. The scene of the accident is visited and all available witnesses interviewed. The decision of this committee is subject to review by the Safety Department. Should this department not be in accord with the decision rendered, it may then be referred to the Plant Safety Committee. As a matter of information I might add that while all accidents are considered by the departmental committee, the serious accidents, or those involving a loss of thirty-five days or more, are also investigated and acted upon by the Plant Safety Committee, which is presided over by the higher officials of the plant.

I was prompted to select the committee which has just been described

for the discussion of this paper, because of its consistent safety campaign. This committee has so imbued the rank and file with the spirit of Safety, that if an accident happens anywhere in this department, the workmen themselves, immediately go after the injured workman because of the fact that he has helped to mar the safety record of the department, and if it develops that it is the fault of the injured workman himself, he is made to feel his personal responsibility for the same and is in for very severe criticism.

I believe this description typifies in a general way the operation and functions of departmental safety committees throughout the plant. I might say that we have some twenty standing departmental safety committees, whose membership consists in the aggregate, of approximately one hundred and twenty men. The personnel of all committees is changed from time to time, some departments preferring to have the members serve for a period of six months, others one year, which system gives all employees an opportunity to serve as committeemen, and in the course of time the organization will contain many practical safety men, whose knowledge has been gained by actual experience and service in this capacity. These departments that do not have standing committees select their membership periodically, and I believe it might be stated that they function along the same general lines as those that maintain the regular standing committees.

ATTITUDE OF THE GENERAL MANAGEMENT

After all, I believe "Getting Results from Plant Safety Committees," depends entirely upon the attitude of those at the top, and like the sun's rays, it is reflected down to those upon whom it shines according to its degree of brilliancy. If it is cloudy and the sun is unable to penetrate, then its brilliancy is deflected and it does not reach the earth and give forth that degree of help to man, animal, and plant life for which it has been ordained. And likewise, if the General Management is cold and indifferent toward the Safety movement, it will also be reflected down along the line through the superintendent, foreman, sub-foreman, gang leader to the workman. The net result will be in proportion to the enthusiasm reflected.

Therefore, as I see it, the first duty in the organization of plant safety committees, is to secure the undivided support and co-operation of the powers above, otherwise your opportunities for success will be reduced to the minimum and the desired results will not be accomplished.

FUNDAMENTALS OF SAFEGUARDING

DAVID S. BEYER, VICE PRESIDENT AND CHIEF ENGINEER, LIBERTY MUTUAL INSURANCE COMPANY, BOSTON, MASS.

You all know the story from one of the oldest of Books, about the man who was going to build a house. Perhaps King Pharaoh had a pyramid-

building project underway at the time and had cornered the stone market; or maybe the mason's union was asking for a half-interest in the house for putting in the foundations; anyhow this fellow decided he could get along all right without a foundation so he just built his house on the sand. You all know what happened when "the rains descended and the flood came," the poor chap might as well have put his money in one of the "50 per cent interest in 45 days" get-rich-quick schemes of the day: he had nothing to show for his trouble but a pile of rubbish after the storm blew over.

So far as I can recall, the Good Book doesn't tell what happened next, but no doubt this fellow had learned his lesson and called in a good architect and said "I want you to put up a real building with the right kind of foundation under it, so my family and I won't have to sleep on a park bench after the next storm." Briefly, this story illustrates the experience of many plants in putting in machinery guards, unless they are fortunate enough to have a man on their staff or in consultation with them, who has been through the guard-building mill of experience and has learned that in this, as in so many other lines, the best is the cheapest in the long run.

STABILITY

In other words, when you are going to guard a machine, it pays to do it right the first time so you won't have to do it over again in a little while. A machine guard has to stand up under a certain amount of handling and natural wear and tear, and in addition it is like the new boy in the country school—it often has quite a bit of natural prejudice and ill will to overcome, and if a covert kick or knock will get rid of it, said kick or knock is likely to be forthcoming.

The thin, flimsy, poorly-constructed guards which went into so many plants in the early days of the safety game have now generally been replaced with ones that are built to last as long as the rest of the machine.

CONVENIENCE

Much of the difficulty in getting guards used and keeping them in place will be overcome if reasonable attention is given to the convenience—nay, even to the prejudice—of the man who is going to run the machine on which the guard is located. It should interfere as little as possible with the operation of the machine, and should be so arranged that it can be opened for inspection or repair work, giving access to those parts of the machine that are likely to need periodical attention. It should preferably be so arranged that it is not necessary to remove the guard entirely for any ordinary operation, so as to minimize the likelihood of its being mislaid or left out of position. For example, I have in mind guards that are hinged like a door, or which have sliding or rotating sections that expose necessary parts without being removed entirely.

When installing a new guard it is usually worth while to talk with the operator of the machine and get his ideas on it; he may have some worth-while suggestions and if he feels he is being consulted about it

his attitude toward the guard will be much more friendly. And above all, let me say for the benefit of the new man in safety work, don't give up too soon when you meet with a tough proposition in guard-building: we encountered many machines in the early days which foremen, operatives, and mechanical forces all said could not be adequately guarded, but which *were*, sooner or later. I believe there is no machine built that cannot be equipped with some practical and reasonably effective guard, if the nature of the hazard and the character of the operations are thoroughly understood.

MATERIAL

The material used in a guard will depend somewhat on the conditions surrounding the machine to which it is to be applied; if there are parts underneath the guard that should be observed, woven wire, perforated sheet metal, or expanded metal may be advantageous, the main point being to have the guard of sufficiently heavy material and so braced that it will not easily be bent out of shape, and without openings so large that a finger or other parts of the body may project through the guard and be injured in the working parts. Solid sheet metal or cast-iron guards are very effective in certain locations where it is not necessary to see beneath the guards, and where it may be desirable to keep out dust or dirt from the machine parts.

Where only one or two machines are to be guarded it is usually less expensive to use sheet metal, but where there are a number of similar types which justify making up a pattern, cast-iron may be the least expensive and most satisfactory in the long run. The use of wood is generally to be avoided, although it may be necessary in chemical industries or other locations where a metal guard would corrode rapidly. It may also be considered permissible in places such as carpenter and pattern shops, where there are facilities for making up and repairing wooden guards readily, and where the addition of a few such guards would not add seriously to the fire hazard which already prevails.

Every guard should be so designed that it won't stick out "like a straw hat in January"; it should conform to the general outlines and appearance of the machine. It should be neatly finished, so as not to leave sharp corners or projecting edges on which injuries may occur from the guard itself.

Some good suggestions on the minimum size and weight of material used in guard-building are found in the "Industrial Rating Standards" adopted by the Compensation Insurance Companies and issued by them in booklet form.

BEST TO GET MACHINE FROM BUILDER ALREADY GUARDED

Unquestionably the best method is to get the machine from the builder already guarded. Most of the standard machinery manufacturers have designed guards for their equipment and will furnish a machine with first-class, serviceable, well-designed guards, if the guards are specified at the time the machine is ordered,—although they may leave them out in order to save cost if this specification is omitted.

Where the machine builder protects the machine in the beginning the cost to the purchaser is minimized; at the same time the danger of an accident after the machine is set up but before it can be protected has been eliminated. Safety specifications should accordingly be placed on an order for any new machinery.

GUARD BUILDING GANG RECOMMENDED FOR LARGE PLANTS

Unfortunately there are many unguarded machines in most plants at the present time, and for this purpose it is necessary to have a guard building gang made up for application to the machines already in place. Where a plant is sufficiently large to justify it, it pays to have a regular guard building gang of one or more men, depending on the size of the plant, who are trained in the best methods of constructing guards and can carry the work along to completion without much further interruption when they are once broken in on it. In this way a great deal of time is saved, as it is no simple job to design a good guard for complex machinery, and it requires experience and understanding of conditions on the part of the men doing the work.

In the case of smaller plants or those in which the number of machines to be built is limited, it may be preferable to call in one of the designers of machine guards, of which there are several concerns in different parts of the country, and have them submit a plan for protecting all of the machinery that needs it.

GUARDS BRING INSURANCE RATE REDUCTION

In most states there are reductions in the compensation premium for machines that are guarded in accordance with certain minimum standards; it is always well for those who are installing guards to be familiar with the insurance standards, so as to get the benefit of any rate reduction that is allowed. These standards harmonize in general with the state standards and trouble is best avoided by being sure that the guards are up to standard before they are put in.

To summarize briefly, the important points in safeguarding machinery are as follows:

1. The guard should be strong enough to stand the necessary strain and tear.
2. It should be convenient, so as to offer the minimum interference with the duties of operators and repairmen.
3. The material should be adapted to the particular conditions of the machine, steel or cast-iron being preferable to wood.
4. Machines should be guarded by the builder, through the use of suitable specifications, if possible.
5. Where local guarding is done it should be by a specially trained guard building gang.
6. Guards should conform to insurance standards (or to state standards where the latter differ) so as to get the benefit of rate reduction and avoid criticism from state inspectors.

ADJOURNMENT.

Health Service Section

September 28, 29, 1920

DR. W. IRVING CLARK, JR., Chairman
Norton Company, Worcester, Mass.

DR. A. W. COLCORD, Vice-Chairman
Carnegie Steel Company, Clairton, Pa.

DR. WILLIAM A. SAWYER, Secretary
Eastman Kodak Company, Rochester, N. Y.

TUESDAY MORNING SESSION

CHAIRMAN CLARK: The first address scheduled on the program is "Doctor and Patient vs. Employer and Employee," by Dr. Burlingame. I regret very much that Dr. Burlingame will not be here. At the last moment I received a telegram from him, stating that it would be absolutely impossible for him to come. However, he has sent me his paper, and I am going to read it myself. I asked Dr. Burlingame to come here and give you a talk, and this paper is really the substance of a talk which he would have given and should be considered more as notes than as a distinct paper. He put it slightly into shape when he found that he was not going to be able to come. Therefore, I beg of you to remember that and consider this not in the same way as you would a technical paper.

DOCTOR AND PATIENT VS. EMPLOYER AND EMPLOYEE

DR. C. C. BURLINGAME, MANAGER, SERVICE DEPARTMENT, CHENEY BROTHERS,
SOUTH MANCHESTER, CONN.

I stop and think of physicians in industry and industry and physicians and all that sort of queer thing—I think back to the time when I threw out my chest and said "I am a part of the management now." At first I wasn't inclined to allow the president of the company to have anything on me in importance. I had it pretty well ingrounded in my mind that the silk business was organized for the sole purpose of supporting medical department and oftentimes I resented the fact that they seemed to think it was organized for profit in the manufacture of silk. I, for one, had it firmly in my mind that the physician in industry was a part of

the management I take it was not alone in these ethereal thoughts. It was lots of fun to think of it that way—I kidded myself along—probably had the best time of my life—at least my head did.

But with all this joy a certain danger developed, and that danger was that I should some day conceive myself to be so much a part of the management that I would forget I was a physician and sacrifice my ethical relations with patients to maintain my very desirable position as part of the management. Oh, glory be!—part of the management—but—poor patients! They were to come in and tell me all their confidential secrets and I, as part of the management, was to sit among the assembled, pulling out the inmost secrets of the patients and, with a smile and gusto, telling these secrets to the rest of the management of which I was a part. Certainly—why shouldn't the patients all scramble, fall over themselves, and tumble into my office and, with the greatest joy and pleasure, tell me all their ills—private ills, which were to be made public by me to the management and, through the management, to the rest of the plant.

Great scheme. But something away down within me seemed to tell me that there was a flaw in this line of reasoning—that there might be somebody who would not appreciate this opportunity of telling all his ills directly to the management, of which—I beseech you—don't forget I was to become a part.

I pictured to myself my medical department organized to perform, as one of its functions, the examination of all applicants for work. These obliging little applicants were to come up and say "Dear Doctor, I know you are a part of the management and that what you know you tell to all the bosses, foremen, and employment manager. And, dear Doctor, I know that if there is anything really wrong with me I will not get the job, and that you will tell everybody all that I tell you. So please, dear Doctor, here are all the things which are wrong with me."

But again, on second thought, I decided that the millenium had not arrived and probably this would not work. I decided that more than likely if I were too much a part of the management and told all I knew I would find the applicant lined up on one side, concealing everything concerning his physical condition which it was to his interest to conceal, and I would be on the other side sparring with him and trying to draw this information out of him. I pictured to myself having only five or ten minutes to make each examination and able to get only the grosser defects, and being deprived of all of the subjective symptoms which he would tell to a private physician but would not tell me. It did not take much imagination to appreciate that he would keep to himself the most important part of the examination and the things which would aid me most in recommending to the management the job for which he was best fitted physically.

And then my mental aberration again returns to me and I picture myself conducting this medical department as a part of the management and all of the applicants, after they have gotten to work, scrambling in to tell me they are suffering from tuberculosis, contagious diseases, having various illnesses, venereal diseases, and all that sort of thing,

knowing that when they were doing so they were talking to a part of the management who might confine himself only to telling the president, managers, superintendents, foremen, employment manager, and a few others. Then I had another hunch and realized what the result of court-martial was upon the venereal record in the Army. The venereal record was fine, but it drove some cases from the Army doctors to the private physicians, the quacks, the druggists, self-treatments, etc. In other words, I realized that as a part of the management I probably would not get the majority of cases and probably very few of the contagious class, in which I would be most interested from the standpoint of reducing illness in the mill.

But that wasn't enough—the dream came back. I couldn't give up being a part of the management, and so, in my own mind, I conducted my medical department once more as a part of the management—as a special agent for the employer—so as to sit in state and pass upon great questions for the management—a sort of cheerful disciplinarian at times, but having the employees flocking in to see me concerning their health. Because they feel themselves running down a little and breaking down, but knowing they must be up to standard physically or have some one else placed on the job, they come to me and tell me about these ills—realizing that in so doing they are indirectly telling the boss that they are not physically fit and that he should be prepared to have some one else put on the job in the not too distant future.

Something saved me once more and when I came to I realized that if a man were in his right mind and there were any physicians left on earth at all he probably would not come near me.

By what I have said you will see that I have been forced to abandon my dream of being a most important part of the management—in a way being one of the employers, or at least a special agent of the employer, taking care of, if not the poor downtrodden laboring man, at least one of the employees. But so it is with all our dreams of life—our fondest dreams of greatness must pass and we must be content to seek a more moderate success if we are to have success at all. It is one of the sad things of life, nevertheless true, that something is always taking the joy out of life and bringing us back to the more fundamental things that seem to be turning themselves over and over in the mind of the other fellow.

MANAGEMENT MUST SUPPORT YOUR EFFORT TO WIN EMPLOYEES' CONFIDENCE

Somehow or other the average workingman's mind seems to work about the same as yours and mine. When he is sick and has anything wrong with him he is going to the physician of his choice if he can, and if you want to get his business, in some way or other you have to become the physician of his choice. If your management wants you to take care of the human machines in its industry it must get back of you in your efforts to have yourself elected the physician of their choice.

I ask you—"How does a private practitioner ever get his business?" You pick out in your own acquaintance any very successful man in building up a business, study his rules of success, and go and do likewise. If you do this you won't go very far astray. There are very few rules

of practice which he follows which you should not. There is nothing which he can do for his patients as a private physician which you should not do and which you can afford not to do if you want to be the greatest success.

First of all, come to the mutual understanding with your employer that as much as you would like it, you must sacrifice a certain amount of the pleasure of being an important part of the management in order to deliver to him the largest financial returns on his investment in his medical department. Tell him that you are willing to take on the job of keeping the human machines in his industry as fit as possible,—to try to keep the old parts from breaking down, and all that sort of thing. Tell him you realize better than any one else that it is harder to get new parts for human machine than for the other kind of machinery he is investing in—but tell him also that a queer thing is true about the human which is not true of the other machinery—that you must have the co-operation of the human machinery but not the other kind—that in order to get the chance of keeping the human machinery in repair you must first get it into your office—that absent treatment has met with little or no success. Admit to him on the spot that you are a smart doctor, but tell him that you cannot get all there is to know out of the patient by a mere physical examination—that the facts he is going to tell you about himself will help you as much, if not more, than your physical examination, and therefore you have not only got to get him into the office, but into the office voluntarily and in a frame of mind to unburden everything which is on his soul. Tell your employer as tactfully as possible that in order to do this it has to be generally noised about the industry that the doctors are paid by the company but are working for the employees first, last, and all of the time—that all the employer requires of the doctor is reports from the employees that he is doing good work for them and evidence that this is the truth as shown by reduced loss of time, illness, etc. First, have your position well defined with your management. Do not misunderstand me and feel that this means you are expected to line yourself up with the employees against the management or anything of the kind. It is not a question of taking sides, and this is not at all necessary to sell the employee on the industrial medical proposition.

From this point on be a private physician privately treating patients in a private office maintained at the expense of the industry. Tell the employees—avail yourself of every opportunity to impress upon them, that the information given you is entirely confidential and never is used to their disadvantage. Not only let the employees know this, but let it be actually true. Remember that if you do not practice this as well as state it, you won't be able to preach it loudly enough to convince the employees. Say it—but more important—do it.

Make it your rule never to obtain any information from an employee or an applicant for employment which you would use to his disadvantage without his consent except under identically the same conditions as a private practitioner might be forced to use this information to his disadvantage. For example:—

Under most of the existing compensation laws we find that if a man is to receive any compensation at all his doctor, be he a private physician or not, must give full information regarding the case to the employer or the insurance company. We find that if there is a benefit association or insurance scheme maintained in industry it is necessary that a diagnosis of illness be given before the employee can collect benefits or insurance. In this case the diagnosis would have to be given whether he employed a private physician or not.

NOT NECESSARY THAT MANAGEMENT SHOULD SEE MEDICAL RECORDS

If an applicant for work was required to go to a private physician before being given employment, that physician would undoubtedly advise the applicant to accept the job or not, depending upon what he found physically. You, as an industrial physician, should do the same thing—you should advise the man whether or not to accept the job he has been offered,—and then you should not tell the employment manager what you found, what the symptoms were, or what your diagnosis was. The only thing you should tell the employment manager is that this man would be injured by work requiring heavy lifting—this girl would be injured by being put on work involving nervous strain, etc. There is a great difference between prescribing the character of work and giving out a diagnosis or symptoms. If I may digress a moment I would like to bring up the question of giving diagnoses and symptoms to the employment manager.

I am at a direct loss to understand why this is necessary. The average employment manager is not medically trained. If you give him a diagnosis he has first to study up what that diagnosis would mean, or, if you give him the symptoms, he has to study up what bearing these symptoms would have on certain employment. If, for example, you told him that the patient had a pleurisy and pain on deep breathing, would he, without studying up, know whether or not it was wise to put that patient in a room where there was some dust in the atmosphere? Why not tell him that this patient should not be required to work in a room which is damp, dusty, etc.? You are then talking in his own language and, unless the employment manager is inordinately curious, he would prefer to have the matter presented to him in this way.

While I have probably just given you the impression that the medical department should prescribe employment but should not reject for employment, I wish to qualify this. Any private physician who came in contact with a patient would feel justified in interfering with his being placed in an industry if he thought such placement would be dangerous to the man, to others, or to property. To my mind, these are the only conditions under which the industrial physician should be instrumental in rejecting for employment.

INDUSTRIAL MEDICAL DEPARTMENT MAINTAINED ON BASIS OF DOCTOR AND PATIENT

I have intimate knowledge of one medical department operating in industry which, for about five years, has been maintained strictly on a

basis of doctor and patient and operated in this confidential relation. In this particular concern the employment service never has access to the medical records, is never given a diagnosis, and never given any confidential information concerning patients. The employment manager may be told that the applicant is fit for any employment or that he is fit for work not requiring nervous strain, etc. The industrial physician prescribes the type of work and if the employment manager has such a job he fills the prescription.

In this same industry the medical records are not open to the inspection of the president of the company, the managers, superintendents, or the foremen, with the result that everything from ingrown toe-nails to baldness comes to that medical clinic. Venereal disease is treated, and the employee is not fired. As a result they know more about where the venereal disease is in the plant than would be possible under any other condition. In this way it can be limited by proper treatment instead of being spread by indifferent treatment or concealment.

I could stay with you all day long talking about this little hobby of mine, but I am not so sure that you would stay with me—but I cannot bear to think of your escape without my sliding in a few remarks on one subject which has become very dear to me.

PROFESSIONAL ETHICS

I have attended so many meetings of little inner circles of physicians where invariably the conversation drifted to the discussion of the very inferior type of practice which was going on outside of certain inner circles, etc.,—how some of this practice was so punk that it hardly deserved ethical consideration, etc. In all of these things—all of which may be true—it is sad to relate, the general public—and the American workingman is part of the general public—reserves the right to make any of these decisions without the assistance of any employer—if a man wants to employ a bum physician that is his inalienable right as an American citizen. It may be, after all, that the physician is not as bum as some of us think. But this leads me to what I was going to say.

The oft repeated fact that the physician in industry has been subjected to much unethical treatment does not in any way give him special license to be unethical in return. As a matter of fact, I believe the physician in industry will find his strongest card is in being the most ethical person in his community. He may be the smartest doctor in town and know more about taking care of patients than all the rest of them put together. He may even have convinced his employer that this is the case, but this does not give him the right to butt in, at his employer's request, on some other man's case and be unethical in so doing. Just because you are employed by a company and a sick employee is also employed by the same company does not change your ethical relation with a doctor in the community. Be ethical with him whether you think he is bum or not, for, remember, he may think you are bum, too. At any rate, if you know more than he does and you have something to give him, you will not have a chance to do it unless you are on friendly

terms. Get a reputation of being square, and if you really are smart you will have a much better chance of contributing something toward the raising of medical standards in your community.

DISCUSSION

DR. A. J. LANZA (Medical Director, Hydraulic Pressed Steel Co., Cleveland, Ohio): I am sure that we all appreciate the points that Dr. Burlingame brings up, particularly the question of the confidential relations that must exist between the industrial physician and industrial worker.

It is absolutely true that if the industrial worker does not feel that he can go to the plant doctor as he would go to a doctor on the outside, with the same confidence and knowledge that his troubles will be taken care of, then that plant physician will not be able to get at the work that is to be done there in the plant.

It is not always so easy as it sounds, however, because frequently if a man is disabled from work, particularly a valuable employee, such as a foreman or a sub-foreman, it is not always easy to tell the manager that Mr. So-and-So is not on the job and should have a few weeks' vacation; it is rather difficult when they say, "Why?"

I think it is absolutely essential that the plant physician stand on the same basis of medical ethics, so far as his patient is concerned, in the plant as he would on the outside.

DR. H. P. HOURIGAN (Larkin Co., Buffalo, N. Y.): I think the doctor has placed the subject the way we all like to look at it. In our plant we follow this plan: Our records are for the use of the medical department alone, except that the collective findings are used to direct the health policy of the plant.

Several years ago, when Dr. Oswald Park was alive, I remember hearing him called on to testify in court, in a case involving a patient of his who had died. The attorneys asked the doctor a question that involved the giving of private information which the doctor had received from the patient. The doctor said, "And if I refuse to answer?" The judge said, "You will be held in contempt of court." - He said, "That means I will be punished in what way?" "You will be fined fifty dollars". The doctor paid the fifty dollars.

Now, I think Dr. Park took the position that we all like to take, and I think the management of the industry thinks a great deal more of us if we take that position.

CHAIRMAN CLARK: I understand that Father Moulinier, President of the Catholic Hospital Association, is here. I think we should all like to hear from him in this discussion.

FATHER MOULINIER: I came here to listen and to learn and did not expect to be called upon to say anything, but I am very glad to say a word on this subject because my conclusions are so final as far as I am concerned that there is no ground for debate in my mind. And I should say that the policy so well put in this paper and so well substantiated by the two speakers, unquestionably should be the policy of every industrial medical department in any plant.

If perchance anywhere the management should try to claim the right to get from the medical department any of the facts concerning the individual employee which were not warranted in the mind of medical men or man, they should simply be told that it is out of the question, that it is impossible, and that it is just as harmful for them, just as bad in results financially or economically as it is wrong ethically. After all, if the confidential relations between the patient and the physician are not preserved in a plant, what is it going to mean in the mind of the laboring man? It is going to mean to him that he is being exploited, that his injuries, his health, which are primarily a private matter, are being used in spite of him. Now that is invading human and individual rights; therefore, it is wrong.

There are plenty of facts that can be used which are not individual, as was stated by one of the gentlemen, for forming the basis of medical conclusions. And if I may be permitted, I should like to say something just about that one point. Is there anywhere in this organization, or in the minds of you gentlemen, the thought that the facts, the data, that are wrapped up and perhaps buried in your records are not being brought out and vivified by analysis and study for the advancement of industrial medicine and surgery or for the advancement of medicine and surgery in general?

I hit upon this and speak of it gladly, because I have recently started the formation of a clinic research division of the Catholic Hospital Association. We have in that association on this northern continent, in the United States and Canada, six hundred and fifty hospitals. We have somewhere near half the bed capacity of all the general hospitals. And as I have been very active in traveling throughout this country and Canada with a view toward helping to bring about the standardization of hospitals, I find that the records after having served their initial purpose of more careful work on the part of the medical men, are, as I have said repeatedly, deposited in the record room or record files as in a morgue. They are dead, and I am trying to revivify them through the organization of a clinic research division, which shall have a central bureau, through which as a kind of clearing house all that buried data may be of service to the whole medical profession on this northern continent.

Now, if you will do something like that, or if you are in any way connected with the Catholic hospitals that are now being organized and will generously co-operate, I hope that within a few years all the industrial plants will likewise through a carefully organized machinery, bring out the general facts which will enable every industrial medical service department, every hospital in the whole medical profession to do more in the way of preventive medicine, and, of course, more too in the way of curative and alleviative medicine and surgery.

I absolutely think you are all right in regard to the ethics of this secrecy between the patient and the medical man, and I hope that it will be clear to everybody that secrecy will not be violated by using the great mass of data that are being gathered in all your records.

CHAIRMAN CLARK: I am sure we shall be glad to hear from Dr. Patterson, Secretary of the American Association of Industrial Physicians and Surgeons.

DR. F. D. PATTERSON (Pennsylvania State Department of Labor and Industry): If I were able to have gratified the wish that is in my heart, it would be that the paper just read, written by Dr. Burlingame, might be scattered far and wide throughout the United States, and be made a text-book in the schools of medicine.

It is not a far cry from where we are today to those days when the company doctor was the synonym for derision on the part of the medical profession and upon the part of those whom he served within the industrial plants. We all remember the position that the company doctor occupied, and to those of us who come in contact with the representatives of organized and unorganized labor, as I am obliged to do in my official work for the State of Pennsylvania, it is with a great deal of earnestness that I come to say to the industrial surgeons and physicians of this country that the point as outlined by Dr. Burlingame as to the preservation of the confidences of the consulting room can not be too strongly emphasized.

We hear today upon the part of organized and unorganized labor the statement that the company doctor, as he is still called by labor, is in many cases simply the tool, as it were, of the management, for the purpose of scrapping the undesirables located among the ranks of the employees.

So, I urge upon every one of us and upon the students in the medical colleges, that we must by our work and by our preservation of confidence eliminate this feeling upon the part of many who labor against our chosen profession.

It seems to me that the industrial physician has the most marvelous opportunity in the world. In days of old, employer and employee worked side-by-side at the craftsman's bench. Today a mythical, intangible personality known as stock-holder has replaced the employer who was the guide, the philosopher, at the side of his employee, with whom he worked. Industry has been magnified and commercialized to such an extent that the old boss whom the employee knew has had his place taken by a foreman who is often nothing more than a slave-driver in disguise.

And so in many plants that I know of, the industrial doctor has become that wonderful connecting link between employer and employee, has become the guide, the philosopher and friend of both. Whatever else we do, let's try to maintain it on that high level. Industrial surgery is still in its infancy. It still needs the careful, conscientious thought of those who go into it, so that we may be well above criticism from either capital or from labor.

Let us strive on; let us maintain that happy balance between the two that should exist between patient and physician; and if we do, we will go on and on, and such things as state medicine will go into the limbo of things that are forgotten.

OHIO GIVES PHYSICIAN LEGAL RIGHT TO WITHHOLD CONFIDENTIAL INFORMATION
GIVEN BY PATIENT

DR. C. M. HARPSTER (Toledo Railways and Light Company, Toledo, Ohio): The story regarding Dr. Oswald Park was very interesting. As I understand the law, there seems to be some discrepancy in the interpretation of the judges in our state, at least. If I am put on the stand as a witness, I have the right to ask if I am to qualify as an expert or as an ordinary witness. If I am qualifying as the doctor of the defendant, of course, the best lawyers maintain that the information that this patient has given me as his physician is confidential. But some of our judges have ruled that the physician who is called as an ordinary witness is in duty bound to give to the court and jury the facts that he has obtained from the patient.

We are often in this embarrassing position: We are asked, say by another company, to give our findings—"Why was John Jones rejected?" I have always maintained that this was my confidential information, and I have always refused to give it to any one except on the order of the court. But in our state the courts have the right to come in and take the records from the hospital or from the surgeon's office and introduce those records as evidence. I believe that we should firmly fix upon the minds of the public that these records are the property of the surgeon who has them and are his only.

MR. E. M. COFFIN (Staff engineer, Associated Industries of Massachusetts): Dr. Burlingame's paper suggests to me the value of a clearly worded notice posted in the employment office and in the medical department, making clear what disposition is made of the records of physical examinations and consultations, and clearly emphasizing the privacy of all conferences between the physician and employee.

CHAIRMAN CLARK: I think that is a very interesting thing. Before closing this discussion, I should like to hear from James B. Douglas, Manager of the Claim Department of the United Gas Improvement Company, Philadelphia.

MR. DOUGLAS: I don't think there is any question about the desire for greater privacy in records. We have three dispensaries and an employment center to which the record cards are sent in Philadelphia. Those cards are kept as confidential as they would be kept in the doctor's private office. It seems to me, however, that there has been a suggestion here this morning that too great secrecy be maintained. I would like to ask some of the men here to express themselves as to whether or not the form of records should not be a part of the history of the employee and kept in an envelope with the man's record of the personal side of his work, and made available to the proper official of the company in case of a workmen's compensation accident arising.

It seems to me that if the doctor takes care of the information he has obtained in physical examinations, this information is not available in case of an accident, which may cause the wrong view-point to be assumed. If a man has a bad heart and this is shown in the physical exam-

ination, we class him in B (we have A, B, and C—a being perfectly fit, B being fit for certain work, and C, unfortunately, not fit for our work). But if we place this man in a position where he can do proper work and then an accident occurs, it seems to me the employer should have access to the records to see whether there was a condition existing prior to employment which would have a bad effect.

I can't mention that point without touching on the subject of rupture. We don't reject a man for rupture, but we don't want that blamed on us if he does not have an operation or wear a truss. It seems to me that we can go too far in maintaining secrecy.

DR. OTTO P. GEIER (Manager, Employees' Service Department, Cincinnati Milling Machine Co., Cincinnati, Ohio): There might be the feeling in the audience not made up of doctors that Dr. Burlingame is a little to the extreme in the matter of secrecy. I think industries must make up their minds, when they employ physicians, whether they shall employ a man who is going to serve the men primarily or whether they shall employ a man who is to be a hireling of the employer to spy out and to do things that are inimical to the interests of the employees. Of course, the employer who is broad-gauged realizes that the physician who really serves the employee best serves the employer. The type of man who enters industry with that view-point, to serve the employee first, will safeguard the employee always, and, therefore, maintain the proper professional secrecy in the matter of records.

That does not mean that the case of fraud should be permitted to go by unchallenged by the medical department. The physician should not permit abuse of confidence and relationship that should exist between the employer and the employee in the matter of fraud at a time of injury.

Father Moulinier emphasized the matter of the confidential relationship. Industry must finally make up its mind whether it wants one hundred per cent service out of the doctor, whether it wants to capitalize that splendid relationship between doctor and patient, or whether it wants to buy a nickel-in-the-slot medical service. If it wants the first type, then it must permit that doctor to work out his salvation and his relationships in a way in which the family practitioner approves that relationship, mentioned so splendidly in the paper when Dr. Burlingame says, "the physician of his choice".

If we will keep that phrase before our minds—that we must be physicians of the employees' choice—then I think all difficulties will disappear. If we sell our services to the employees, then we become known as "the physician of his choice", and all difficulties which arise between employer and employee disappear.

CHAIRMAN CLARK: I will answer Mr. Douglas's question about the sacredness of records. Dr. Burlingame says in his paper that under most of the existing compensation laws if a man is to receive compensation, he must give full information to the employer or insurance company. That answers the question about compensation—full information must be given, under the law.

Now in regard to the selection of the private physician: In the State

of Massachusetts every man under the Workmen's Compensation Act has the right to choose his own doctor. So, the factories have to provide men who are acceptable to the employees, or the employees will go somewhere else. The fact that the majority of employees use the factory hospital shows that they are perfectly satisfied with the treatment they receive there, as they all know they have the right to go elsewhere.

CHAIRMAN CLARK: I have prevailed on Dr. Patterson to give us a talk on industrial medical training in medical schools. We all know how long it took the members who are present here to get started and find out the tricks of the trade. Now I am going to ask Dr. Patterson to say a few words on the subject of training in medical schools.

DR. F. D. PATTERSON (Secretary of the American Association of Industrial Physicians and Surgeons): If I had thought twice and had written the title for what I hope will be a round-table discussion, I should have put down as the subject, "The Lack of Training in Industrial Medicine and Surgery in the Medical Schools of the United States".

LACK OF TRAINING IN INDUSTRIAL MEDICINE AND SURGERY IN MEDICAL SCHOOLS OF U. S.

I can't emphasize too strongly that the medical schools of the United States are today failing to meet their responsibility for the conditions which confront medical practice everywhere. We do have one or two schools which are giving a course of post graduate instruction in industrial medicine and surgery, but mark what I say, the instruction is post graduate.

Today we are face to face with the situation that medicine is rapidly becoming the profession, by necessity, of those who are born with the so-called golden spoon in their mouth. It requires a collegiate degree or its equivalent to enter any class A medical college in the United States, and that means four years in college and graduation around twenty-one or twenty-two. Another four years is spent in a medical school, at the end of which the majority of the states make it necessary, in order to secure the license granted by the Bureau of Medical Education, for the graduate to spend from a year to eighteen months in a recognized hospital. The result is that by the time the student is eligible by reason of medical degree, he has reached the age of thirty-four, thirty-five or maybe thirty-seven; and we all know from our own experience that we don't become self-supporting the day upon which the state confers upon us the right to practice.

I contend that what is wanted today in the medical schools of this country is not post graduate instruction in industrial medicine and surgery, but the requirement, as part of the medical course, that the student in medicine before receiving the degree of medicine and the right to go before the state board for examination, shall be, if I may use the term, apprenticed to some works physician; that that medical student shall be sent out under the guidance of this trained works physician and there be given the necessary training and experience that will fit him to go into industry or to go into private practice.

It seems to me that the average medical school does not stress at all the necessity of knowing how to meet the man or woman who is to be the patient of the physician, and that the medical student could gather this knowledge in the industries far better than he could ever gather it in the hospital as an intern.

I hope that when we reach that Utopian condition of affairs, when all things will always be all right, that the medical student will have to go out into the industrial plant and get more knowledge of how to make a proper medical dressing, rather than be required to know how to make some frightful amputation or know the symptoms of a leprosy case which he may never see.

DR. GEIER: If doctors are to be trained for industry, they have got to be specially trained. The training of the medical colleges of today does not particularly fit a man for that work. So much of that four years' course is so technical that a man can not get the social sense that he requires if he is to be a real, honest-to-God industrial physician. After all, the most successful men in industry today are not necessarily the men who are the most scientifically trained in surgery, but are those who are the greatest interpreters of character in the beginning, and who are able to interpret working problems to the employer and to the employee. In other words there is a social service feature in the work of the industrial physician which the average medical student learns nothing about.

There is another factor that enters into the industrial physician's life, and that is the necessity for understanding what loss of time in illness means to the average man, not only what suffering and agony may be produced by injury and illness, but also how that affects the morale of the family which loses the support of the bread-winner during that period of unnecessary suffering, as we look upon it today.

We recognize also that the physician in industrial dispensaries has opportunities for serving the worker which are not given to the private physician. Now, that is contrary to the general belief, because the industrial physicians as a class are not valued by the profession nor by the average employee as one who can serve the employee as well as his own family physician. And yet the fact remains that we have in industrial medicine an entirely new type of medicine—that type which will bring about more prevention of disease than any other plan yet conceived.

The reason is very simple; because the doctor in industry is far more accessible than he is in private life. Therefore, the patient uses the clinic more frequently and he comes there for more trivial reasons than ever occurs to him outside. And if he has not that initiative himself, his absence rate and his inefficiency will prompt the medical department to send for him so that they may find out why he is inefficient and absent.

So, between those two factors—the one where the physician is the employees' friend and is, therefore, used more effectively; and again, in the part that the medical department plays in searching out the individual cause of frequent accidents, frequent need of service—we have between these factors piled up in medical industry probably fifteen times the ordinary number of records that are usually made up for any individual.

Today the rich man or the well-to-do man is supposed to have enough intelligence to have himself examined once a year, but we know that he neglects to do so, and things which seem trivial to him do not cause him to go to the doctor. But there is that spur in industry from both the physician and the employee to use the medical department more frequently than any other service in that industry. This causes records to be piled up which are subject to interpretation and which would bring out diagnoses far in advance of the average practitioner who never has an opportunity to pile up these endless records indicative of symptoms.

INDUSTRIAL PHYSICIAN NEEDS SOCIAL SENSE

Finally, it is the economic sense of the doctor, the social sense of the doctor, which he does not get in his training at medical college in the ordinary medical training, that should be added to his curriculum by the post graduate course, if he is to serve industry in the best way.

Now, industry can make this possible only in one way—if it is willing to pay the price. Industry must recognize that just as it chooses production managers, so it must choose medical directors with the brains that will deliver to the employee something that is not procurable on the outside, the type of service which he can not purchase today, no matter how much money he has, because it is a matter of training and these other things which I have mentioned.

Unless industry seizes this opportunity and makes available to the average American this type of service which shall raise the standard of living and efficiency of individuals, we are bound to have forced upon us as a country some system of socialized medicine for which we are wholly unprepared, and which can only lead us into a chaotic state of our science, such as England is facing today. We are essentially an industrial nation; therefore, we can not imitate Germany and some of these other countries in adopting plans which lower the morale and efficiency of the profession. There is sufficient science today for ten or fifteen years ahead. We are ahead of the application of our science today at least ten or fifteen years. We may center our thoughts, it seems to me, upon the application of that which we already know, and I know of no place where intelligent surgery and curative medicine may be better applied than in the high-grade industrial clinics.

CHAIRMAN CLARK: I wish that every employer of labor in this country were here today to hear this talk by Dr. Geler. It is of greatest importance that they realize the value of the industrial physician at the present time.

I think that one of the most interesting things mentioned is that point of the possibility of early diagnosis. There is no place where early diagnosis can be made so well as it can in the industrial clinic. Men come to the industrial clinic before they really have much the matter with them. They won't go to the family physician or to the hospital at such times. I believe that that is the time to get the majority of the chronic diseases.

PREVENTION AND RECLAMATION**DR. HARRY E. MOCK, CHICAGO**

The last decade, 1910 to 1920, has witnessed many noteworthy advances in preventive medicine and in public health, due chiefly to the better understanding developed between laymen and physicians resulting in a co-ordination of their efforts against both accidents and disease. Prior to ten years ago rarely did laymen and physicians meet in conferences or in great national gatherings to consider problems related to human conservation. Almost every other phase of conserving the national resources has received careful consideration, been thoroughly studied by experts, obtained both state and federal support and the machinery has been established for their maintenance, but only recently the conservation of our national man-power has become a real live issue.

Foregatherings such as this—the layman represented by the National Safety Council and the medical profession by the American Association of Industrial Physicians and Surgeons—bespeak better team-work and greater accomplishments for the future.

The best examples of co-operative effort between laymen and physicians is found in a few of the largest industrial concerns of the country. Due to these efforts, Industrial Medicine and Surgery has become a permanent fixture in the economic fiber of our industrial life. In such establishments one finds a large staff of human engineers devoting their time to the maintenance of a healthful, happy, contented working force. Their work includes the prevention of diseases and accidents; the improvement of working conditions; the smoothing out of all friction between employees and foreman; the abolishing of the old, unscientific methods of firing and hiring; the development of industrial sanitation; the adequate care of the sick and injured; and the establishment of all those activities which tend to improve conditions of employment. To accomplish this vast undertaking requires many specialized engineers all co-operating on the human maintenance problem.

Thus in these few well-organized plants are represented the following staffs of experts:

INDUSTRIAL RELATIONS, SAFETY, AND MEDICAL ENGINEERS

(A) The Industrial Relations Engineer who is responsible for employment, for transferring and discharging, for wage adjustments, for loans, and for all things related to the personnel problems.

(B) The Safety Engineers who are responsible for the prevention of accidents among the employees. Of late years the importance of sanitation, ventilation, lighting, and other factors found in sanitary engineering has caused the installation of sanitary engineers or of experts who combine the knowledge of safety and sanitation.

(C) The Medical Engineers, responsible for the health of the employees, and who combine preventive and curative medicine in their work. These are the engineers who must examine and study each indi-

vidual human machine and must often transmit knowledge thus gained to the other two groups in order that they may function properly.

Some of these concerns adopted the above comprehensive system of human maintenance from the more sentimental standpoint of so-called "welfare movements", while others adopted it purely as an "efficiency" measure. All have come to recognize it as the inalienable right of the working man or woman to have protection from accidents and disease, to have adequate medical and surgical care, and to have the opportunity of developing their individualism even when employed in great masses, and have thus voluntarily anticipated the time when the state will provide for these rights.

A great many other industrial concerns have adopted some one or two branches of this human engineering work. You will find them stressing the industrial relations end and neglecting the safety and medical departments, or the medical department is well developed but the safety and relations ends are neglected. It is essential that the three great national organizations representing these three great departments in human engineering, namely the Industrial Relations Associations of America, the National Safety Council and the American Association of Industrial Physicians and Surgeons, should meet together frequently and discuss jointly their various problems in their relationship to the whole. Only in this way will the representatives of thousands of our large industries come to recognize the inseparableness of Prevention, Reclamation, and Employees' Relations.

While viewing with pride the advances of the last decade yet one must not forget that there remain approximately 25,000,000 wage-earners of the United States who lack the advantages of a well organized plan for prevention, and for rehabilitation when disaster overtakes them. In addition, consider the daily casualty lists in every community from accidents in the homes and on the streets. These lists are trebled because of the lack of protection from preventable disease conditions. Thinking of the community as a great industry it is evident that the forces for human conservation are still woefully unorganized as compared with a few of the far-visioned industrial establishments.

As pioneers in the Safety First and the Industrial Health movements it behooves this group to consider its responsibility to the community as a whole. Principles have been established through our industrial practices and through our experiences in the army which are now applicable to every community in the land.

These established principles and their application to the general community are:

THREE ESTABLISHED PRINCIPLES AND THEIR APPLICATION TO COMMUNITY

I. Prevention of accidents can reduce greatly the number of injured employees. The success of this prevention work depends upon systematic inspections, safeguarding by appliances, lighting, cleanliness, etc., educational campaigns for safety, and the "follow-up" of every accident to prevent a recurrence. The surgeon, by thinking in terms of prevention

while securing the history of each case of injury and by reporting all accidents to the Safety Department in an industry, has become an essential part of the safety movement. Teamwork between laymen and physicians combined with *reporting, inspecting, safe-guarding, and educating* is the secret of success in the prevention of industrial accidents.

Think now in terms of the community. Every day witnesses hundreds of accidents in our larger cities, and in proportion to the population a like number in the smaller cities. During the last three months on the surgical services of a large general hospital with which I am connected in Chicago there have been admitted more than 20 skull fractures, more than 40 fractures of extremities, at least a hundred serious crushing wounds, amputations, and minor injuries. This is just one hospital; multiply this by 40 and you gain some conception of the economic loss to Chicago from the result of accidents. The majority of these cases are due to automobile injuries, public utility accidents, and to accidents in the small industries where prevention systems are unheard of.

But the daily routine in the hospital and of the surgeons engaged in repairing these victims of accidents apparently flows on undisturbed by these appalling conditions. There is no safety department in our Public Health Department; there is no connection between the hospitals and the doctors and the industries from which these injured employees come. Therefore how can we concern ourselves with preventing recurrences of like accidents?

It is just as essential that every community should have its Safety Department as its Public Health Department. It is just as essential that physicians should be forced to report accidents as to report communicable diseases.

Reporting, inspecting, safe-guarding, and educating must not be limited to a few industries, but must be applied to the community at large.

II. The second established principle is: Prevention of disease can reduce time lost, disability, and the mortality rate very materially in industries. This has been accomplished by industrial hygiene, by protection against all forms of occupational diseases, and by studying the physical conditions of each employee and interpreting the findings in their relationship to occupation and working conditions. In those industries with well established health departments, the minimum standards of industrial hygiene have reached a plane compared with which the sanitation and hygiene departments of most community public health departments are still in their infancy.

Take for example the careful inspection of the plant restaurant and the physical examinations of the employees handling the food in these restaurants, and compare it with the uninstructed public eating places with syphilitic and tuberculous employees preparing and serving the food. Every industrial physician recognizes that unhygienic home and community conditions mitigate the results of his efforts in plant hygiene.

The examination of employees reveals about 25 per cent with threatened diseased conditions or with physical disabilities which must receive careful consideration if disease is to be prevented or if their occupations are not to be responsible for premature breakdowns. Thus physical ex-

aminations is not only the method of regulating the work of
bers of employees but it is the recognized means of supervising
of the working force.

In hospital and private practice very little attention is gi
relationship between physical conditions and working ability.
is cured or relieved of his symptoms and then, because no
established for following him up after leaving the hospital and
care, he returns to the occupation or to the unhygienic st
which were responsible for his original breakdown. Recu
frequent with return of the patient to the hospital and with th
loss to the community of such a hit and miss system.

From industry the community can again learn the lesson tha
inspecting, safeguarding, and educating will reduce and preve

III. The third established principle is: When in spite of all
measures employees become disabled, handicapped,—due to di
jury,—the great majority of them can be reclaimed as useful,
citizens once more.

Human salvage has replaced human scrapping in these rep
industries. It must replace the wasteful practice of assigni
manently handicapped individuals to mediocre jobs, or to the
charities, or worse to the beggar class, methods now so prevale
community.

FOUR STAGES OF RECLAMATION

The Reclamation of the Disabled can briefly be divided into 1

(A) Adequate Medical, Surgical, and Hospital Care. Th
the early diagnosis and best form of treatment of all sick and
poyees, the use of group practice methods, and the employ
therapeutic adjuncts which will aid in the complete functional
of the disabled, such as, physiotherapy (electro, hydro, me
masso therapy, games and gymnastics) occupational therapy a
work.

The Industrial Surgeon of today must think beyond the me
curing his patient—he must work for a functional result whi
able the injured employee to return to lucrative work in h
soon as possible. To do this requires the use of all these meth

As a result of the reclamation work of industrial surgeons
greatly by the reconstruction work in the Army we see the n
fession as a whole striving more and more for an economic es
their cases. In the hospitals today one finds the doctors and
cussing functional restoration, the future usefulness of the
social service, and employment, whereas formerly discussions w
largely to calomel, digitalis, and drainage material; undoubted
is being made.

(B) The second stage in Reclamation is Education and
Training. Handicapped individuals, during the early stage o
ability are prone to become discouraged and to develop ment
which foredoom them to the parasite class. Constant teaching
tors, nurses, and social service department is necessary to ovr

mental state. That they can again become useful, successful men and women in spite of their handicap must be the daily theme of these teachings.

These daily injections of "pep" are more essential than the daily dose of medicine in many cases. The occupational therapy department in the hospital is one of the greatest value in this form of reclamation. The making of some useful article is often the first awakening of interest in the patient rapidly drifting to the scrap-heap.

Unfortunately, most of these cases are chronic, requiring months and months for their reclamation. The hospitals functioning chiefly for acute cases must discharge them when the active medical care is finished. Many of these return to unsuitable environments for their convalescence—environments often responsible for undoing the good accomplished at the hospital. In my judgment, this lack of supervision after patients are discharged from the hospital is one of the chief causes of the beggar and parasitic class. Suitable convalescent centers must be established in every community where this training process can be continued until assured of the reclamation of every handicapped individual.

Vocational training for new occupations when the disease or injury has unfitted the patient for his old type of work, or to fit him for specialized work where he can become efficient in spite of his handicap is a most important branch of Reclamation. All the handicapped children and young adults need it, and about 10 to 15 per cent of the badly handicapped adults can have their economic usefulness improved by means of vocational training.

(C) The third step in Reclamation is *Proper Placement* of the Handicapped.

If our medical and hospital care, our interest in securing a functional restoration, and our vocational training and curative work have been of the highest order and yet no provision is made for the scientific placement of these handicapped people the whole reclamation system may fail.

The wasteful practice of discharging heart cases, or tuberculous patients from hospitals and sanitariums without supervising their choice of occupations resulting so often in their return to the hospital without a recurrence of the trouble illustrates the importance of Placement. Many industries have employed handicapped people with benefit to the concern and without detriment to the individual.

Team-work between the doctor and the employment manager was necessary if this employment was to be successful.

Physical qualifications plus occupational qualifications equal to the job was the equation which solved this problem.

No reclamation service therefore can be complete until some provision is made in every community for the proper Placement of the Handicapped.

(D) The fourth step in Reclamation is the Supervision of all Handicapped individuals to see that no recurrence of the disability is threatened, that his work remains of the right nature, and that his reclamation, both mentally and physically, is completed.

All of this Reclamation Service is after all another form of Prevention, —prevention of deformities and permanent disability, the result of inade-

quate medical service; prevention of dependency by re-education; prevention of recurrences, by proper placement and continued supervision.

These principles of Prevention and Reclamation have proven their value in many industries. Those of us interested in the great problem of conservation of the man-power of our Nation must now strive for the application of these principles to the whole community.

SERVICE LEAGUE FOR THE HANDICAPPED

In Chicago we have organized during the last year the Service League for the Handicapped which is a definite effort to extend Prevention and Reclamation to the community. This League has 700 representative men and women of Chicago among its active members—twelve of the most influential business men, two doctors, and a laity prominent in this work make up the Executive Board of this League. It has a Medical Board of 60 physicians, representing most of the hospitals of the city.

The Service League has become a clearing house between the hospitals, where these handicapped people are physically reclaimed, and industry where they are rehabilitated by being placed at lucrative employment. The League is co-operating with all existing agencies now engaged in the handicapped problem in Chicago, establishing new machinery only when it is necessary. One of the members of the Executive Committee is also a member of the Executive Committee of the Safety Council of the Chamber of Commerce and it is hoped to see a close alliance between the Safety Council (prevention) and the League for the Handicapped (reclamation).

The adjuncts to the physical reclamation of the handicapped are physiotherapy, occupational therapy, and social service. At least four of the large hospitals of Chicago have installed these adjuncts to the medical and surgical care. When the patient is ready to be discharged from these hospitals, the social service departments endeavor to see that proper places for convalescents are provided, either at home or elsewhere, and that the discharged patient is placed in touch with the Service League for the Handicapped.

The Service League then takes up the problem. Its chief work is in finding suitable occupations for the handicapped patients. This occupation for a time is often special work in the League's workshops, then when the patient has fully recovered or has been trained in some special work, a position in private industry is found for him. In many cases the service rendered is providing re-education either in public schools, night schools, or more often, in small industries where even badly handicapped individuals can be trained in some special line of work.

From St. Luke's Hospital in Chicago during the last year, through the efforts of a Social Service Department and its Department of Occupational Therapy, co-operating with the Service League, at least 32 men and women, permanently handicapped, have been trained to make baskets, wicker lamps, cane seats, leather work, metal work, and similar occupations, and have been placed in industries where today they are making more money than they ever made before. For example, one woman who was badly

handicapped by the loss of her arm at the shoulder, and who before her accident did washing, scrubbing, and other forms of laborious work, is now earning \$25 a week making baskets in one of the large factories.

Another example is that of a young Polish man 21 years old, an illiterate and speaking very little English, who was injured by a mine explosion. His leg was crushed at the middle of the thigh and an amputation was performed. After six months in the hospital he was discharged with the wound almost healed—only a little discharging sinus remained. He received a \$1,900 settlement from the State Compensation Board, but this was turned over to his father and step-mother. The boy came to Chicago where he had a sister living but was unable to locate the sister. He tramped the streets for three weeks looking for employment, but no one cared to take on a man with only one leg. Finally, driven to distraction, and with his money all gone, he was about to take up begging when some kindly person referred him to the Service League. He was referred to my service at St. Lukes Hospital where an X-ray examination showed the lower three inches of the bone in his stump was honeycombed with infection. A re-amputation was done, and in six weeks this boy was walking about on an artificial leg. This was the first artificial leg he had had. Meanwhile he was given lessons in English, and devoted considerable study to photography, as he was anxious to get into the motion picture business. After his discharge from the hospital, the Service League placed him with a film concern at \$5 a night. He took special work at one of the schools in the afternoon. He bought a permanent artificial leg, the Service League signing his notes, and he made weekly payments until the leg was paid for. When I last heard from Kominsky he was making \$6 a day and was getting along nicely. This man was not only physically reclaimed but he was also Americanized.

Thus you can see we have made a beginning in Chicago in co-ordinating the work of Prevention; the medical, surgical, and hospital care; the re-education of the handicapped and their re-employment. A Service League acting as a clearing house in this way is the best method for reclaiming the handicapped and is the answer to the question "How may we adapt a Prevention and Reclamation service to the community?"

This is a beginning of the development of a Community Health Center in Chicago. May the growth of Community Health Centers be as rapid in the next ten years as the development of Industrial Health Centers has been in the past decade!

CHAIRMAN CLARK: I shall ask Dr. Farnum to start the discussion.

DISCUSSION

DR. C. G. FARNUM (The Avery Company, Peoria, Ill.): I assure you it is a very great pleasure to hear this last word from Dr. Mock on the carrying out of his ideas of reclamation. We have all become familiar with his ideas while in service, and now this which seems surely to be the last step is mighty gratifying to us. I think every industrial surgeon gets a very profound interest in the matter of the handicapped who comes into the employment department looking for work.

At one time I got, so very much interested that I was willing to make the assertion that I didn't care how many legs or arms a man had, because I knew that in the plant there was work and a job for every man. After we had carried out this policy for some time, we developed some statistics which were rather interesting, showing that our labor turn-over was vastly lower among the handicapped, and their accident incidence was materially less than among the plant as a whole.

It seems to me that in the matter of reclamation of the handicapped, this one thing deserves a special emphasis—the relation of the individual plant to its own and the community handicapped; for example, we are seeing every day or two statistics concerning the number of men who are rejected for employment on account of physical defects, and I have frequently made the assertion that I would wager that I could go into the plant and pick out a hundred jobs that could have been held satisfactorily by the man who was refused employment that morning at the employment window. I still believe it.

I occasionally see statistics that eighteen per cent are rejected because of physical handicaps. Then I know that the system in that particular plant is a mighty poor system; I know the men in that plant are not interested in this big, big end. We know that, statistically, ten per cent of the men are rejected, and ten per cent should not be rejected in any plant at all. Some time ago in our organization nearly ten per cent were rejected, and I am quite free to confess that we were doing a rotten job.

How many men deserve rejection for physical handicaps? In our plant we have it down to five-tenths of one per cent, and five-tenths of one per cent is getting pretty close to the irreducible minimum, because we can't employ an active tubercular or a small-pox case, and they do come for work.

I should like to emphasize this matter of the actual, honest-to-God interest that a surgeon ought to take in the co-ordination of his work in the use of these handicapped men. Dr. Mock's system is perfectly wonderful to me, and I admire him greatly because of it, but that system must stand or fall upon the ability and willingness of the employers to use these handicapped men, whether their own employees or somebody else's. I think that we ought to give more study to the psychology of these men, these poor devils with a leg off, lying in a hospital, becoming hospitalized, and becoming floating defectives. But yesterday I had the pleasure of visiting the B. F. Goodrich Works in Akron, where this work is being brought to a very high state of perfection.

This company selects the man for the job, or the job for the man, and then adjusts the man to the job. I speak now of the sub-normal men, of the men and women who are below normal. They are given a job; they are pretty sick; they are placed on a three-months' trial list, and they get what medical treatment they need during those three months. If they can make good at any kind of job in this plant, they are kept on the permanent list. It is one of the best things I saw in Akron. Twelve doctors and twenty nurses are engaged in that work with twenty-five thousand employees.

ADJOURNMENT.

JOINT MEETING

HEALTH SERVICE SECTION AND AMERICAN ASSOCIATION
OF INDUSTRIAL PHYSICIANS AND SURGEONS

September 29, 1920

DR. OTTO P. GEIER, CHAIRMAN

President, American Association of Industrial Physicians and Surgeons

WEDNESDAY MORNING SESSION

CHAIRMAN GEIER: In the absence of Dr. Clark, I will call on Dr. Patterson to make the report of the nominating committee appointed yesterday.

REPORT OF NOMINATING COMMITTEE

DR. PATTERSON: Your nominating committee recommends for the ensuing year Dr. A. W. Colcord, of Carnegie Steel Company, Dr. W. A. Sawyer, of the Eastman Kodak Company, and Dr. A. J. Lanza, of the Hydraulic Pressed Steel Company, for Chairman, Vice-Chairman, and Secretary, respectively.

(It was voted on motion duly made and seconded, that a unanimous ballot be cast for the gentlemen named.)

PRESIDENT'S ADDRESS: THE FUTURE OF INDUSTRIAL
MEDICINE IN A LABOR POLICY

DR. OTTO P. GEIER, DIRECTOR, EMPLOYEES' SERVICE DEPARTMENT, CINCINNATI
MILLING MACHINE COMPANY, CINCINNATI, OHIO

INTRODUCTION

If one would adequately discuss this subject, it would be necessary to define at least the following problems:

- (1) What is a labor policy and how is one developed?
- (2) What is the economic and social value of a labor policy in production?
- (3) To what extent has industry adopted such policies?
- (4) What is industrial medicine?
- (5) Does industrial medicine vitalize the development of an efficient labor policy and thus assure its future?

The scope of the subject is tremendous and cannot be confined within the period allowed, so we may but undertake to discuss briefly the five queries in the outline.

UNIVERSAL UNREST

When we try to measure industry's responsibility toward world affairs we recognize that every conscientious person today is giving more serious thought to political and social questions. Never before have economic and social problems had the national and international importance; never before has universal unrest the new "weltgeist" shaken the foundations of so many governments. One by one have all our well-rooted ideas as to the permanency of many institutions believed unshakable been so forcibly cast into the discard. Nations, political systems, century-old economic and political theories and practices have gradually disintegrated before this new universal unrest, leaving the world face to face with the necessity for beginning anew to reconstruct our whole thinking processes so that the semblance of order may come out of the present chaos.

There exists a smug theory that every great crisis is met by the springing forth of some master minds to grapple successfully with new situations. If such supermen exist today, they have yet to make themselves known, or perchance their voices are unheard in the turmoil of the mob. If ever we needed statesmanship, it is now, and yet as we daily read the cabled news, we get the impression that nations at large are adrift.

INDUSTRIAL DISCONTENT AND LOW PRODUCTION

Looming up largely in this international unrest and disorder is an industrial strife in proportions beyond imagination. Just to what extent is industry, with its rather general lack of a labor policy, responsible? Strikes, lock-outs, seizure of plants by the workers, are but signs of a general discontent with the present order of things, resulting in general lowering of output everywhere. And this at a time when mass production is needed as never before to rehabilitate the war-stricken countries, to feed and clothe the millions now underfed, stricken with disease, and almost naked.

This unfortunate outlook is rapidly brought before our minds not to discourage but to stimulate, not to suggest that we be on the lookout for the superman to lead us out of our difficulties, but rather to impress upon us the necessity of each doing his part, to the end that greater sanity and justice again prevail. Governmental regulation and legislation will not prove a cure.

World peace and progress will be born finally of individual right thinking and doing, rather than old-time statesmanship and diplomacy, and of no phase of the world's disorder is this more true than of industry.

INDUSTRIAL STATESMANSHIP LACKING

It is no pleasant admission, but the leaders of industry have been slow to realize their individual responsibility not only to their own workers, but to the broad social and economic questions of the day. Too many industries have been run by single-track minds, conscious only of the possible profits to be made. Such minds give no thought to human factors of management, such minds do not formulate a labor policy. Only when strikes impend do they give heed to labor relations, and then only to

run to cover with other employers for purposes of defense. In brief, these types of business heads lack a constructive policy for industrial peace, and are therefore only blindly prepared for labor's method of warfare.

THE LABOR MOVEMENT AND THE GANG SPIRIT

If, in the past few years, labor has seemingly grasped too much for the general good, we can rightfully blame industry for failing to do its share in keeping the pendulum from swinging too widely. All men are bound to seek leadership. We all respond to the gang spirit from youth on. Organized labor in large part has supplied a certain kind of leadership, and right or wrong in its tenets, has satisfied the human longing to belong, to have something to say, to do other than just to earn, to be recognized as an entity, to find some form of self-expression. In times of strike and industrial strife the worried employer belatedly tries to assume some leadership, only to find that it cannot be imposed on the group or substituted for that which already exists. Industry does not attempt to build up an effective production organization over night, nor stand ready to change its managers for new ones on short notice. Even more slowly and less kindly do employees take to radical changes in their leadership.

CONSTRUCTIVE LEADERSHIP FOR LABOR

If employers at large are dissatisfied with the character of leadership in labor's ranks, if they would make it less radical, more constructive, they will have to help create a feeling among the average workman that this present leadership is not safe for the general good. To do so the employer will have to become as astute in appreciating the employees' psychology as is the labor leader. To accomplish this difficult task he must first inform himself about the history of the labor movement, its purposes and promises, its methods and results, for then only will he be able to dissect its strength, its weaknesses, and failures, and hold them up to light. But even then he will have no audience to sway, no group to persuade, unless he has proven by past performances that he is just and fair in his dealings with his fellow men and deserves their confidence and leadership. Primarily, then, the employer must have a labor policy, which is exactly what too few men at the head of industry now have. Too often a blind prejudice against all organized labor is substituted or mistaken for a labor policy.

LABOR POLICY A COMPLEX STUDY

The very definition of the word policy includes a thoughtful conclusion based on all obtainable facts. In the case of a labor policy, all the facts include all the basic principles of social and economic justice that enter into wage relations, tempered, necessarily, by the varying attitudes of the respective employer and employees. In brief, we have here the most difficult complex study facing any human being, one that is never completed, but one always to be adjusted and brought up to the moment or it becomes less effective. Each separate industry, more or less affected

by the processes and limitations that enter into the product, has its particular labor problems which further extend to the craft of which it part. Yet all these conditions, in some instances, are in turn defined, moulded and influenced by the composite will and desire of the group and the community at large.

To have a labor policy, therefore, that will stand the crucial test, management must then be willing to put real brains, energy, and heart into the study of itself and its employees and their relations to other employees and employers, as well as the community. Management must possess its soul with patience, with forbearance, for most slowly this knowledge unfold itself. Much wisdom will come from broad ranging, more from the practical results of other similar searches after economic truths, but the most exact information will come out of the disorganized effort at better mutual relations. Nothing will avail until he can establish such ordinary but useful human relations between himself and his group; and by this very measure will he be successful. He must learn to talk their language, to anticipate their misunderstandings, to accept gracefully their early suspicions in the hope that through frequent contacts, through frank and painstaking exchange of ideas, usual barriers will finally break down.

A NEW TYPE OF PREVENTIVE MEDICINE

Industry and society need today an ever-increasing group of serious-minded, well-trained physicians and surgeons who realize the great social and economic contribution that they may make to industry and society by a special study of their opportunities to serve both the employer and the employee. In conserving the body and mind of the worker, the industrial physician is able frequently not only to add to the earning capacity of the man, but also to change his attitude towards his job. Incidentally he educates the employer to the dollar and cents value of individual and community health.

If we but stop for a moment to consider the world-wide attitude of industry towards the physician in general, and particularly how he is accepted by the industrial worker not only as a medical advisor, but as a friend and counsellor, we may at a glance perceive how industry, by bringing this new personality into close contact with its workers, provides a point of sympathy and understanding which can be supplied readily by no one of any other class, be he a highly-trained employer, manager, social or welfare worker, or what-not. When industry accepts this noncontrovertible fact that in the physician and his old-time relations with the patient it has a new and definite asset, then will progress in building up personal service departments be made more quickly.

Who dare deny for a moment that the contacts produced in an industrial clinic under the supervision of a high-grade medical officer are most natural in the world; that here human helpfulness may find its best expression, free from any paternalistic slant, providing a type of service for the worker otherwise unpurchasable, unsecurable. The employee can usually secure for himself almost all of the recreational

educational facilities which a well-developed human relations department attempts to provide, but the medical guidance is a service in a class by itself.

LOWERED DISABILITY FROM SICKNESS AND ACCIDENT

In establishing a one-hundred per cent health department service, industry supplies a type of preventive medicine which was never before conceived by the medical profession, the benefits of which even the wealthy do not enjoy. Daily supervision of health, ready accessibility of the patient to the doctor, innumerable opportunities for observation of minor symptoms and conditions finally build up an entirely new type of preventive medicine which is bound to reflect itself in a lowered sickness rate, and therefore a lowered death rate.

The thousands upon thousands of contacts that are made each year with the men through the medical and service departments give the employees an appreciation of the purposes and difficulties of management, and on the other hand, give the management an insight into the personal problems that confront the men. It is when this clear understanding between the two is reached that management becomes fully successful, to the ultimate gain of both employer and employee.

If the physicians connected with industry are to establish a real place for themselves and the new specialty of industrial medicine, they must intensively apply themselves to the work before them. Mere finger wrapping and the giving of gun-shot prescriptions or pills inside of a dispensary connected with industry does not qualify a man to state that he is practicing industrial medicine. With such professional assistance industry only fools itself in the belief that its medical department is serving the workers. This type of work is worthless to industry and has furnished the labor agitator with ammunition with which to attack the meritorious system of physical examination and medical supervision.

That physician, however, who has the management's support and who has a broad understanding of the problems of industrial relations, modern employment methods, safety and sanitary requirements of the plant, and who appreciates the relationship between these things and the wage loss due to accident and disease is in a position to make a marked contribution to industry and therefore to society.

ADEQUATELY PAID PHYSICIANS REPORTING TO MANAGEMENT

This brings us, however, to challenge industry to exercise the same care in selection and show the same willingness to pay an adequate price for properly equipped physicians that they display when hiring other executives for the plant. A cheap doctor, like a cheap manager, spells disaster. Many good physicians are finding their opportunities to serve industry in a big way made impossible by being placed under the control of some narrow-gaged safety or employment men whose chief concern is the size of his payroll. Good preventive health work costs money, and unless the plant physician can sell this idea direct to the management and from that source receive encouragement for further effort, he will soon degenerate into the routine finger-wrapper and pill-vender mentioned above.

We submit then for final and thoughtful consideration:

- (1) That production is fatally low.
- (2) That unrest is universal.
- (3) That industrial discontent is extensive.
- (4) That general unrest and industrial discontent will be cured not by legislation, but chiefly by the collective result of intense individual effort, each employer working out the problems in his own plant.
- (5) That the general lack of a labor policy has contributed not a little to these conditions.
- (6) That the acquirement of an effective labor policy is a man-sized job, extending over years.
- (7) That a constructive policy will heavily stress the value of health in the worker.
- (8) That physicians giving their whole thought and energies to industry are an important factor in labor relations.
- (9) That industry's power for social and economic good or evil is unmeasurable. It can and must solve its problem of labor relations. It can and should set new standards of health control.

If industry knew how largely it dominates life at large; if it really sensed the tremendous responsibility it bears towards society; if it could be made to see how our whole commercial, social, and economic existence is finally and absolutely dependent upon its actions; if its leaders would realize that the force and character of industrial life pulsates throughout the community, making for good or bad citizenship, for unhappy, restricted existence or for healthy, contented, constructive living; if these leaders could know to what extent good human relations in one plant leavens and makes safe the body politic, then in truth would they wield that power more largely for the common good.

The power of kings is as nothing compared to the collective power of industry when working for society's welfare. Massed within its walls are great units of society whose quality of citizenship will finally be the measure of democracy's success. The ultimate fruit of industry is not its products, but will ever be either a discontented, unhealthy, apathetic, thriftless community, or it will be an energetic, successful, growing community, vibrant with good health and happiness, producing most per hour of employment, and adding steadily to its wealth.

Which shall be the choice? Upon the answer depends the future place in history of our industrial national life.

CHAIRMAN GEIER: The industrial physician must not only know occupational hazards, etc., but he must know the conditions that surround the men; he must treat the men well when he first examines them upon their entering the plant; he must do everything that will bring to him their support and their confidence. When he is a thoroughly trained physician with years of practice and medical service, and comes with these other qualifications into the industrial clinic, he then sees every patient in a new way, and his approach is quite different. He no longer merely hears a hack or a cough, because if he is in truth the proper man in that job, he is looking beyond into the background of this individual to see whether

he can perchance find in the factory the thing that has brought on the hack or cough.

So, when a man from some department where he is exposed to lead comes to the physician with some minor symptom, the physician should not ordinarily pass that up and credit the man with a little pain, but he should be wondering all the time whether this light, negligible symptom is possibly a forerunner of this more serious occupational hazard symptom. Therefore, in order to understand this relationship of the industrial physician to industry, we have got to try to probe into the minds of individuals who live in industrial clinics and who there successfully serve the workers.

The other point that was so wonderfully stressed yesterday is the statement that the physician must, first of all, be the man's choice. That can only come about by the highest type of service, and by freedom from fear on the part of the worker that the information he is giving to the industrial physician is to be used to his disadvantage. The worker should be led to feel that whatever information he gives to the physician as to his physical or mental condition, will only assist him to be placed to his better advantage in the plant and ultimately to the advantage of the employer.

When charging industry with lowering the morale of physicians working for them, we must not for a moment overlook the deadening effect of the casualty companies in some instances by their methods of employing physicians in connection with industry. When casualty companies are aroused to the fact that they are having this damning influence on physicians and that by their methods they are tending to industrialize the effect of the short-sighted policy of permitting somebody else to make their adjustments, then perhaps this whole matter of industrial relations will also move more rapidly and make way for more physicians of proper caliber to take their places in industry.

DISCUSSION

DR. A. W. COLCORD: It seems to me that Dr. Geier has not over-stated the great future of industrial medicine; if anything, he has under-stated it. I think there are wonderful things to be brought about by industrial surgeons. When we go around, when we visit the homes in industrial towns (it is true in Pennsylvania and I think it is true all over the United States) and see the large amount of preventable sickness and preventable deaths, of suffering, of loss of money from loss of time, and the expense of taking care of the sick—when we feel that one-half of all that sickness is preventable, we see the great field that is before us, the great work.

It is our privilege to help do that work, to help prevent some of that suffering, that loss of life, that loss of money. We are just starting in that great work of preventive medicine in the mills and in the homes of our industrial workers.

I can only emphasize what he has said about the relation of the

employer and of our industries to the workman—the closer relation, the feeling we must bring about among the men, that we are their friends and that we want to help them. And it is our privilege to interest the employers of labor in this great work. We must keep right at them day and night, and make them feel that they are their brother's keeper, that they must help. And they are helping; we are succeeding.

Many of our leading industrial surgeons today are succeeding largely because of their ability to interest the companies for which they work in this great work. They are doing team work; they are all working in the harness together.

I admire greatly the work that Dr. Farnum and his running-mate, Mr. Avery, are doing at Peoria. Dr. Farnum says that Mr. Avery keeps just two or three jumps ahead of him, and he has to work hard to keep up with him. It is largely through Dr. Farnum's enthusiasm that Mr. Avery has taken this interest, and they are working like a team in the harness. That is what we must bring about. We must bring together the whole company to work for this.

FATHER MOULINIER: I can't remember that I ever heard a paper, in my medical career of ten or twelve years interest in medicine, that is so deep and significant for the welfare of this country as the paper read by Dr. Geier.

I must tell you just a little bit about the reason that I come to this conclusion as a matter of personal experience. I have been connected with the Medical School of Marquette University here in Milwaukee for ten years. I have been studying medical education all during those years, from the point of view of an educator. For the last six years I have been president of the Catholic Hospital Association, and that has brought me in close contact with hospital service to patients. For the last four years I have been intimately connected with the American College of Physicians and Surgeons in its efforts at standardizing hospital service.

You see, therefore, that with that background, the things said by Dr. Geier in this paper medically have a tremendous meaning to me. Now, if added to that you will think of the fact that I am deeply interested in sociology, in the broad sociology that includes every human relationship, you will still further understand my deep interest in this paper and my appreciation of it.

I can't do anything more than absolutely commend it and express my desire that every man and woman here who has heard it will try to get it and read it. And I should like to hear a motion from this body that that paper be reprinted in pamphlet form and be sent to every employer on this continent, in thousands and thousands of numbers, because the medical profession has not the social and economic point of view as a profession. You are the very few people in the medical profession that have it. Further, it is almost impossible to teach it to the medical students. I teach the methods; I teach them psychology; I try to give to them that point of view, in a small body, in a school, but how many of the profession get these fundamental ideas in their school training? Almost none.

I will say to you that your convention is bringing and will be bound to bring lasting benefits to our community. I trust and hope, and I believe that you will receive the co-operation here which is necessary to make this Safety Week the most successful of any you have thus far conducted; and I believe we will make good in having no deaths in Milwaukee during the week you are in session here.

Let me say in conclusion that no doubt the most important part of your work is education. You have brought to Milwaukee this message of care, caution, and safety in a way that brings it home to us as individuals. Therefore, we want to say that we appreciate your coming here, we wish you the greatest success in the future; we hope that this convention will not only be the greatest but the most successful you have ever held, and we trust that you may keep on growing until it is practically impossible for any preventable death to occur in the United States of America from accident. I thank you.

PRESIDENT RICHARDS: On behalf of the Congress and the members of the National Safety Council, I wish to thank you, Mayor Hoan, for the hearty welcome you have extended to us.

PRESIDENT'S ADDRESS

R. C. RICHARDS, PRESIDENT, NATIONAL SAFETY COUNCIL,
CHAIRMAN, CENTRAL SAFETY COMMITTEE, CHICAGO AND
NORTHWESTERN RAILWAY COMPANY, CHICAGO

It is immensely gratifying to the responsible officers and committeemen of the Council to see from this great gathering of men and women that interest in this movement for the conservation of the lives and limbs of the people of this country is increasing by leaps and bounds,—a movement that, as has been said by Slason Thompson, the well-known railroad statistician, has borne better fruit in a few years than was attained by legislative enactment in thirty years, is entitled to receive and maintain the interest of all good citizens; and when you look over the program and read the names of the men and women who are to take part in the general and sectional meetings, you can, I think, realize how important these Congresses have become. There is no movement in the world that is of more importance than the Safety Movement, and there is no movement that is in greater need of men and women of vision and enthusiasm, of men and women of education, training, knowledge, ambition, experience, and wisdom—and as you know, we get knowledge from books and from the experience of others, but wisdom only from our own experience—of men and women who are willing to devote a part of their time, without thought of compensation, for the benefit of humanity.

We must remember, in carrying on this work as in everything else, that men and women are valuable just in proportion as they are willing to work in harmony with others, so we should always be willing to co-operate with others in this great work even if our ideas and theirs sometimes differ; the essential fact remains that human safety depends ulti-

of what he has gotten in his courses in the schools and internship, but especially of industrial medicine and surgery? It is a post-graduate course by its very nature. The young mind does not grasp those things. They have not the social outlook, have not had enough experience. You must take them into your shops, and into the medical departments of the industry, and have them there as your assistants, paid or unpaid; and you must bring your employers to understand that this is an obligation they owe, not only to their own industry, but to the country. And they owe it to you as a profession, to help you and to bring the young men there and train them as your successors.

Now, realize that. The schools are working with the Council on Medical Education and with the American College of Surgeons, by withholding their diploma until after the internship. Some nine, ten, or eleven Class A schools have done that already, and they are going to come rapidly to it. They can't go beyond that; a school can't go any further. I don't think the Council on Medical Education can go any further. But it seems to me that you have a parallel function in your great profession with that of the American College of Surgeons; namely, to take care of this great mass of young medical men between their internship and their time of independent practice or group practice in your medical departments of the industries, to make that as big a work as any body of medical men might care to have.

It is wonderful. It is taking care of your brothers, of your own professional younger members. It is what the great medical profession has been doing, and if you don't help them, it seems to me that you are lacking in a professional sense of obligation to the whole body.

Now, let me say just one more word: The industrial medical man, it seems to me, learns all the fundamentals of medicine and surgery in the school. There is no difference between surgery in the shop or medicine in the shop and surgery or medicine anywhere else. You are simply trying to bring harmony where disharmony has been established in working out the biological laws of the human system. The thing you have to learn is the outside environment of social relationships or human relationships, as Dr. Geier has put it. And it is not only mere medicine and surgery I mean, the fundamental sciences of anatomy and histology, pathology, physiology, and chemistry—those you all have. It is not so much there that you must emphasize the work in industrial medicine, as I see it, but you must have neurologists, you must have psychiatrists, you must have men who know psychopathic care and treatment, and all the broad range of drug hysteria. Dr. Geier spoke of it as mental treatment.

TEACH FUNDAMENTALS OF RIGHT THINKING

I am going to carry that just a step farther. You must provide not only mental treatment, as far as it enters into neurology and mental diseases, but you have also to help the men think right socially and economically. The working world today, I believe, is in a mass condition of mental disease, neurologically, perhaps, but more than neurologically—economically, sociologically. People are thinking wrongly. They don't know the fundamentals of right thinking.

There is no one, not even excepting a clergyman, who gets closer to the men, and who is in better position to help them to think right than the physician. Right thinking is the start of it all. Your safety engineers are emphasizing the educational point of view. Think of the tremendous consequences of injury. Get that into the child, and eventually there is going to be more care to avoid accident. But you have got to get your men to think right, not only in this matter that I just mentioned from the social and economic point of view—to make them look upon these wrong economic thoughts and theories as a kind of insanity—not only for that purpose, but also in order to have them function right physiologically. Isn't it safe and correct science to say that nearly every accident is due to some wrong physiological functioning?

DR. CLARK: It might interest you to know that at least one company is doing this work of training the young men in industry. At the Norton Company we are taking young men just out of medical schools, for three to six months, paying them a little salary and giving them this experience under good industrial experience.

MR. G. L. AVERY (Sec., The Avery Co., Peoria, Ill.): The work that we are doing started as a defensive proposition, you might say, at the time the compensation law went into effect. We were put on the defense, believing that if we were to pay compensation for injuries, we must know what the injured man's condition was when he was employed. That gave us a basis upon which to start.

"WHAT IS GOOD FOR THE MEN OUGHT TO BE GOOD FOR THE BOSS"

Then the question was, how could we extend this medical work so as to get our men interested in improving their health? It was clear that we first had to sell the idea to the men; they must be willing to take the examination freely. So we started with one of the officers of the company; he was the first man to take the examination. He said what was good for the men ought to be good for the boss. The result was that he was under our doctor's care for one year and a half, because we found ailments that he did not know were there. And he, himself, became one of the principal factors in selling this proposition to the men whom he had known for some thirty or more years in the shop.

We tried to capitalize each injury; in fact, we rather welcomed an injury, providing it was not too serious, in a different department, to get this work started. As each man was cared for, he went back and worked for the plan among his brothers. Thus, the scheme gradually grew in favor among the men.

Dr. Geier has brought out one thing that I had in mind to speak of more particularly, and that is the question of dealing with the men after the injury—the personal contact we have with the men after the injury.

We have been carrying for over eight years what we call the deductible average clause in our policy. It is an excess form of policy. We carry insurance up to a certain amount, two thousand dollars for each case. That gives us the opportunity to deal personally with the men, because in the early days we found that the insurance people have a differ-

ent viewpoint in handling these men. The deductible insurance proposition gives us a chance to come in personal contact with the men, and it gets the doctor, lawyer, and the employer closer together. Then we can have a closer understanding with the employees; and when we have treated them fairly and right and have taught them why we came to certain conclusions, then we have no trouble.

DR. PATTERSON: I only wish that this paper of Dr. Geier's might go not only into every factory throughout our land, to be read by the management, but be put forth as a document to be read by every man and woman who works.

The state at large is not conscious of the terrible toll that is now being paid by society at large, due to the fact that industrial medicine and surgery has not become an absolute requirement of the state for the treatment of every works accident. And by industrial medicine and surgery I mean to emphasize simply this: That we who are physicians know that if the injured person comes under competent medical attention early enough, the chances of lost time by reason of that industrial accident are reduced to the absolute minimum, because septic infection is prevented.

BURDEN IN LAST ANALYSIS FALLS UPON SOCIETY

In Pennsylvania within the last two and one-half years, we have had more than 750,000 industrial accidents with a loss of time which exceeded two days. I am satisfied, if every one of those accident cases had had the benefit of competent medical service by a properly trained industrial physician within a reasonable time after the occurrence of that works accident, that the loss of time would have been greatly reduced, and that the enormous sum of money, more than \$75,000,000, which was lost by reason of compensation payments and loss of wages, would have been materially reduced. The general public does not appreciate the fact that this burden in the last analysis falls upon society.

(It was voted upon motion duly made and seconded that Dr. Burlingame's paper and Dr. Geier's paper be given the widest distribution possible on the part of the Association and by any other means, through the secretary of the Association of Industrial Physicians and Surgeons.)

(A rising vote of thanks was given Dr. Geier for his services.)

CHAIRMAN GEIER: Whatever ideas I might have had in concluding this paper, have been dissipated by the kind remarks made about it. It is embarrassing for the president of the Association to find that he is putting extra financial burdens upon the society of which he is just taking charge. The fact that you have discussed this paper and shown a general interest in the viewpoint it presented, confirms my belief that industrial medicine has the future I tried to indicate.

Just where the physician shall fit into a business organization, of course, is quite a paper in itself, and I would ask your permission to have the other papers read and discussed before we enter into that phase of it. This much we know: That the place that a physician will hold in an industry will depend upon its size, to begin with; secondly, the size of the man who is taking the job as head of the health department, but primar-

ly, I think, upon the position that the management takes toward the broad question of social economics and health.

When a wise manager, in directing a far-seeing policy in its personal relations department, wishes to give the physician some portion of the labor problem, he will have to place that man so that he is not reporting to some underling, some man with a narrow view of medical work, but he must place that man where he will have a feeling of dignity, a feeling of responsibility, and where he will report to management and be able to educate management and employee alike.

That seems to be the weakness in plants generally around the country—that physicians are placed under an employment manager, shop superintendent, or safety man, and perhaps no one of these three has any idea of what the man's opportunity is to serve the workers. There is no use to have a physician there unless he is really to have a chance to serve the worker.

I believe this, that when you consider the size of organizations, you will reach the conclusion that an industry employing, say, five hundred men, can employ a full-time physician. I believe that that man should be qualified by training, college experience, human relations contacts, and everything that comes through practice, to take charge of the personal relations department and have under him such clerks for employment and safety as will unify this whole question of protecting the worker from accident, disease, and inducing into the organization a spirit of mutuality, of self-respect, of desire for health, and that thing Father Moulindier so well expressed, a citizen type of mind, a feeling of responsibility toward the community and his fellow workers and to capital at large. Then, in truth, can you have a true personal relations department. I think that is where the physician can serve tremendously.

Now, I don't mean to suggest that that sort of physician is limited to small industries. That same thing applies to larger groups. It is only the question of getting at the head of the personal relations department sufficient brains, sufficient heart, sufficient intelligence, sufficient appreciation of social values to understand the fundamentals and guide the activities of the human relations department. I know that I have seen many good physicians strangled in their efforts by the fact that they were not placed in the proper relationship to management. It seems to me that is the keystone to the situation.

Let me say this in conclusion. Industry today is spending hundreds and hundreds of thousands of dollars individually, and millions through casualty companies in the meeting of problems of accidents. Dr. Patterson said that within the last two and a half years in the State of Pennsylvania alone there were more than seven hundred fifty thousand industrial accidents, with a loss of time which exceeded two days. Now, when we multiply this by seven, we get an appreciation of the problem of disease. If industry is willing to pay these millions for the adjustment of accidents, it would seem fairly intelligent if it would spend some money on something seven times as serious.

I will now call on Dr. William O'Neill Sherman, Chief Surgeon, Car-

negie Steel Company, of Pittsburgh, Pennsylvania, to present his paper on "Industrial Surgery."

INDUSTRIAL SURGERY

DR. WILLIAM O'NEILL SHERMAN, CHIEF SURGEON, CARNEGIE STEEL COMPANY,
PITTSBURGH, PA.

Industrial surgery as a specialty has been a development of the past ten years. While surgeons and doctors have been associated with industrials for many years, they were never considered as an integral part of the plant or works' organizations. The enactment of employers' liability legislation, together with a realization by progressive and humane employers, has brought about a demand in industry for surgeons who have shown their fitness and ability, not only as surgeons but as executives, who have a broad and liberal vision and grasp of the many problems common to the environment and needs of the respective industries. The delay in recognizing and including the surgeon in industrial organizations in the past was partially due to the lack of training and sympathy on the part of the medical profession. It was considered unethical, and frowned upon by certain of the profession, to be associated with an industrial institution in which the doctor was compensated by salary. It is obvious to those familiar with the subject that the only way a surgical or medical organization can be efficiently operated is on a salary basis, dependent upon the time spent and qualifications of the doctor.

The old plan of contract practice which is followed in certain communities today, in which the doctor is employed by being paid a fixed monthly rate for each employee and he in turn employs underpaid assistants, is to be condemned. There are certain local conditions, such as isolated mining communities, where this plan is the only practical and efficient one, but in such cases all the doctors should be paid salaries commensurate with their ability. The contracting, or directing doctor, is entitled only to his fair share of the earnings, and not to the lion's share of the collections. We recall incidents where the so-called contract doctor was collecting from twelve to twenty-five thousand dollars annually, paying his young assistants \$100 to \$125 monthly. As a result of such a policy, the employees as well as the doctors and employers were being cheated. In such isolated communities where it is necessary and expedient to organize by collecting a fixed sum from the employees, an attempt should be made to organize along the lines of the group system (Modified Mayo clinic). This is being done in many parts of the country and has resulted most satisfactorily to employees, employers, and doctors. Local conditions and environment must at all times be considered before proceeding with such an organization.

WORLD WAR REVOLUTIONIZED INDUSTRIAL SURGERY

Much of industrial surgery has been more or less revolutionized as a result of the recent world war. We are now able to save lives and

extremities from amputation that formerly would have been lost. The Carrell method of treating wounds and infections, the wax treatment of burns, the mobilization (i. e., free exercise of muscles and joints) of fractures (Thomas splints, Jones splints, Balkan frames, etc.) and the reconstruction surgery by means of plastic reconstructive operations, active and passive exercises, electricity and massage, are all applicable to industry, and should be adopted without further delay and absurd discussion. Many, many lives were needlessly sacrificed, and countless amputations could have been prevented, had there been some general policy tending to the immediate application of new and modern methods throughout the armies, until such time as better or more improved methods were available. It seems almost inevitable that any change of methods or treatment from the old orthodox methods is due for severe condemnation and criticism on the part of those who know nothing whatsoever about the subject and those who think they are infallibly wise. It is our duty to accept new ideas when they are conclusively proven. Every real advance meets with such violent opposition that as a result the public fail to gain the benefits of scientific discovery until years after the first introduction. We should not be gullible to everything that is being advocated; however, the unreasonable reactionaries are just as great a menace as the most ignorant.

There is no excuse today (excluding certain exceptions) for the so-called infected cases. In the great majority of instances this is due to carelessness or ignorance on the part of doctors or nurses. In well organized industrial services, infection is almost unknown. In this respect, the industrial surgeon has shown the way to the general surgeon. It is imperative that we use every possible resource to cure our patients within the shortest possible time, with the best possible functional result. Those who complain that certain dressings or apparatus take too much time to apply, have no moral right in the medical profession because they are unwilling to give their patients what they know to be the very best.

Championier 25 years ago advocated early mobilization (i. e., free exercise of joints and muscles) in the treatment of fractures. His advice was unheeded until the onset of the war. It is now generally conceded that early mobilization of joints in fractures and infected joints is vitally necessary if early functional result is to be expected. By putting into practice many of the treatments which were demonstrated to be of great value in the war, we have been able greatly to shorten the convalescence, reduce the compensation, and return the injured to his former employment with a saving of 30 to 65 per cent of the time usually lost. It is obvious that we should keep uppermost in our minds the necessity for returning the injured to work at the earliest possible date with the least loss of function. Time lost from accidents is a loss to employer as well as employee.

Industrial surgeons can learn much by visiting hospitals and industrial organizations where up-to-date surgery and methods are being practiced. Every effort should be made to introduce new and improved methods.

MEDICAL SCHOOLS RECOGNIZE THE IMPORTANCE OF INDUSTRIAL SURGERY,
MEDICINE, AND HYGIENE

The medical schools (Harvard, University of Cincinnati) have recognized the importance of undergraduate instruction in Industrial Surgery, Medicine and Hygiene, and have within the past few years included in their curricula subjects bearing on these specialties. At best, they can only give a brief course of instruction to undergraduates. Efforts should be made by our medical schools to include jointly the subjects of Industrial Surgery, Medicine, and Hygiene, and Military Surgery, Medicine, and Hygiene. There is little or no material difference between them.

The outbreak of the war found us totally unprepared from a military standpoint. We are just as much unprepared medically in industry. We should have a post-graduate course of instruction in some industrial center, such as Chicago or Pittsburgh, where the clinical material is ample for such teaching. There are many positions unfilled today because of the lack of properly trained industrial surgeons and executives.

The Department of Industry of the State of Pennsylvania has recognized the importance and value of joint meetings of industrial doctors and employers to discuss their many mutual problems. These conferences have been of much constructive value and have had a tendency to elevate standards throughout the State. The subjects discussed were germane to industry and were of a character seldom presented at medical meetings.

The recently organized Industrial Section of the A. M. A. has awakened the American College of Surgeons to a full realization of their position. In the near future, we can expect helpful suggestions and constructive recommendations which, undoubtedly, will be of value to the profession as well as to industry. It will have a tendency to elevate the standards and introduce into industry the highest professional talent, and ideals. The large employers of labor are only too eager to accept a constructive and helpful program if it can be conclusively proven that it is to the advantage of the employee.

Vocational training of crippled or impaired soldiers by the Government has been of great constructive value in that it has salvaged many of the injured from the so-called cripple gangs and restored them to useful occupations. It is the duty of the State to establish vocational training schools so that those who have been incapacitated can be taught a trade or given instruction whereby they can make a comfortable living. The vast majority of the so-called cripples can be rehabilitated in so far as industry is concerned. They become self-respecting citizens as well as producers instead of non-producers and social and industrial eye sores.

A careful study of the physical and mental qualifications of the individual should be made in order that his efforts should not be misdirected. The Industrial Surgeon should interest himself in vocational training and lend every assistance to bring this about.

It is quite evident we have only scratched the surface of Industrial Surgery, Medicine, and Hygiene. It is imperative that those engaged in this field equip themselves properly to render the very best of service to both employee and employer. Those of us who have sufficient breadth

and vision are going to fill a great vacancy. Mechanical, chemical, civil, and electrical engineering have been wonderfully developed during the past fifty years. Human, or Medical Engineering, as applicable to industry, has been almost lost sight of and has only recently made its presence felt. The opportunities are great and it behooves us to keep pace with the public. Industrial surgery is certain to develop rapidly during the next decade, and we should at all times adjust ourselves to the scientific advances as they are applicable to our work.

Those engaged in this work who are interested chiefly from a monetary standpoint can expect little success and should withdraw and enter some other field. The successful industrial surgeon is the one who loves his work, who receives his chief reward from the satisfaction of work well done, and who treats his patients as he himself would like to be treated were conditions reversed. Always be frank, honest, and sincere with your patients; don't forget they, too, are human and not pieces of machinery. Such conduct on our part will gain their confidence, good will, and co-operation, and will have a great tendency to bring the surgeon closer to the employer and employees.

CHAIRMAN GEIER: Unless the organization rules differently, I am going to read Dr. Moorhead's paper now and have the two papers discussed jointly.

FRACTURES INCIDENT TO OCCUPATION

JOHN J. MOORHEAD, PROFESSOR OF SURGERY, N. Y. POST GRADUATE MEDICAL SCHOOL AND HOSPITAL, NEW YORK CITY

We are accustomed to believe that certain occupations are inherently dangerous to life, limb, and health and for that reason seek to erect safeguards by various methods which are well known to you. We have reached in various branches of medicine what might be called the age of prevention; we seek to attain that in various branches of surgery also. Malaria, typhoid and yellow fever are now recognized as preventable maladies. Pulmonary tuberculosis and other diseases almost as rampant as the "white plague" will some day become as uncommon as was typhoid fever among the soldiers in the late War. Cancer is the one great menace yet unchecked and my belief is that the War has set us back many years in the conquest of this foe who was being fought hard in laboratories and clinics the world over. Doctors and scientists of all the civilized world were temporarily deviated from their accustomed work by the onset of war and their labors were centered in caring for the injuries and accidents incident to the greatest occupation the world ever saw. The injuries of this temporary occupation called War were practically wounds and fractures and despite the concentration of medical thought and study on these two problems, no radical departures from established principles can be recorded, no strikingly new method of treatment has resulted that will help us in our management of the accidents and injuries of peace time. Certain advances have been made, but they were applicable in the main to military and not civic activities; they could be put into use for military but not for industrial welfare.

Industry has always been regarded as the primary cause of accidents, and it still retains that position; but in recent years the extensive use of automobiles has made travel accidents a very close competitor. In certain non-industrial communities, the ordinary accidents and injuries incident to everyday life scarcely afforded the physician an opportunity of caring for that large group of the injured which physicians in industry so often encountered. But the accidents incident to automobile usage has changed all this and now physicians the country over are brought into direct contact with this new element in their practice. In my own city (New York) automobiles are now productive of so many accidents that their use has practically created what may almost be called an occupational hazard. Industry, transportation, mining, and ordinary mishaps now constitute the big four in the causation of injury.

In a broader grouping we may say that injuries occur as the outcome of pursuits indoors and outdoors; they are the outgrowth of work or play; they arise from gainful pursuits or occur as ordinary hazards.

In these post-war days of stress, accidents are increasing; their severity in industry is lessening, but is rapidly increasing elsewhere. In this diminution, organizations such as yours have taken a place in which you may well take pride. In a very large sense our entire community is engaged in some form of "occupation" and it is in that sense that I attempt to speak to my theme: "Fractures Incident to Occupation."

SEVERITY OF OCCUPATION DEPENDENT UPON OCCUPATION

For descriptive purposes we may say that fractures are of minor, moderate, and severe grades, not in the quantitative sense of the size of the broken bone, but in the qualitative sense of the damage done to osseous and soft tissues. A compound comminuted infected fracture of the right index finger may be more serious to a mechanic, a stenographer, a pianist, than a fracture of the thigh in the same individual. A laborer, a fireman, a policeman may be crippled by a fractured ankle, but a broken skull in the same individual may in no wise affect earning or productive capacity. However, a high official of one of our allied countries was recently forced to go out of office because of a minor fracture of the skull although a crippling injury of several limbs would have permitted him to remain the honored incumbent of high official position.

In other words we can say that the severity of a fracture is inversely dependent upon the occupation and not upon the severity of the injury. With this mathematical basis in mind, we are enabled to estimate the potential possibilities of a fracture not upon the initial severity but upon the probable outcome in terms of deformity or disability.

This brings us to the problem of treatment, for after all the diagnosis is no longer hidden in this day of universal X-ray usage. In passing let me say that we place too much reliance on this means of diagnosis, we use our eyes and our fingers too little, we are losing our inherent special senses from atrophy of disuse. Let us employ our special senses more for diagnosis reserving the X-ray to determine the success of our attempts at reduction.

There are certain simple principles of treatment to guide us. These are pre-Hippocrates in origin, ages old in application. The styles of splints change almost as often as the clothes we wear, but like our clothing they seek to cover (or uncover) the parts beneath.

There are four essential principles in fracture treatment—the four H's I call them. They are (1) Recognition or Diagnosis; (2) Reduction or Setting; (3) Retention or Splinting; (4) Re-education or Functioning. Of these the second (Reduction) and the fourth (Re-education) are the most important.

Briefly permit me to set forth some of the cardinal factors in each of these four groupings.

I. RECOGNITION OR DIAGNOSIS

Let us at the onset first determine that we have a fracture and not a contusion-sprain or dislocation. If we are in doubt, let us treat our case as a fracture until we prove the contrary. We may well invoke the doctrine of probabilities in reaching our conclusion, notably in respect to joint injuries. Almost 99 per cent of deforming and disabling injuries of the hip joint are fractures of the neck of the femur and nothing else. In the wrist and ankle, this proportion is about 85 per cent. In the smaller joints, like the fingers, fracture, not dislocation, not contusion-sprain is the ultimate diagnosis. If we will remember this, we will less often have rude awakenings in our hip, ankle, wrist, and hand injuries. Let us realize that basically there are only two classes or types of fracture, either of which may be simple or compound. Type I is the displaced form in which the fragments are unapposed. Type II is the non-displaced form in which the fragments are apposed. In Type I we must not only reduce our fracture but also retain it; but in Type II we need only retain it. This clarifies the situation to a considerable extent; it makes us realize that in some cases we do most when we do least.

II. REDUCTION OR SETTING

This phase of treatment applies to Type I only. Let us realize that efficient reduction is the key to success and that splints however modern or elaborate will not of themselves aid reduction in the slightest. This I cannot emphasize too strongly because too many of our cult believe that a splint of fancy name or fancy form will work some magic change in the hidden bone. A splint only helps to keep the part in the position we place it; no splint of itself ever set a fracture.

We must get in the habit of using anesthesia more often as an aid to reduction. Nitrous oxide is the safest and best for ordinary use. Ether or ethyl chloride are the next choice; but chloroform is very dangerous in any accident case. Begin every act of reduction by making the original deformity worse to loosen fragments and stretch the soft parts. End every act of reduction by overcorrecting the original deformity. Absolute relaxation is a necessity because displacement of bone is due alone to abnormal muscle pull and we correct our bony mal-alignment by restoring mal-aligned muscles. In no joint fracture is muscle pull more potent

than in Pott's fracture and unless we fully relax the tendo-Achilles our efforts may fail, and to do this the best way is to fold the thigh fully on the abdomen and then make traction with the limb in that position. There are certain cases inherently impossible of reduction without open operation or skeletal traction. Let us recognize these and not waste time attempting what experience tells us is impossible. In this group, personally I place certain fractures of the thigh, of the lower leg, of the forearm and os calcis. I advise operation in fracture of the olecranon and the patella provided the patient has the physique and the surgeon the technique. The introduction of buried foreign matter like plates, screws, and wires is only most exceptionally needed.

III. RETENTION OR SPLINTING

The first requisite of a splint is safety, the next security. Moulded plaster of Paris should be used in that class of case in which we ordinarily choose a circular cast. The latter are dangerous and they prevent ready inspection, hence do not permit early massage and motion. Thomas splints are excellent for the lower extremity, especially for first-aid treatment. The Jones arm splint is an excellent device also. But each of these requires constant supervision and for that reason are most useful in hospitalized cases. My routine for fracture of the neck of the femur, in selected cases, is the plaster of Paris abduction splint. For fractures of the thigh elsewhere, the Steinmann nail or the callipers (ice tongs) is the method of choice. For the lower third of the leg, the stirrup of Finocchietto is the choice. Forearm fractures (irreducible by two attempts under anesthesia) are cut down upon and forced into place by jamming the fragments or holding them in place by kangaroo tendon. For non-union, autogenous bone grafting is the usual necessary measure.

Too tight or too loose splintage is, next to non-reduction, the most usual cause for failure of the fracture to unite and accordingly we must guard against this. Here again moulded plaster of Paris is very helpful for in effect this is the custom-made splint that is designed to fit the patient, unlike the ready-made splint to which the patient is fitted.

IV. RE-EDUCATION OR FUNCTIONING

This, as stated, is the second most important phase in treatment, reduction being of all the most necessary. Early massage and early motion should be part of our therapy and the nearer the fracture to the joint, the earlier these may begin. The foundation of this part of our treatment is the recognition that in the pathology of a fracture, the osseous damage is only the core of the lesion and that the soft tissues, muscular, tendinous, articular, vascular, and neural—usually share in the composite picture.

In a Colles' fracture, for example, massage begins the day after the injury, passive motion on the fifth day, active motion on the tenth, all splints off at the end of the third week. In every joint fracture, the early use of massage and motion means less stiffness, less atrophy, less weakness when union has become firm. In lower extremity fractures, especially of the thigh, the use of walking calipers (made from a Thomas

splint) will get the patient out of bed, will exercise muscles, promote circulation, restore function nearly fifty per cent more promptly than by older methods. Physiotherapy is a sovereign aid toward recovery, and no longer can we regard our patient as cured until function is restored. When we return our patient to the occupation from which he came, then and then only should we regard our duty as fully done. Cooperation from our patient is a great asset for without that it is impossible to attain the safe and speedy outcome we now seek to attain.

As to compound fractures, we now aim to convert them into simple fractures by applying the war lesson of sparingly cutting out all the damaged soft parts, suturing or partially suturing knowing that by this method of controlled debridement we can combat infection and in effect make of our open a closed fracture.

Briefly we have tried to show that the occupation of the patient is a main factor in the situation irrespective of the gravity of the fracture. We have tried to stress the importance of reduction and re-education as essentials in determining the outcome.

We realize that there are two types of fracture only and that the treatment of one is often difficult, the other easy.

We recognize certain fractures as being in the "irreducible" class and in these we do the operation of open correction or use the Steinmann, the tongs, or Finochietto procedure.

We begin massage and motion early, not forgetting that physiotherapy will often give us an excellent result when the contrary appeared likely.

We convert selected cases of compound into simple fractures by the process of debridement.

Finally we recognize that a fracture is a problem in major surgery, that the possibilities of crippling are inherent, that it often requires more skill and experience to obtain real recovery than in many abdominal operations. Traumatic surgery is not always spectacular, it will always appeal only to a certain class of physicians, it is becoming a specialty of its own and in the recognition of its importance, industrial surgeons have taken a prominent part.

CHAIRMAN GEIER: These two papers are now open for discussion. Dr. W. Irving Clark will open the discussion of Dr. Sherman's paper.

DISCUSSION

DR. CLARK: It occurred to me that the thing which might be of interest to take up in the discussion is the method by which the industrial surgeon at the present time is keeping in contact with his case from the time of injury until the time at which the man returns to work. That, we admit, is the thing that should be done; therefore, I shall try to outline a method.

METHOD OF KEEPING IN CONTACT WITH CASE

When the man is injured, he is taken to the nearest first-aid station or sub-dispensary in the factory. This requires that the man be moved to a place only a short distance from the place where he received the injury

to be given adequate first-aid treatment. The patient is then either transported to the main hospital in the plant, or the doctor is called to that sub-hospital, where the preliminary treatment before transportation is given. The patient is now ready for transportation. The fractured femur (we are now speaking of serious accidents) is put in a Thomas splint, and the ambulance is then called and the patient is taken to the hospital.

Now, the plant surgeon, who is competent to take care of all such work, should be on the hospital staff. So, we shall assume, in this particular case, that the surgeon who is in charge of the factory hospital is also the operating surgeon in a hospital run in a measure by the factory, or in a private or city hospital in the manufacturing center. This case is now ready for that surgeon's services.

If an operation is required, as it usually is on these badly lacerated cases, that work is done by the surgeon, who knows the work that that man was doing at the time the injury was caused, the probable amount of destruction of tissue, and what work that man will be expected to do when he goes back to the factory. With that background the surgeon is able to do work which is infinitely superior to anything which can be done by one who has not that background. He, therefore, operates with that point of view, and the subsequent treatment of that case is entirely in his hands.

At this time he sends his visiting nurse to the hospital to keep in touch with the patient. The visiting nurse is able to carry messages from that man to his family, and to assure him that his family is receiving proper assistance. We all know how difficult it is for families to get into hospitals, except on visiting hours; and this ability of the man to call on the nurse for extra service is a tremendous help in keeping up his morale during the period of hospital treatment. This is also a great encouragement because he knows that the plant has not forgotten him and that a place is being prepared for him as soon as he is able to resume work.

When the man is discharged from the hospital by the industrial surgeon himself, he either returns to work or to his home, and is taken to the hospital dispensary for dressings. The advantage of this is that he keeps in contact with the factory. He does not lie at home and get into the home habit; but he is brought every day by the visiting nurse to the dispensary of the factory, where he keeps in touch with his fellow workers, and never loses the work atmosphere.

As soon as the man's wound is in such condition that he is able to return to some type of work, he should be given such work and go for dressings, if necessary, to the factory dispensary. Finally he either resumes his original occupation, or he is placed in a position where he is able to get a maximum amount of money for the work which he is able to do.

RE-EDUCATION THROUGH ACTIVE WORK

Now, as to re-education: In France I found it was pretty definitely decided by the French surgeons that the best method of re-education was to put the man at work; that all this plan of doing little things in bed,

and working with a Sander machine, and various things of that kind, was helpful from the psychological point of view, but the real curative advantage was not to be obtained until the man made active motion of his limbs in accomplishing something which he psychologically felt was of great advantage and which made him feel he was doing something that should really count. Therefore, we should try to get our surgical cases back at some kind of work where they are in the factory and feel that they are part of the industrial organization.

DR. HOPKINS (Chicago and Northwestern Railway, Chicago, Ill.): Eighteen years ago, when I became identified with the Northwestern Railway after serving three years in a hospital and a year abroad, I was amazed at the lack of interest that was shown by the laity or by the employer as to the character of doctor or surgeon who was employed to look after the injured employees. In railroad surgery, particularly, he was often employed by the division superintendent, who employed him because he was his family doctor or because he had some political pull. It was merely the fact that he was a doctor, and that was enough—just the title, whether a horse doctor, corn doctor or any old doctor, it didn't make any difference.

I thought over that thing for a long time, and it made me sad to see some of the results obtained and some of the methods carried out by the man, and some of the reports which came in. The more I thought, the more I saw a field for missionary work, and from that time on I began to study the situation. Although I was assistant for a number of years, I quietly and gradually, without making myself offensive to my superior officer, tried to improve the type of work that was being carried out upon a large railroad system.

A number of years ago, when I finally took charge of the department, with a number of surgeons under me, one of my chief desires was to employ men of the highest type, men who had a high standing in their community as men, as citizens, and as surgeons. I was backed by the broad-minded president, who stood by me in every respect. He said, "When you find that you can not run this department along the lines you have outlined, let me know, and I will appoint some one else."

I have been amazed at the number of reports that come in from men who are supposed to be of high standing and of long experience, as to the type of treatment that they use, their ideas of first-aid, their meddlesome interference in fractures or severe injuries, and the number of times that they will perform amputations because it is the quickest way out—not considering the final result to the individual, and the economic waste to the individual, to the community, and ultimately to the state. They will have an amputation case well and out of the hospital in four weeks, but by using some sense, care, and a little responsibility and science, a limb might be saved, although it may take six months.

The idea of first aid of so many of the men is often amazing to me by the degree of ignorance that they display in handling certain chemicals, showing that they are un-read, that they don't keep informed, and that they are still working along the lines that were inaugurated twenty-five

or thirty years ago in regard to bichloride of mercury, which we know is absolutely useful, iodine, etc.—but the subject is a big one and it would take some time to cover it.

DR. CHACE (Texarkana, Texas): It seems to me that in a general meeting of this type, where laymen as well as physicians are present, the papers ought not be so scientific, so technical that they are not clearly understood by the laymen. Also, we ought, if possible, to avoid papers that are really exhortations for the subject of industrial surgery, as far as we can. Father Moulinier brought up the essence of this thing when

FAVORS STANDARDIZING INDUSTRIAL MEDICINE

he said that we ought to standardize industrial medicine. I believe we are past the stage when exhortations are necessary, except perhaps to individual employers, also, perhaps to individual physicians.

We ought to state in words so clear that they are unmistakable just what the relationship is between the physician and his patient in industrial medicine. That great subject of venereal disease is far greater in its incidence than fractures and everything else put together. I have not yet heard that relationship discussed.

What we ought to do for the young medical man when he is ready for practice has been mentioned. Father Moulinier brought that out, too. That should be discussed in detail. These things are very important in industry.

Let us get it clearly fixed in our minds that industrial medicine and surgery is passing the stage of experiment. Nowadays you don't have to exhort people to weigh this thing, but we do have to standardize it, get past the experimental stage, and get to the point where we can say that this and that thing are right and the other thing is wrong in industry. Our records ought to be standardized, and our procedures, methods, our relationships to the employer and employee ought to be stated in much clearer terms. When we have done that, we can accomplish something and interest the people who are laymen as well as physicians.

DR. R. W. ELLIOTT (National Lamp Works, Cleveland, Ohio): I am not interested in industrial surgery, except that I have practiced surgery for some fifteen years, because our accidents are minor accidents. I will say this, however, that I believe the importance of minor accidents is greatly overlooked. We are now investigating in connection with our law department this phase of the subject—the loss of money from neglected minor injuries.

FIND OUT WHY ACCIDENT HAPPENED

Many of our thousands of employees are young women, and this is a phase of work from a surgical standpoint that appeals to us. There is another phase of the matter I do not think is very often touched upon in our work, because it is of minor character: I don't care whether the doctor touches that wound or that broken or lacerated finger, I want him to go out into the shop and see what has happened and why it has happened and that it does not happen again. He can tell the nurse how he wants the finger dressed, but I want him to find out from the foreman

whether that girl was improperly trained and sent to work too soon, or whether she was not using a safeguard and in that way got hurt, or whether she was unfit for the business and in that way got hurt.

There are three questions that I have requested our staff doctors to ask themselves as they look at a patient and to consider from her standpoint as well as from the factory's standpoint: Can that wound be dressed or that simple fracture be taken care of in such a way that she can return to work? If so, she shall return to work. If she can not do the work she has been accustomed to do, is there anything else she can do in the factory, so that she will not stop work and lose contact? It is a bad thing for people to stop work. If the girl is earning something and continues working, she does not get the habit of loafing. The third thing the doctor must decide is the necessity for her to stop work entirely. If that is necessary, the doctor should inform the employment department how long it will be necessary to employ a substitute to do the work that the injured employee had to stop.

I say again that we have not very many hazardous conditions, but it is a multiplicity of these little aggravating, annoying occurrences that we are trying to reduce to a minimum, and we have them. We are working with glass, and glass can do an awful lot of damage in an institution.

CHAIRMAN GEIER: I think Dr. Elliott has very splendidly given us the socialized economic type of industrial surgery. I am going to ask Dr. Harpster, of Toledo, to say something on this subject.

DR. C. M. HARPSTER (Toledo Railways & Light Co.): The subject of the relation of the surgeon to his organization has been touched upon somewhat, and as Dr. Chace says, we have not settled the real status of the surgeon. I think that unless the surgeon has the president of the organization back of him, it is very difficult for him to accomplish good results in this line of work. If all the different departments are organized, if they are all closely allied, that is, the welfare, the claim, the legal, and the medical departments, and all the different divisions of these departments, and also the important department of transportation, mechanical department, etc., then we have the proper basis.

In our plant we have every week three meetings of the round table, that is, the heads of the department have a round table conference, and the matters of each department is gone into with the president of the company.

PROBLEMS OF FRACTURES OF THE SKULL

In studying the problem of fractures of the skull several years ago, I analyzed between 7,500 and 8,000 cases of transportation injury. It may be interesting for you to know that we found two and one-fourth to two and one-half per cent of all injuries that occurred in this group were fractures of the skull or injuries of the head.

The fracture of the skull itself is not the vital problem to consider. We should consider the condition of the patient primarily and not the fracture of the skull itself.

Recently a man was brought to us with the whole side of his head pushed in. We could not get any instrument under the bone to pry it

back. Now, I think it is a mistake to remove from the skull all pieces of bone. If we can wedge that bone back, our experience shows us that it will be repaired again. In this particular case my assistant suggested that we drill off and take the DeVilbiss rongeur and cut through the deepest portion of the depressed fracture. We could not pry it back, so we drilled that back until we came to the extremity of the fracture. To remove all this bone that was depressed and some of it loosened would have made an extensive defect in the skull. This man had a perfect recovery.

Now, regarding the question of depressions of the skull that are left after the injury and regarding the epilepsy following these conditions: I have never seen a single case where I would say that the depression of the skull had produced epilepsy. Several cases which have come under my observation have been treated by drilling off the side and putting some instrument through this hole and raising the depressed fragments. It was impossible in some cases to raise back the extreme edge of the fracture farthest removed from the point where we drilled. Probably all the depression should be brought back into position, but I want to advise against the promiscuous removal of a whole lot of fractured skull bone that you can wedge back into position.

CHAIRMAN GEIER: Back in 1914, when I first had the privilege of attending the annual Safety Congress, among the humanized surgeons I met at that time was Dr. Farnum. I am going to call on Dr. Farnum to humanize this discussion.

DR. FARNUM: I have been called everything in the world but a humanized surgeon. It seems to me that one or two things have come up that need a little additional emphasis, and one of those is the matter of keeping these patients from becoming hospitalized; in other words, doing something to get them back at work. In relation to fractures, I feel that that is especially necessary.

In my own experience it might interest you to know that in eight and one-half years, 86.4 per cent of all our fracture cases have not drawn compensation in the State of Illinois. That means that they have not been away from their work seven days. Sixty-four and six-tenths per cent of the fracture cases in our plant have not been away from work more than one day. Now, these are figures that would be utterly impossible if it were not for the one thing that some of us have harped upon a long while, job classification. The jobs in a plant should not be merely in the mind of the employment manager, but also in the mind of the surgeon, so that a man with a Colles' fracture who has been handling pig iron does not need to lose more than four or five days of work. These cases have no business being away from work more than four or five days; not because the man can go back to handling pig iron, but because there is something else in that plant that he can do. In the psychological handling of men, that must be taken into consideration.

~~~~~  
"WHY IS A MALINGERER?"

These humans are not any different from us, I don't care what their nationality is: they are all just exactly the same. And if somebody is

really caring for these fellows, they are going to come clean. When I get into meetings occasionally, I hear men talking about fellows who don't come clean, and I always get boiling mad, because when it comes to malingerers I want to say this: if you have malingerers in your plant, it is not the malingerers' fault, it is yours. Why is a malingerer?

The average one of us is not going to be very white or going to come clean all the way unless the other fellow is just as clean as we are under the same conditions.

We have had in our plant in eight years, 17,600 accidents. We have an Industrial Commission in the State of Illinois, and I would like some of you to guess how many cases our company has had before the Industrial Commission of the State of Illinois. We have had seven. Four out of that seven were sent up by us because the insurance company under the deductible average clause would not let us settle with them.

Now, don't get it into your mind that we are running any philanthropic organization down there. We are running a "he" man's business. But when we get together with men, it is a question of honest-to-God men, men who believe in coming half way; and the other fellow always comes half way. The consequence is that while I am not prepared to say there is no such animal as a malingerer, I am prepared to say that if you have malingerers it is because you are making them.

DR. HARRY E. MOCK (Chicago, Ill.): Dr. Farnum has touched the keynote when he says that it is the personal contact between the surgeon and the men. I know in my factory work, when I was connected with a large industry, we got the men back to work. Now that I am out of the industry, in handling the employees of small industries and the people that are injured on the street, in trying to apply to the general hospitals the principles which I learned in industrial work, I find great difficulty in doing it. That is the reason that I am so anxious to see a central location in every community where humanized surgeons and humanized laymen can put these poor duffers to work. It can be done. The malingerer and that type of man that you can't get back to work can be influenced if you start while he is still in the hospital and get some work for him to do. The minute he is able to leave the hospital, get him a job somewhere; if not with his old company, then give him a philanthropic job.

In Chicago we are establishing a convalescent center and we are taking over eight plants to meet that very situation. When the industries won't take the men back, this convalescent center takes them in.

DR. C. W. HOPKINS (Chief Surgeon, Chicago & Northwestern Railway Co.): Where you have a plant in a community that you can't control personally, and an eleven thousand mile railroad, with shyster lawyers who are allowed by the government to thrive all over the United States and influence these ignorant Polish people, I would like some one to explain to me how I can get the men back to work. They won't go back.

DR. SHEERMAN: Dr. Clark has outlined the exact plan that we have carried out, following up the patient from the time he was injured until the time he went back to work. It is the personal association with the patient in carrying out those plans that brings the best results.



## AMERICAN COLLEGE OF SURGEONS ENDEAVORING TO STANDARDIZE EQUIPMENT

Now, as to standard equipment: The American College of Surgeons is endeavoring to standardize equipment. We shall have to get down to a standard treatment. All over the country every doctor has a different method of treatment. There should not be seventy-five or a hundred ways of treating every one thing.

Ten or fifteen years ago Lane came to this country and pointed out in detail the absolute necessity of doing these bone operations without hand contact. That was, as I said, ten or fifteen years ago. He started at Boston and went all over the country; and how many surgeons are carrying out that technic? What are the results? They all say, "Well, we have infection, we have pus." Yes, and ninety-eight per cent of those infections and pus are due to ignorance and carelessness on the part of the doctor because he is stubborn and will not accept these new ideas.

Don't lose sight of the fact that the public is just a little more progressive than we are, and we are not going to fool the public in the least. It is up to the medical profession to keep abreast of medical progress, or the osteopath and chiropractor are going to put us out of business. It is all right to talk about these high ideals, but we don't carry them out. See how many hospitals in the country have Thomas splints, massage, passive and active exercises. There are very few. The patients are not given what they should have.

ADJOURNMENT.

## WEDNESDAY AFTERNOON SESSION

DR. W. IRVING CLARK, JR.: It is my great pleasure to introduce the new Chairman of the Health Service Section who was elected this morning. He will hereafter serve as Chairman of all these meetings and is now about to give the Chairman's address, Dr. Colcord.

CHAIRMAN COLCORD: I wish to thank you sincerely for your great consideration in electing me Chairman. I must confess it has been a very pleasant surprise.

It is with a great deal of temerity that I get up before an audience like this to discuss the subject "Physical Examination of Employees", before men who have done more of it than I have done, who do it so much better than I can, and who know so much more about it than I do. I feel that it is a rash thing for me to undertake. However, if I can say some things that you don't believe in and which will arouse some discussion, the paper will have attained its purpose and done some good.

## PHYSICAL EXAMINATION OF EMPLOYEES

DR. A. W. COLCORD, MEDICAL DIRECTOR, CARNEGIE STEEL COMPANY,  
CLAIRTON, PA.

When I was a young man, many, many years ago, I was greatly impressed by a lecture I heard at a teacher's institute entitled. "Pedagogus

Cui Bono"; "The Teacher—For Whose Benefit?" If we could paraphrase this we would have a more appropriate name for this address—"The Company Doctor, In the Role of Physical Examiner—For Whose Benefit?" When we had the great steel strike, one year ago, the unions made twelve demands and one was the *abolishment of physical examinations*. This is our indictment on the face of it. There must be something radically wrong with our whole system of physical examinations or the workers would not only be satisfied with them but would demand their continuance.

My aim will be chiefly to inquire why we have failed to convince labor that these examinations are mainly for the benefit of the employee. Let us ask ourselves whether we have undertaken this job in just the right spirit; whether we have grasped the opportunity; whether we have not let the "protect the company" idea cloud our vision and shut out the broader, better view. Here is our chance to help the man become healthier, happier, more efficient, live longer; a chance to make him feel our personal interest in him, a chance to start him on the way to become a loyal, contented member of the great big family that runs our plant. Are we letting this chance slip? Some one has said, "We examine the new man to keep out the unfit and fit the fit." This is all right as far as it goes. It is well to select the men who are adapted to our needs, and to find just what job each can do best; but this is not enough. We must not only fit the fit but must make the fit fitter—and we can often make the unfit, fit.

There are times when the Industrial Surgeon can serve his company best by not serving it. Whether on the witness stand, in the emergency hospital, or in the examination room the Surgeon is not an advocate for the company but a just judge—the apostle of the "square deal" and if he must leap, let it be toward the employee.

If nine days are lost each year by sickness by each worker, and if, as we are told, one-half of this sickness is preventable, we must first find out the causes of preventable sickness and then set about preventing it.

We may do this work along four lines:

1. Better working conditions in the mill
2. Better living conditions in the home
3. Finding out and arresting disease in its early beginning
4. Adjustment of the man's life to suit his physical condition

So much has been said about care of the eyes and teeth, and about tuberculosis that I mention them only to emphasize their importance.

There are especially two fields where more work needs to be done and where our minds remain somewhat unsettled. One is the Hernia question and the other is the heart. (See paper by the writer, "Hernia—Should It Be Classed as a Compensable Injury or a Disease?" *Pennsylvania Medical Journal*, August 1918.)

Our profession is just waking up to the importance of heart disease; to the fact that it is one of the three greatest causes of mortality; that it often disables the victim for years and, most important of all, to the industrial physician, that it is, if caught in time, curable, or arrestable."

We owe much to Sir James McKenzie for teaching us the relative unim-

portance of heart murmurs; that it is function after all that counts, and that we may detect these signs of heart failure early, while the heart is still efficient and so regulate the patient's life that he may have many years of usefulness.

Before the passage of compensation laws, examination of employees was unusual among the great industries.

About five years ago the Carnegie Steel Company began examining its men, gradually introducing it into its various plants. Since that time we have at the Clairton plant examined about 25,000 men. As more than twenty-seven states now have compensation laws, the employers of labor have felt that for their own protection they should have some form of examination.

These examinations have varied with the needs of the particular industry but more with the ideas and hobbies of the medical director of the company—some having the most cursory inspection without stripping, and others having a one or two hour examination, going over each case with great thoroughness. Some examiners place the greatest emphasis on eyes and ears, some are strong for tonsils, some think the teeth the main thing, while others concentrate their energies on looking for and trying to cure tuberculosis. Then we have the hernia enthusiast; the man who looks especially at the feet for fallen arches major and minor, hallux valgus, etc.; the heart specialist; the man with tobacco and alcohol phobia; the expert who would measure the man's mentality with a Binet test or his physical endurance with a muscle testing machine; the G. U. man who puts his applicant through the third degree as to gonorrhea or syphilis; and the laboratory man who would find out the most necessary things by making blood counts, urinalysis, Wassermanns, and taking blood pressures. I do not mention these to disparage any one of them but only to show to what lengths a hobby may carry a man. Out of all this we should select the necessary and the best.

#### THE EXAMINATION

In our physical examinations we must not lose our sense of perspective—must not exaggerate one feature nor minimize another. There is good in each one of these hobbies but we must not ride it too hard.

I believe aside from the clerical work a fair idea of each man can be obtained in ten minutes, on an average.

I would suggest some such routine as the following:

1. Height and weight, obtained by a clerk outside.
2. Applicant comes into examining room *stripped* and *alone*.
3. Examiner makes rapid, systematic inspection—noting his gait, carriage, appearance of skin, muscles, joints—and notes any scars, deformities, limp, or stoop. One learns unconsciously to note his apparent age, mentality, nutrition, signs of dissipation or ill-health, signs of physical training as of a soldier or athlete. To the trained examiner all this and much more is apparent in the few seconds elapsing while he enters and walks up to the examiner. It is well to follow some definite outline in this inspection

at first until it becomes a habit such as beginning at the top of the head and going downward—hair, eyes, face, neck, shoulders, arms, hands, chest, abdomen, genitalia, thighs, knees, legs, ankles, feet, toes.

Greet the applicant cheerfully and in a way adapted to his personality. This cannot be taught—but is one of the most important things in the examination. Many applicants are nervous, some frightened, some ugly at having to submit to an examination, some inclined to be over-familiar with the examiner. The greeting must be such as to quiet the nervous, allay the fears of the frightened, win over the grouchy one, and command the respect of the over-bold and familiar.

Above all we must make this first greeting win his confidence and make him feel that we are his *friend*. After we have done this, we have won the battle; he will tell us anything we wish to know; willingly submit to anything we may need to do in our examination; and he will help us in every way he can.

5. Having made our preliminary inspection and placed him at his ease we now lay him on the examining table and go over him more closely again, beginning at the top of the head and going downwards. In my own work I prefer to do this with the applicant standing.

Eye lids are everted and examined for trachoma or other disease. Corneas are inspected for scars or ulcers; the pupils are noted for inequality, irregularity, or immobility.

The teeth, mouth, and throat are inspected. I do not believe it necessary to make a record of each tooth but a general record may be made of teeth, tonsils, etc.

After noting condition of ears, neck, cervical glands, thyroids, etc., we proceed to shoulders, arms and hands, especially noting signs of previous injury, stiff joints, or old fractures. We then pass to the chest and with a stethoscope or the ear and a towel we rapidly listen to heart and lungs.

Our first inspection has usually indicated to us which points to emphasize in each case and whether a thorough chest examination is needed. We note chest development, deformity or asymmetry—getting a history from patient of empyema scars, area of dullness or flatness, protracted coughs, pneumonias or pleurisies.

We then pass to the abdomen, palpating spleen, liver, and appendix. The hernial regions are gone over, as the patient coughs—first inspecting, then palpating the rings and lastly invaginating the scrotal skin over the little finger into the external ring.

I have classified open hernial rings into three degrees according to how patulous or lax.

A normal ring, admits the little finger with difficulty—an open ring of first degree admits the little finger easily but has a firm border to the ring and shows little or no bulging on coughing. An open ring of the third degree has widely open ring admitting middle finger or thumb with distensible border. There is an open canal, usually with a weak aponeurosis on posterior wall of canal. If the inner ring can be felt and admits

the finger there is probably a hernia although we may not be able to get it out on coughing or lifting. We note the condition of whole hernial region observing any weakness of muscles—any signs of operation or truss-wearing. We must not mistake an enlarged gland, an undescended testicle or a varicose vein over inguinal canal for a hernia. We also observe condition of spermatic veins and evidence of bubo or its scars, varicocele, hydrocele or scar tissue from old orchitis or epididymitis. Acute gonorrhea, chancre or chancroid will of course be in evidence if present.

The thighs, legs, and feet are gone over in the same way noting stiffness of joints, scars, deformities, varicose veins, oedema, ulcers, flat feet, hallux valgus, etc. We have of course noted the presence or absence of skin eruption or scars of operation or wounds.

The examination of an applicant becomes, with long practice much like the reading of a page of proof by an experienced proof-reader: He goes very rapidly over a whole page and sees very little unless there is some error when a misspelled word, a letter upside down, or an omitted capital stands out from the page and instantly arrests his attention.

The going over in this way of a large number of men can with long practice be reduced to about ten minutes for each man on an average. The healthy man with nothing to note will require about six minutes, while here and there a bad case will require fifteen or twenty minutes. If a large number of men are being examined it may be well to give these subnormal cases only the routine examination at this time, having them come back at an appointed time for a thorough examination.

If we are to test eyes and ears we must add two or three minutes to the average time. In railroad employees, the color test will require one or two minutes more. Many companies have this done outside by a trained nurse before the doctor's examination. This plan seems to work very well.

Having completed his examination and written on the card all important points we have yet:

1. His grading as entered on the card:

I usually have in mind a marking on the scale of 100. Loss of a finger counts five; great toe, five; twenty one-hundredths vision in one eye, five; a stiff elbow in one arm otherwise strong, ten; loss of two fingers, ten; a deformity of leg or hip causing a marked limp, ten; deafness in one ear, five to ten; partial deafness in both ears, five to ten; stupidity, five to ten; stuttering or stammering, five to ten; hollow chest, stooping shoulders, poor nutrition, bad teeth, sallow complexion, heart lesions, old lung areas of consolidation, all having a value according to their gravity and especially in their bearing on his usefulness as a worker.

Having his percentage in mind, the rest is easy.

From 90 to 100—A.

From 80 to 90—B

Below 80—C

The C man is employed only after conference with the chief employment officer. Complete loss of one eye or one leg or a

hernia, grades to eighty or below and makes a man a C. Whether to employ such a man with our present compensation laws is a debatable point. Many companies do employ them and place them in selected positions.

Active venereal disease or other contagious or infectious disease should temporarily reject a man. An exception should be made of scabies or pediculi if the man takes measures at once to rid himself of them.

Trachoma should reject while active and showing pus in the eye. We have allowed cases of trachoma to work after the acute stage had passed provided the man used his own basin, soap, and towel, and kept himself under the treatment of a competent man till pronounced cured.

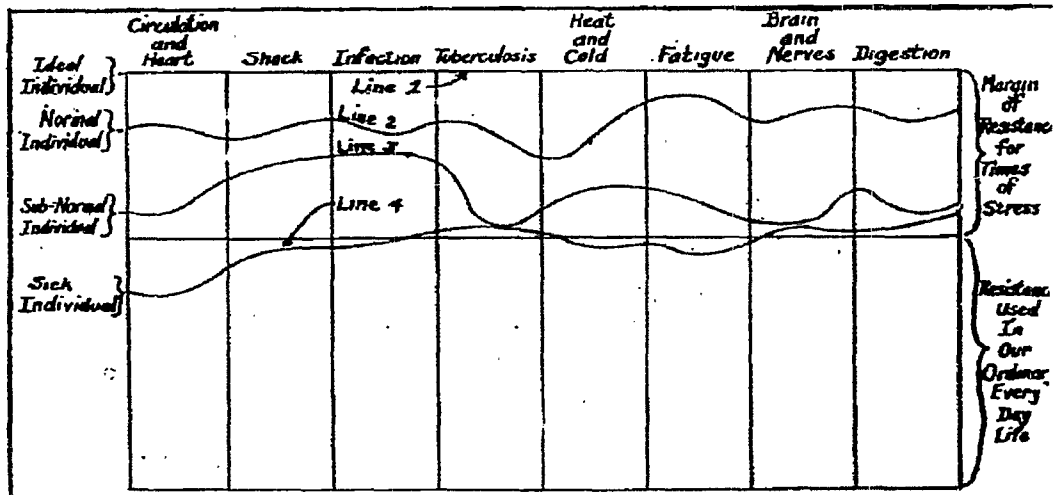
## 2. Estimation of Resistance:

In the evolution of a race whether of plants or animals, resistance is most developed along lines of the strongest attack. An oak is an oak because the winds have blown it, the winter has frozen it, the summer suns have scorched it and the drouth has tried to dry it up—it and its ancestors—for thousands of generations. "We are what we are because we have been doing what we have been doing." At those points in our wall of resistance where we have been subjected to the greatest stress, we have developed a special resistance. Our bodies have built up through the ages a mechanism for withstanding fatigue, shock, various poisons, the different infections such as tuberculosis or erysipelas, hemorrhage, hunger, heat, cold, heart strain, mental strain, dust, thirst, loss of sleep, deprivation from oxygen or sunlight.

From the cradle to the grave our life is a constant struggle for existence. Beset with foes without and within we gather strength by the fight we make. We slowly learn to adapt ourselves to our surroundings, to the life we must live, to the things we must do. Health is an adjustment of our body to its environment. Each organ has this power of adjustment within certain limits. When this limit is exceeded, injury and disease result. The heart adjusts itself to running, walking, sitting or lying, the blood pressure adjusts itself to the various conditions, rising in cerebral compression, arteriosclerosis and uremia, and falling during sleep or shock.

If continued strain is put on the heart its walls enlarge and thicken. If intra-abdominal pressure increases over a considerable period of time the muscular walls become thicker and stronger. This is especially true in manual laborers and it is this compensatory strengthening of abdominal walls that usually prevents the laborer from getting hernia more frequently than the clerk.

If we were to represent this wall of resistance graphically we would have the upper line (marked "1") on the accompanying diagram, showing a perfect individual existing only in our imagination, the "Wonderful One Hoss Shay" of Oliver Wendell Holmes.



Line 2 on the same diagram indicates a wall which comes we up at all points showing a good margin of resistance everywhere. This is our "normal" individual.

Line 3 represents a man whose wall of resistance is low at one or more points, coming down near the danger line. He cannot stand stress at these points.

Line 4 represents a sick man. He has not enough resistance to lead even an every-day life and he must be turned over to someone competent to treat him until his wall is built up at this point.

It is the business of the examining physician to locate the line of the man's wall of resistance; to find where he is strong and where he is weak; what he can stand and wherein lies his danger.

He must estimate the man mentally and physically—his aptitude to fill a responsible position, his endurance, his ability to keep himself or others from danger and his resistance to disease or exposure.

3. Personal conference with the man as to his condition, his care of his person and of his health. He will, if we have used tact to this time, tell us freely of such of his past history as we need to know, including his habits and way of living—good or bad. We now tell him as much of our findings as we think is good to him to know, show him what bearing these may have on his future health, happiness or longevity and direct him what to do or where to go to have his teeth fixed, his eyes corrected, his hernia operated, his scabies cured, or any one of the many correctable things we may have found. This personal interview is the psychological moment of the whole examination—the time when we can do much good or harm; we may miss a splendid opportunity to follow up our advantage we have already gained in winning his confidence and respect, by not telling him the truth.

he ought to know. There is no time when we can impress the excessive smoker of cigarettes of his danger as when we have just examined his heart. The man who is intemperate in eating, drinking or working can be warned of his danger.

If in this examination we have failed to break down opposition, clear the prejudice out of his mind that may have existed against physical examinations, show him that we take a personal interest in him, that we are his friend and are anxious to do him good—if we fail in this, I feel that our examination has been hardly worth while—we have wasted our time and energy and the company's money.

Those cases examined who have correctible deformity or curable disease should be seen at regular intervals to make sure that they are profiting by our advice. How much pressure should be brought to bear on them to compel their following this advice will depend on the policy of the employing company, and to a certain extent on each individual case and its needs. Certainly there should be some follow-up system, systematically carried out and every effort should be made to bring every employee up to the highest point of health and efficiency. I have said to a man with a serious error of refraction still uncorrected, "You will be employed with the understanding that you will report to me in ten days with properly fitting glasses." If such a man is not financially able to do this he should receive the necessary aid.

The applicants for employment, on examination, fall naturally into three groups:

1. **Normals:**

These will need examinations at regular intervals to make sure they are still normals.

2. **Subnormals:** These need—

(a) Adjustment of the man to his environment—habits—treatment.

(b) Adjustment of the environment to the man. Selection of department; co-operation of superintendent or foreman as to kind and quantity of work he should do.

(c) Correction or regulation of his home life.

(d) A keeping in touch by frequent re-examination and conferences to see whether he is placed right. How he stands his work—whether he is taking our advice.

3. **The Sick:** (Deferred till well)

Those who do not have the strength and endurance for even the lightest work or the routine of everyday life. If their case is hopeless we must return them to their friends and tell them kindly of the fact. If their sickness is curable we should refer them to the proper place,—family doctor, their friends, or if they have no family, friends or means we should send them to a hospital and assure them that as soon as well and able to work we have a place for them.

Those who have contagious diseases, whether active venereal



or otherwise must be sent away until they are not a source of danger to fellow-workmen.

This leaves few real rejections:

1. Those whom State Compensation Laws would penalize us for hiring. Such laws are inhuman and all such portions of the law should be repealed.
2. Those hopelessly sick.
3. Those who by mental or physical unfitness would be a source of danger to fellow-workmen.

In installing a system of physical examinations in a plant, I would suggest that we should provide for the following:

The rooms for examination may be a part of the plant hospital or may be connected with the employment offices. We have the latter arrangement at the Clairton Plant.

The waiting room is used in common with the Employment Bureau. From there the man passes into a dressing room with individual booths. When stripped, he walks into the examination room. This is a room 10x26 feet with three windows on one side. It is also well lighted by electric lights. The furniture consists of stationary wash basin, desk, swivel chair and two still chairs.

A rug is on the floor covered with a square of heavy duck to be changed daily.

A surgical table is placed at one end of the room on which the applicant lies during the greater part of the examination.

At the other end of the room are test charts for eyes.

The surgeon should be provided with the usual instruments for examination—scales, for measuring and weighing, stethoscope, blood pressure instrument, urinalysis set, microscope and accessories, tape measure, ruler, ophthalmoscope, nose and ear specula, tongue blades and head mirror.

The floor of the dressing room should be covered with some material which can be cleaned daily. There should be a shower bath and toilet connected with the dressing room or within easy access.

The above described arrangement is suitable for one examiner only. If there are specialists to examine each man, or even an occasional man, suitable offices should be provided, with necessary equipment.

All rooms used in examinations should be especially well ventilated, not only for the health of those in attendance but because the air soon becomes very offensive, if not frequently changed.

One or more policemen or other attendants should be on hand to direct the men as they enter and leave the examination room.

Some doctors prefer to have a clerk present to record his findings. I am aware that this is a great saving of time and relieves the doctor of much work, but it seems to me it destroys the privacy of the examination and robs it of the close personal relation between doctor and applicant to be discussed later. For this reason I prefer to do my own clerical work during the examination. One hears much discussion about where, how, and by whom examination cards shall be filed. Certainly there should be some system used making them easy of access. In my opinion they may be filed by an employment clerk and attached to the employ-

ment card—filing by check number with a cross index by name. When needed by the doctor he has only to ask the employment clerk for the man's card. We then have the man's whole employment and examination history before us and in case of re-employment, the same employment card and examination card can be used with such additional entries as are needed.

The difficulties in examining foreigners who can speak no English would seem almost insurmountable; yet in actual practice, when we learn how, these difficulties are more apparent than real.

After handling large numbers of the various nationalities, one learns, to a certain extent, how they think and what manner of approach is best suited to them and will best win their confidence.

I never use an interpreter and would much prefer to have the man alone though I could not speak a word of his language. In the Employment Office of course interpreters are necessary.

In the physical examination of women employees, I have had no experience and would very much like to hear this phase of the subject discussed by some one who has done this work. In the many large plants where it has been tried it has proven as necessary and useful as the examinations of men. It should be conducted in separate rooms and only by women attendants and women doctors.

#### SPECIAL EXAMINATIONS

In times of epidemic of contagious disease it may be necessary to make daily examination of all contacts. We have done this during several small-pox epidemics, allowing contacts to work in a crew by themselves, out-doors, and having a doctor or nurse inspect each man daily including temperature.

During the great "flu" epidemic of 1918 we had 1,000 men in our bunk houses. The "flu" hospital was equipped early with two graduate nurses in charge and each bunk house was inspected daily by an officer. Every suspicious case was at once examined by doctor or nurse and if "flu" was suspected, he was taken to the "flu" hospital and isolated. When the cases were convalescent, they were kept several days in a convalescent hospital before being allowed to return to the bunk house.

Although 30 to 60 per cent of the inhabitants of surrounding towns had "flu" during this epidemic, only 70 cases or 7 per cent developed in our bunk houses.

In addition to the routine examinations there should be a careful examination made of each case of slight sickness occurring among the workers. Our attention may be called to these cases in several ways, among them:

1. Visits to our hospital by men, while working, for slight ailments, such as headache, tooth-ache, indigestion. We average 7 such cases daily in our emergency hospital.
2. Cases found during visits of our welfare nurse.
3. Cases referred to us by foremen, superintendents, or fellow-workmen.

4. Disease detected while attending to any injury.

The way these cases of ambulatory sickness were handled in some of our military camps during the "late unpleasantness" is a good illustration of how it should not be done. In one large camp in the Middle West, these men lined up and were rapidly questioned and as rapidly classified into two great groups—the respiration group and the stomach and bowel group. The former got Brown's mixture and the latter castor oil.

If we are going to run a dispensary for our employees who get sick at the plant, let us run it right. Let us give each one such examination as his case warrants. Let us give him careful medication and advice and then either refer him to his family physician or follow up the case ourselves until we are sure he is well.

During the trachoma epidemic of a few years ago, I examined two thousand eyes in two days and one night, working continuously with the aid of one nurse. Twelve positive cases were found and twenty suspects. An eye specialist went over these cases, confirmed the 12 and added 3 cases of suspects to the positive list.

The positives were treated and cured—all but one. The suspects were given weekly and then monthly examinations for several months. The positives are still under observation. There has been one recurrence.

Our scheme of examination should include:

1. Complete examination of all now employed
2. Examination of all applicants
3. Re-examination of all who leave the service of the Company, one month or longer and return
4. Re-examination of all employees at stated intervals
5. Special examination of an employee who has just passed through a severe sickness or has had a serious injury. Also a man who shows in his work that his health is failing or that he is losing his efficiency.
6. Frequent re-examination of all subnormals.

If at this point in my address you were to stop me and ask me to give you a few reasons *why* we should examine employees, I would answer that if these reasons have not already been apparent in what I have said, I cannot give any better ones. However, as a summing up, I might select as the important benefits of examinations:

1. To sift out the physically, mentally, or morally unfit. In addition to rejecting the man with a hernia, or the man with only one eye, one hand or one foot, I think it just as wise to reject the degenerate, the man with active venereal disease, the chronic alcoholic, or the drug addict.

How far we should turn our mill into a home for the ruptured and crippled, a school for the feeble minded, a place of reform for the vicious or a Keeley cure, rests of course with the management; but certainly if we are going to do any of these things, we should do them with our eyes open.

2. To make a systematic and permanent record of the imperfections of those whom we do employ: The fingers off; the crippled hands;

the crooked elbows; the stiffened knees and hips; the flat feet; the corneal scars; the open hernial rings; the deaf ears; the flat chests; the heart murmurs; the scars of wounds and operations; the badly set fractures; the missing or decayed teeth; the rapid pulse; the exophthalmic goitre; the enlarged glands; the stuttering and the stammering; the hare lips, cleft palates, varicoceles, hydroceles, pigeon breast, and hallux valgus; the alcoholic breath and dilated facial capillaries—and so on through the long list. We should find out and record these things:

- (a) That we may more intelligently treat our employees when sick or injured.
  - (b) That we may be better protected against the malingerer.
  - (c) That we may more accurately estimate the damage we have done the man if we injure him.
3. To help us help the man; that we may put him in the right way to get his errors of refraction corrected; his hernia operated; his scabies cured; his teeth repaired; or his heart saved from further damage.
  4. It forms one of the best points of contact between employer and employee. If the examining surgeon is the right man in the right place; if he is kind and courteous; sympathetic and tactful; cleanly in his habits and attractive in his personality; if he has the gift of getting the confidence of the stripped stranger in one minute and keeping it; if he has the rare common sense to know just how much to say to each man—he can soon overcome all opposition to examination of employees. He can make the examinations one of the most popular and useful things about the mill. He can do much to make the new employee into a loyal worker. He can start the men toward better health and more efficiency.
  5. The men already working in the mill have a right to be protected against contagious or infectious disease; against the vicious, the hopelessly stupid, and the degenerate; against the man too blind or too deaf to protect himself or others from danger.
  6. Examination has shown us the frequency of certain diseases and conditions among the workers, and has placed us in a position to grapple the problem as a whole.
  7. The conscientious, thorough, systematic examiner receives a valuable training in this work, becomes more and more proficient in rapid, accurate diagnosis, and acquires a wide knowledge of men and a rare judgment in the placing of them that must be of great value to his employers and a source of satisfaction to himself.
  8. As the years go on, and as we do more and more of this follow-up work; as the improvement in health and efficiency of the workers becomes more apparent; as the great importance of preventive medicine is borne in upon us; as we look beyond the mill to the homes of the workers and see the appalling amount of preventable sickness among the men and their families, we shall feel the need of systematic, regular examination of *all the well*; we shall catch disease in its incipency; we shall study the causes of sickness and

remove them. Then and not until then will the industrial physician have fulfilled his mission and come into his own.

9. Finally, examination of employees, done in the right spirit and with the proper "follow-up", is in keeping with the trend of the times toward better living, better and healthier homes and mills; more help to the fellow that really needs it; and toward that feeling of brotherhood which must come if we are to solve the problems that confront us.

CHAIRMAN COLCORD: If there is no objection we will now listen to the paper of Dr. W. A. Sawyer, of the Eastman Kodak Company, on "Fundamental Requirements for Successful Medical Work in Industry". We will then have the discussion of the two papers, as both are along the same lines.

### FUNDAMENTAL REQUIREMENTS FOR SUCCESSFUL MEDICAL WORK IN INDUSTRY

DR. W. A. SAWYER, MEDICAL DIRECTOR, EASTMAN KODAK COMPANY,  
ROCHESTER, N. Y.

It is my desire to focus our attention for the time given, on what seem the logical basic essentials for industrial, medical practice. No doubt there are ideals, held by at least some of us, which keep us ever pushing on toward a fuller program. All very well, if at the same time we are avoiding the snare of too much individuality and making all possible progress along lines of co-operation and interest, from the upper executive realms down, through our own staff to the rank and file? Therefore, first of all we must have a spirit of sympathetic understanding from the top of the concern. Second, I cannot over-emphasize the value and need of adequate personnel—adequate first in quality and then quantity. I know of nothing so impossible to do without as the spirit of sincerity and confidence, emanating from the head of the medical organization, reflected and augmented by the personality of each assistant, doctor, nurse, or even stenographer, in order to warrant the faith and produce the support of the employer and employee.

It seems hardly necessary to mention equipment and quarters. Granted my first condition—co-operation from the top—and these will adjust according to the need. That the quarters should be clean, cheerful, and business-like goes without saying. It should accommodate the necessary privacy and equipment. The latter should include a real system of records as well as the medical and surgical accessories which the case demands. The elaborateness of these is no indication of the success of the Department, but the kind of a *program*, the evolution of the possibilities within the scope of your service, this is evidence of the usefulness of your organization. I once visited a factory dispensary where a full-time doctor was in charge and where it was only necessary for an employee to come to the doorway and ask for this or that medicine, much of which was in liquid form, in bottles all labeled with directions and

which were handed out without a question or a thought as to why or how. A large percentage of the clientele never crossed the door-sill and often they took with them this or that favorite remedy for a fellow-worker. This might be called industrious medication but not industrial medicine. The industrial doctor who realizes that certain changes are unavoidably overtaking the field of medicine and who helps to give hygiene and education the place they are inevitably to assume is surely adding length to his stride for success.

#### PHYSICAL EXAMINATION

Time does not permit of a comprehensive survey of all that enters into success in this field, for there is as much needed here as is needed elsewhere in the field of medicine, but when I permit my mind to dwell upon its manifold opportunities I return always to one important fundamental, namely, the honest, salutary, and intelligent physical examination. The first thing that enters the mind of a doubter, on this subject, is the *supposed* unwilling or even antagonistic attitude on the part of the employee. In concluding that this attitude is the case it is my experience that too much is taken for granted, and not enough given for the *method of procedure!* A thorough physical examination, properly recorded, explained to the examinee, repeated periodically, following up the delinquent and defective, develops a very solid basis for a thorough preventive and curative program, because service which is carried through can be understood, then appreciated and ultimately greatly desired by the recipient. I am sanguine enough to believe that in some not far distant day our procedure will be such that those applying for positions will ask for these examinations when they contemplate new employment, in order to be *assured* of greater safety and efficiency through proper placement, and that such procedure will add greatly to the consequence. There is no doubt but that our own attitude can do much to shape this end.

In most instances when physical examinations are mentioned all that is thought of is a rather superficial survey, at the time of taking up employment with an organization. Anything beyond this is neither contemplated nor hoped for. Such a cursory examination is better, perhaps, than none, but where can the line honestly be drawn? The real reason, the one mutually advantageous to both the employer and the employed for the maintenance of a Medical Department, is to *sustain* good health for each individual, with every worker at the job for which his physical qualifications at least do not unfit him. This not only requires a thorough examination but obviously presages job analysis, for how can the doctor determine a man's fitness to do a certain task unless he knows just what that job entails. In many plants neither the doctor nor the Employment Department know the jobs' requirements. By no means have we begun to realize all the possibilities of the proper selection of workers from the physical standpoint and we haven't scratched the surface on it from the mental view-point. It doesn't require much familiarity with the possibilities of mental analysis to become *impressed* by the subject and there seems no reason why, eventually, this may not become a very impor-

tant part of a complete physical examination. By this, I mean not only an intelligence test, but something which will bring out motives, desires, inherent stability, and balance. I'd like you to give this some thought as you go about your work and see if something of benefit may not be produced. But to return to the present. Where the physical examination is a means to a worth-while end and not an end in itself, little opposition arises. As preventive measures increase, less of the narrow viewpoint will be in evidence. Then too, much of the old time opposition to the physical examination, because it so often simply meant rejection, will soon pass away, for we are coming to feel that every man has a right to work, and jobs must be found in which all can work with reasonable safety.

May I detail here my conception of conducting a thorough physical examination which will be a satisfaction to all concerned. We will presuppose that the applicant has been interviewed, perhaps shown the job, trade tested and examined as to intelligence in any one of several different ways and is at last sent to the doctor for a physical examination. With him, of course, comes the specifications of the job for which he is scheduled. First of all the preliminary data is obtained by a nurse or a clerk together with weight-taking and eye and ear testing. An introduction to the Doctor should then take place, following which ensues first a rather detailed questioning as to previous medical history. This is done to advantage by the Doctor and permits of an opportunity to size up the individual. Then comes the actual physical examination which should be as painstaking as that of the best insurance companies if not as that of our army. Only by such an examination can a true and complete estimate be made of the human machine. If an impairment is found it should be explained briefly, though sympathetically, and if cause for rejection is found, such information should be given to the examinee as the case indicates. Perhaps this might be supplemented by little leaflets given at such a time explaining in a more detailed way just what the condition involves. If he has not previously been aware of the condition, he will leave feeling perfectly certain that a real service has been done, whereas if the examination is made in silence and the report of rejection returned to the Employment Department in a sealed envelope it is more than likely to result in resentment or ill feeling. Only by putting all the cards on the table is greatest satisfaction rendered. At the conclusion of the examination the Doctor should hand the examinee a blank form on which is asked questions relating to hygiene and habits and the general family health. In doing this it should be explained by the Doctor that if the examinee desires a written report of the examination it can be had by properly filling in this blank and returning it. As a rule more reliable answers to such questions can be filled out when there is time for some consideration. When this information concerning personal habits and family health is received, it should be reviewed in conjunction with the physical examination and the report sent out outlining any impairment or correction of habit which seem indicated. A statement should go with it saying that this report is a basis for future examinations to which the employee is entitled yearly or oftener, if necessary, explaining that

the maintenance of health is an asset and any real advancement or promotion in business is precarious without it; and that health is more often the result of vigilance and proper living than anything else. The future relationship of the Medical Department to this individual is built upon this initial contact and understanding, for better or for worse, as the case may be.

If the employee be fit physically, then the duty of the Medical Department toward him is prevention, through health education. If, however, he is in need of better glasses or dental attention or has an impaired heart, then, follow-up is plainly the duty of the Department. Curative as well as preventive measures are in order. Here we are immediately concerned by good working conditions, sanitation, proper nutrition, studies in fatigue, etc. Only by thus intelligently, and I may say scientifically, beginning a relationship with each new employee can the Medical Department adequately cope with the problems which may arise, and I am sure, in this way largely will the employee be impressed with the ability of the Medical Department to serve his needs.

Such a plan as above outlined would perhaps need modification or adaptation to each industry. With groups of aliens, for instance, who understood but little English, the difficulty increases, though it might be in conjunction with a sick benefit association, having periodic physical examinations as a requirement for membership, that the point of contact could be made. There is usually some way. If a worker's intelligence does not permit him to take advantage of what is offered, the Medical Department can accomplish much by a persistent program of education and follow-up, not failing to avail itself of the advantages of publicity work, urging and arousing those with impaired physiques to remedy the condition, and eventually discharging the few who refuse altogether to heed advice. The extent to which this can be done, together with the percentage of rejections at the time of initial examination, of course, bears a direct proportion to the labor supply. If industry is to make the most of its findings it should be able to pass these impaired workers in each industrial community on to organizations which place at satisfactory employment those crippled, with weak hearts, lungs, etc. These men and women who are not able to pass as able-bodied workers, should have the opportunity for appropriate training and subsequent positions just as rightfully as those incapacitated from accident. Inasmuch as the goal of industrial medicine is more efficient and happier workers it should be our constant aim to pass at the time of initial examination only those individuals who are able-bodied, and properly equipped to be able to stand the strain of our present industrial life. Those passed certainly deserve the opportunity of care and supervision in order to *maintain* their potential qualities of strength, or to eliminate in due time an impending handicap.

The value of periodic re-examination depends very largely in the efficiency and the use made of the records kept. For some reason industry generally is not making the most of its advantages here. I know of organizations long established which are finding rather frequently that among the older employees, looked upon as healthy, are those succumbing to



ailments of various kinds and often sudden death due to conditions which have been developing gradually and which often might have been prevented or at least retarded had a systematic periodic survey or inventory of the human physical equipment been made. This is by no means valuable only to the employee but often would save years of valuable experience to the Company. It is another evidence of what almost seems a national trait, failure to conserve. We do it with our natural resources, many do it with their finances and most of humanity does it with their health, but all the while we are being brought closer to the realization that taking care of what we have pays every time. Considering the average employee, it is perhaps, from the Company's position, not so obviously worth while, but when the turnover can be held at all within normal limits it will surely bring results. Of those who handle food in any way, such as in company restaurants, examinations every three months should be made together with exacting supervision on the part of the one in charge to see that a very high standard be maintained in regard to colds or other contagious conditions.

With respect to periodic physical examinations for executives, both little and big, nothing in industrial medicine can pay such handsome dividends and so completely sell the worth of the work as a whole. It is a notorious fact that most men holding large positions because of their responsibility infringe on their health and fail to take into account those things which make for continued efficiency and longevity. Each year records a large number of men in high positions dying prematurely of diseases that could have been prevented. Now I realize full well that merely examining such men yearly or half-yearly and appraising them and giving advice will not accomplish our purpose, because most of them receive good advice, and only when there is a well-established channel for taking care of such cases will results be obtained. When the Medical Department comes into the possession of facts which plainly indicate that a certain executive needs rest or treatment, the word should be passed on to the head of the Company or of the Department and necessary pressure exerted to bring about proper action. I believe that in this way many years of useful service by so-called invaluable men could be saved to the Company.

A careful study of absenteeism from sickness reveals many interesting facts and this is best made at the time of stated physical re-examinations when records of absenteeism have been consulted in connection with what is learned from questioning. It may be found by such examination that the employee is no longer fitted for the work he is performing and perhaps a transfer or short rest will re-establish health.

Industry cannot afford to carry too large a percentage of individual liabilities or potential hazards, and yet, I believe it is agreed that every one should be given the opportunity to work at some form of profitable employment, so a certain proportion of these handicapped cases must be absorbed. The workmen's compensation boards need to co-operate if industry is to admit to its ranks men and women who are obviously accident liabilities. At present no protection is given to the employer, and naturally he does not wish to take on the obvious risk.

Whether we like to admit it or not most of us realize that the type of medical care which the average person receives is not always of the best—time and equipment on the part of the average practitioner are often lacking. If not ability and desire. How often do you hear of this or that worker who has been to not only one doctor, but several, without receiving an adequate "going over?" One man treats him for this and the next man treats him for that and at the end of the period the individual knows no more about his condition than at the start and he may be far from being any better. Quite recently a girl stepped in one of our dispensaries and said she would like to know whether we thought she had appendicitis. She was questioned and examined carefully and told that the indications were very slight and given some advice. She then related that her doctor told her she might have to have an operation and she didn't care for it. She was asked to what extent her doctor had examined her and she said he felt of her side as she stood by his desk, making pressure over the region of the appendix through her clothing. She flinched somewhat and he then gave her some tablets and told her that if it wasn't better in a few days, it would be necessary to have it out. That actually happened and is, I fear, but an example of the sort of thing that is occurring daily. Any doctor engaged in industrial work can repeat many such instances, all of which leads to the conclusion that the greatest need today for the worker in our industries, as well as for all our population, is a chance to know the truth. The above is not a criticism, because it does not behoove any of us to criticize, but it is a fact to be reckoned with. Is it not a logical evolution for the periodic physical examination to become a diagnostic clinic. In this, the opportunity to give the worker the truth as best we see it, thus forewarning and fore-arming him, is perhaps the most effective weapon we have against charlatans, quacks, and pretenders generally. For instance, are tuberculosis associations and clinics ever going to gain real headway against the disease until industrial communities and the business world generally make a thorough search for it, both at time of employment and later? And in attempting to uncover these many hidden cases let us not forget that facilities for their treatment and care are shamefully inadequate and few. Cannot industries group together and eventually find a way to conduct their own sanatoria at a minimum cost, or with a united front demand that Public Health bestir itself and provide accommodations suitable to the need, and free from the hampering influence of civic politics. A system of physical examinations for workers which gives a diagnosis and points the way to continuous health is joining hands with the new vision of public health which now seems to be felt throughout the country, in legislation and propaganda for the mother, the baby, the child, the young boy and girl, and finally for all adults. Once the importance of health as a business asset or a basis for advancement in life is sufficiently understood, the helps offered will be popular and real results will follow. The movement toward health conservation is expressing itself through various channels. The general public is providing for it, accepting and demanding it as its right as it becomes health conscious.

The part that industrial medicine can play in this large program is very vital. Many things in the way of public health can be inaugurated and carried out with the co-operation of industrial medicine, but first and foremost must we consider carefully the fundamentals of successful industrial work, for until in each unit right plans and methods are worked out, the greater achievement will still elude our grasp.

## SUMMARY

Successful medical work in industry must have:

1. Sympathetic co-operation from the top of the organization.
2. Personnel. Staff of adequate proportions and character.
3. Equipment is necessary to a certain point.
4. Program:—Ideals plus daily practice resulting in consistent growth.

A—*Physical examination, complete and painstaking, is of major importance.*

- I Initial or entrance examinations are for the purpose of placing and excluding. To acquaint worker with his physical impairments. This can be made interesting and helpful to the worker. If you get his interest you will have co-operation which in the end makes for a more efficient and contented worker, which is our goal.
- II Periodic re-examinations not only of the rank and file, including special groups such as food-handlers, etc., but the executives of the organization also. Follow-up to see that work does not prove hazardous and that advice as to corrections is being followed.
- III Should help to reduce sickness incidence—hence cut down absenteeism.
- IV Should promote longevity of service.
- V Hooks up with efforts of Public Health work in detecting contagious disease and should be the surest and most effectual way of finding those members of a community suffering from tuberculosis or other prevalent diseases. Greatest opportunity today of medical science is through prevention and *physical examination is fundamental in prevention.*
- VI Physical examination leads into all other branches and parts of medical work in industry; diet, recreation, mental hygiene, housing and working conditions, fatigue, and even to the training and raising of children, and the health of the workers' entire family.
- VII Finally, physical examination will often provide a diagnosis and help to fight quacks, charlatans, and other pretenders effectively. It will teach the worker the truth, something he is mightily interested in.

CHAIRMAN COLCOED: We will hear Dr. A. J. Lanza, Medical Director, Hydraulic Pressed Steel Company, Cleveland, lead the discussion on these two papers.

DR. A. J. LANZA: This meeting will convince all of us, I am sure,

that there is always something to be said on this very important subject of physical examinations.

We hear a great deal about the opposition of labor to the physical examination. In a somewhat scattered experience, I have never come across it. Not very long ago, the president of the State Federation of Labor in New York State told me that he believed physical examinations were a necessity and that they were inevitable. I have heard other labor men make the same remark. If labor criticizes the physical examination, it isn't the examination that it criticizes, but the spirit behind it, and wherever the physical examination is conducted in the spirit that has been set forth by Dr. Colcord and Dr. Sawyer, there will be no objection. I have come to realize that when men come in with various symptoms or complaints, they rather resent it if they are not examined. If a doctor listens in a complacent manner to their symptoms, reaches up and takes out six pink, white, or blue pills and says, "Take one or two of those every hour and come back if you aren't better", that man goes out and feels that he hasn't had proper attention.

I suppose the physical examinations to which they have become accustomed during the war is possibly bearing fruit. Men often expect to be examined when they are not, and I have had them tell me and complain to me that they have not been examined on a certain occasion, either by myself or somebody else. The physical examination will flourish, and it is bound to flourish so long as it has the right spirit behind it.

#### "SYMPTOMS ARE MORE IMPORTANT THAN SIGNS"

There is one point I should like to develop and that is that we must not expect too much of the preliminary physical examination. If we will keep in mind the old saying that has proved so successful, put out by one of our leading tuberculosis specialists, that "symptoms are more important than signs", those of us, who have gone through the anti-tuberculosis battle for a number of years and who have come to realize the limitations of a physical examination, will know that it is well for us to keep both feet on the floor. What I am getting at is this: In regard to the point that Dr. Sawyer brought out so well in reference to the inadequate medical attention that the average bulk of our industrial employees get, we shall accomplish more good for our company and for ourselves if we never neglect the opportunity to make physical examinations of the men or women, as the case may be, when they come in with their headaches, backaches, chest aches, joint aches, etc., than we can at the preliminary physical examination. Of course, after all, the preliminary physical examination has got to be more or less of a snapshot process. We can uncover the more obvious defects, but it is very seldom that we can locate the incipient tuberculosis case on a preliminary examination, because it is the symptoms that tell the tale. Particularly is this true when we stop to realize that in the majority of our industries, our physical examination must be, at least under present conditions, a matter of the skilled eye more than anything else. If we have a steel plant of a thousand people, for example, it is common in these days to hire sixty

men in a day, and a complete physical examination is something that takes a considerable amount of time, and if we spend only fifteen minutes on it, there is fifteen hours of work to be done. If we then remember that we are very likely to deal with the man that can't talk English, it isn't always possible to give a complete physical examination on entrance. That doesn't mean that we shouldn't strip him, and go over him as carefully as the circumstances will permit, but it is the physical examination when they come in with their headaches, their backaches, and their "Doctor, I have had no appetite for six months" that counts. It is then that we uncover the diseases in their early stages.

CHAIRMAN COLCORD: These two papers are now open for general discussion. You are all so interested that I won't need to call on individuals.

#### DISCUSSION

DR. A. G. CRANCH (National Carbon Co., Cleveland): The talks so far today have been along the line of physical examination that would require from fifteen minutes up, and Dr. Lanza has brought out the fact that some plants hire sixty men in a day. That is true of a great many institutions and it should take fifteen hours instead of fifteen minutes to make all those examinations; yet we must consider what we are going to do when the examinations run from fifteen minutes down. If you are going to get those men to work the same day they are employed, you can't give them a long examination.

Therefore, let us consider how we are going to make the examination that averages between five and ten minutes for one man. If the examining physician sees anything wrong, the man can be held at the physician's office for an examination which may last two hours or whatever it demands, without holding up the line as it goes through, or as the sorting process goes by. I thoroughly believe in as thorough examinations as can be given, but for practical purposes I don't think they should necessarily be given on the admission of the men.

DR. SHERMAN: A young man applied for a job in a Pittsburgh steel mill. Examination developed the fact that he had a hernia. The doctor said, "Now don't you under any consideration go out into the mill and lift heavy weights". The man replied, "All right". He went out into the mill and they put him on a job which required that he lift a hundred pounds day in and day out, one lift right after another.

That is a fact. Now you know of other instances of that character. I am sure, where your recommendations to the employees and your recommendations to the employer, have not been followed out. That is one difficulty with the physical examination: the recommendation of the physician is not followed. I have had that experience and you have. Therefore, to my mind, the first step we must take in putting the physical examination on a sounder basis, and I think it is not going at the present time, is to get the absolute co-operation of the employer so that he will follow out implicitly your instructions and your recommendations.

Not so very long ago a man who was blind in one eye came in to secure employment in the blast furnace. He was examined and rejected. He took it very kindly. When it was explained to him that the compen-

sation act was such that employment in the blast furnace would be extremely hazardous to the company as well as to himself, he went to the shipyard. He was accepted there. They don't make examinations. Blindness became evident not very long afterward. He was discharged. Then he went over to the Malleable Castings Company where they give a very careful examination. The defect in the eye was found and he was not accepted. Now, mind you, he was cheerful withal. I didn't hear anything more of this man until about a month later. I had occasion to go down on Lucas Street. Let me tell you no white man lives on Lucas Street if he has anything left that makes life worth while. I won't go into the harrowing conditions of the things I found. But that man is there, down and out. A second thing that we must overcome in order to make the physical examination a stable, safe, and sane procedure is to get the compensation laws changed which will not penalize the employer who accepts a defective employee.

You take the man with the hernia. I know places where these men are not accepted. Take the City of Toledo, for example. I think that is a fairly average city. It is very difficult for a man with a hernia to get an operation without excessive cost. Now understand, he can come into St. Vincent's Hospital and get it free of charge. He can go into the Toledo Hospital and get it free of charge. But the average man who is employed does not want to get that free of charge. He has a certain amount of what he terms respectability left. What are you going to do with men who require reconstructive measures in order that they may be put on a reconstructive basis? Your hernia is a very good illustration.

A good many times I have said to Polish chaps and Hungarian chaps, "You go out and get this hernia fixed up and come back and you will get a good job". Their answers are a shrug of their shoulders, and they go out and get a job elsewhere. But the time is coming when these men cannot get a job unless they are reconstructed.

I want to tell you that the most inspiring thing that occurred to me at this meeting was Dr. Mock's address yesterday morning. In my estimation he has struck the solution of the third obstruction that we are meeting in the application of the principle of the physical examination. He has provided in Chicago a means for the reconstruction of these defectives and their rehabilitation, their placement back in industry.

Yesterday afternoon I went out to the Columbia Hospital and saw a little workshop set back of the hospital. It was a little wooden building. In that building they had various types of apparatus that would assist the men with ankylosed fingers, elbows, knees, and ankles to limber up their joints. Now the greatest difficulty I have in getting men back on the job is pain on motion. Out here at this little hospital they make it so agreeable to the men who have painful joints to limber up those joints that it is a pleasure, and they are very shortly back on the job.

#### THREE THINGS NEEDED TO MAKE INDUSTRIAL PHYSICAL EXAMINATION ACCEPTABLE

I just want to emphasize these three points in passing. You must get the co-operation, the intelligent co-operation, of your foreman in order

stands on the boundary. The name of the town is Texarkana. Dr. Chace has had some practical experience with the examination and treatment of venereal diseases. Therefore, I would like to have Dr. Chace tell us how he handles cases of venereal diseases among employees.

DR. CHACE (Texarkana, Texas): I don't know that I can tell you much about venereal diseases. Like a great many others, we don't accept men who have venereal diseases, but we do take care of all employees who become venereally defective or whose venereal defects are discovered after employment. We find that that has worked out to our own advantage as well as to the advantage of the employees.

#### VENEREAL DISEASES AND ACCIDENTS

A railroad, as you know, has a great many risks to run among its employees on the human side of employment, and if we are to protect the company properly, we must treat venereal diseases among employees. It is the only railroad in the world that I know of that does treat these cases free of charge. But we have found that our accident records are lower, our employees are more satisfied than ever before, and we feel that we are at least doing our full duty to the public by doing so. The reason is this: A man who has a venereal defect, we find upon careful study, is a man who is mentally in such a state of mind that he is a severe risk. We find that such men are more apt to commit crimes, that they are more apt to urge others to do rash acts, unsafe acts, and they are men whose mental attitude toward their employers is not what we want an employee to think of us. Why it is and why that should occur more especially in venereally diseased men, I don't know. But I know it is a fact, and I know that by treating these cases we have overcome that attitude and have lessened our incidence of accidents. One American railroad had three very serious accidents because the engineer was suffering from incipient paresis.

I had a very interesting case of paresis. This man was running passenger trains. Some one noticed that he had a very good opinion of himself and I noticed, when he came to the hospital, that it was rather exaggerated. During his stay at the hospital he got on rather badly with some of the patients. Some one of the men spoke to me about it, and I asked the superintendent to take him off his run. The labor union immediately raised a most awful howl. They told me I was doing a wrong thing to this man and his family. Well, to make a long story short, I compromised with the union and told their agents that I would accept the opinion of any person who recommended him. They chose a very good man. On their way up there to see the man they stopped in the drug store to get a drink. The clerk in the soda store didn't treat the patient as he expected to be treated, and the man threw a glass of soda water in the face of the clerk. That is the sort of thing we have to deal with in the case of syphilis.

Most of our cases of insanity are due to syphilis. Therefore, if we treat these patients in time and properly, we do not have so many accidents. Syphilis is overcome by putting the patients in a hospital and

making them stay there until they are past the infectious state. When they are past it, then they are permitted to resume their work.

This question of physical examination with us who are in the railroad game is a very difficult problem. You know the United States Government made a contract with the shop crafts prohibiting physical examinations. That is just what we are up against. It is a hard problem to put over physical examinations, and the reasons are the three that have been stated and the principal reason is to find the proper job for the man if you do have to turn him down for the job for which he applies. That isn't always possible in the railway game. We must look to other industries, and we hope you will all help us out by taking the men which we can't.

#### PHYSICAL EXAMINATION OF WOMEN

DR. ELLIOTT: We have about fifteen thousand women scattered from coast to coast in our various factories at an average age of twenty. I know of only four individuals who refused physical examinations. The women get practically the same examination that the men get.

I have noticed that the young women are interested in the outcome of the examination. They don't treat it as a joke, as the young men who have the same examinations often do. They are eager for re-examination and follow-up work. We do follow up the work.

We reject, as all other industries do, for acute venereal diseases. In one of our factories a few weeks ago, we found two cases of young women in the second stage of a syphilitic infection. We don't turn those girls loose on the community. The doctor took the time to question them carefully, to find out all about the history of this infection and where they got it. Then we reported those cases to the public health service station in the city, and, as a result, instead of two cases, we had four cases reported and three of them in the city hospital undergoing treatment during contagious stage.

I think we owe this duty to our community. If we get any cases of a similar nature in our factories, we treat the cases, because we want them to work. They have to work and we would rather have them work for us than for anybody else, because it costs us \$500 to train a new operator. So we treat these cases. We give them whatever treatment may be necessary for the cost of the material, and they are often treated in the evening clinics so that there may be no embarrassment from this treatment. We send many of them to the hospital and our own staff takes care of them in the hospitals so that we can control the subsequent treatment.

We have just discharged a girl who has been under treatment through a disease acquired through no fault of her own, and she has been under treatment now for three years. We have discharged her following the fourth negative Wassermann. She told the management of that department that she thought more of the executives who had seen her through this thing than she did of her own father. She is a young girl, eighteen.

Let me give you an illustration of the confidence that some of our men have inspired. We have about thirty-five men on our staff. There is one union that has a distinct provision in their employer's agreements that



are renewed from year to year that physical examinations shall not be required for employment. The head of one of the local committees of one of the local unions came to me a while ago when I was down there visiting the plant and said, "Can you arrange with the doctor in charge here to have your physical examinations taken as a basis for the admission of the men for sick benefits in our local lodge?" Needless to say, we grasped the opportunity. I asked him why they wanted that. He said, "Because we don't want to work with tubercular cases, and we don't want syphilitic and tubercular cases working in here with us and using our things. We don't want to exhaust the treasury of our local union". Our people feel that the men in charge of the medical service work are the men of their choice, and they may come to us for physical examination as a matter of choice.

We don't know of any girls who don't want physical examinations. I only know of four—they reported from one factory and refused examinations. We found that two of those girls had been refused employment elsewhere because of tuberculosis. They were trying to get employment with us and we turned them down, but we also turned them over to the Anti-Tuberculosis League. Two others were rejected for reasons that I have forgotten now—because of some personal reasons they didn't want physical examinations. They knew that certain things would be brought to light that they didn't care to have known. They would rather forego employment. It was purely personal and had nothing to do with the case at hand.

Just another point. In the examination of women, we don't have those women examined alone. The nurse is always present during the examinations. The examinations are never hurried, and in our re-examinations it is our rule that in every case we visit the dispensary to take advantage, as has been said here this afternoon, of the minor complaints to make a careful examination of the individual.

All our work is under one department and the physical examination of the employees includes a dental examination and subsequent dental work after the employee has shown her desire to stay with us.

MR. FRANCIS FEERAN (State Department of Labor, of Pennsylvania): I want to make some answer to the old-time argument that the basis for advocating a reconstruction of the compensation laws shows how we feel about the workman with only one eye who applies for employment. He doesn't tell how he lost the other eye, and I assume he lost it in some other industry, where perhaps they paid him the small amount of compensation that was due him, and then put him on the scrap heap. There are about one thousand cases such as this every year in Pennsylvania.

If a workman meets with an accident while working for an employer who has any human feeling about him, the employer puts the man back at work as soon as possible. Those employers usually comply with the law. Neither the law of Pennsylvania nor of any other state requires that adequate protection be given the employee. I find that ninety per cent of the malingerers are due to the fact that in the industry where they were injured the law was not complied with.

Some time ago at a labor meeting I attended, a workman was com-

plaining about having his eye knocked out in an industry and being unable to find employment; and one of the Bolsheviks in the labor union meeting said to him, "If I were in your place, I would knock the employer's eye out". Now, that was entirely too radical; that would not remedy the situation, but that is how they are advocating it on the other side.

I know the labor movement. I have been connected with it both as a member and officially for a great many years—since I was old enough to join. Labor organizations took the position in opposition to physical examinations because most companies instituted physical examination to discriminate against the physically weak man, and to get the more perfect men that were available for production in industry.

DOCTOR'S EXPLANATION OVERCAME THE UNION'S OBJECTION TO PHYSICAL  
EXAMINATION

I just came from the construction section meeting. That same question was discussed, and Dr. Cleary, I think, from Detroit, said that that was no longer an argument. He said the structural iron workers' union had taken a position against physical examination for the reasons that I have just stated. He went to the union and explained to them the advantages that came to the workman himself from physical examinations, and they said, "Doctor, with your explanation it is all right," and the union reversed its position. I have never before discovered that a physician went to the union and explained the purpose of it—that it was not done to discriminate against the physically weak.

Such questions have been discussed for the last twenty years, to my knowledge. Compensation law is not adequate. I am an advocate of compensation, and if I had my way, I would double the compensation, and I would go further. When an accident occurred in industry, I would require the employer to appear in court to answer to the state. I would impose a penalty, requiring that unless the employer could explain that the accident was unavoidable, he should pay compensation to the state. We would then prevent accidents and find employment for all the blind men that are in the labor market.

MR. GEORGE P. HAMBRECHT (Chairman, Industrial Commission of Wisconsin, Madison, Wis.): I don't like to hear the discussion, "An eye for an eye and a tooth for a tooth". While we are trying to arouse influences for the employment of one-eyed, one-legged, and one-armed men, it is nothing to get excited about, nor is the solution of it so insurmountable that it need concern us for a great length of time. The difficulty has come with reference to the individual employer who did not like to take the hazards of somebody else's accident by employing these handicapped men. Now, that is a human trait. He says, "Why didn't the other employer do this?"

Now, then, what can we do for him? If the individual employer does not care to take the risk of the other man's accident, and perhaps there may be some reason for that, let's spread the responsibility throughout the industry. Wisconsin has done that, and you hear of no difficulty of

one-eyed men, one-legged men, or one-armed men getting employment in this state. It is done by spreading the responsibility.

#### WISCONSIN'S PLAN FOR SPREADING RESPONSIBILITY

We have, as many of the compensation states have, a schedule of fixed benefits for amputations. If a leg, arm, hand, or foot is amputated because of an industrial accident, the employer pays the injured man the scheduled amount and pays into the state treasury, in addition, the sum of \$150—a sum that is contributed as the employer's share toward that man's future possibility of employment. That fund is built up from all these serious accidents.

Now, let us take the man with one eye. Instead of saying to the employer that will give him work, "If you take out the other eye, you are going to support this man for life", we say that it won't cost the employer more than if he hired an able-bodied man. The one-eyed man will go to a place and seek employment. If he loses the other eye, he is a total permanent disability, but his last employer will pay him only for the loss of a single eye, and the State of Wisconsin out of the fund that has been spread all over industry from these one hundred fifty dollar amounts, will give him the difference between what that employer has paid and the amount to which he is entitled for the loss of both eyes.

Every state should give this matter serious consideration.

MR. W. H. CAMERON (Secretary, National Workmen's Compensation Service Bureau, New York City): The State of New York handles that problem in the same way, and I don't see how the gentleman from Pennsylvania has anything in criticism to say. If the Commission in Wisconsin and in New York has solved that, I should think the Commission in Pennsylvania should solve it.

DR. FARNUM: The only way industry is going to be able to survive is to have men fitted where they belong. You know that the number of physical defectives runs approximately ninety per cent. You can't run your plant on physically perfect men. Therefore, the problem is to provide for each man a job that he can fill.

#### JOB CLASSIFICATION TO PLACE PHYSICAL DEFECTIVES

I should like to mention job classification. I am ready to admit that when we began this work we had an eight per cent rejection. Now that eight per cent rejection is down to five-tenths of one per cent, and that is because of the absolute co-ordination of the employment, safety, and medical departments. When a plant has that as a working basis, it does not make any difference how many eyes, arms, or legs a man has, there is a job for him. Remember the accident rate is much lower among the physical defectives, and the labor turnover is lower.

Our statistics show that fifteen per cent of the destructive accidents are due to machinery defects, and the other eighty-five per cent are due to the personal equation. We know that 250,000 men, a quarter of a million, are taken out of industry every year by accident and disease, and that 28,000 are killed. I can't help wondering what is happening to the other

222,000. Where are they? If industry as a mass leaves it to some of us little duffers to take care of the physical defectives, what is going to happen? Where are these men? Are they working? A lot of them may not be.

If industry as a whole will take up this problem of job classification, of putting a man where he can be safe and where he can be efficient, there are jobs enough in the plants to take care of practically every physical defective that exists. I am not talking about malignant syphilis, tuberculosis, small-pox, and scarlet fever. Men with such diseases should not be regarded as material on the labor market. They are subjects for hospitals, and they ought to be there and be taken care of. But industry can take care of these physical defectives if it only will, and the job is easy.

DR. GEYER: I am roused by the speaker from Pennsylvania to say that we have discussed the welfare of men in industry from the physical standpoint, health standpoint, and accident hazard today and yesterday, and no one has referred to that tremendous factor of possible prevention that lies in the hands of industrial commissions in our country. I think

#### SOME WEAKNESSES OF INDUSTRIAL COMMISSIONS

if you were to put the measuring stick on the industrial commissions of today, you would find them at a low state of operating efficiency. I don't say that in a caustic way. I say it in a perfectly friendly sense, because it is the business of groups like this to help the industrial commissions to work out their salvation.

Those problems presented by the gentleman from Pennsylvania are within solution. It only requires consideration on the part of labor and industry of these problems to solve them.

I know of few commissions in the country today which do not need to employ real humanitarian work, real safety work. It is laughable to think of what we are doing in the State of Ohio. We have a two and one-half per cent overhead on almost fifteen million dollars of premium income. We can't run business on a penny, and that is what the Industrial Commission of Ohio is trying to do. We have a fine work to do, but we have no brains executing the law. We are still running on salaries that are absolutely not commensurate. You can't hire brains for four thousand dollars, but the actuary of Ohio gets only four thousand dollars, and he is responsible for the expenditure of twelve to fifteen million dollars. We have a few paltry thousands set aside for accident work.

Can't we as an association of industrial physicians and surgeons, create a demand for more brains in the management of this tremendous business of compensation work? I think that most of these problems that are sores in industry might easily be taken care of if commissions could be given the power to spend more money on the preventive side. I wonder if something of that sort can not be done by this group, which stands between the employers and employees. We need more statesmanship in this field. I believe then these problems will disappear more rapidly.

CHAIRMAN GOLCORN: I feel that I must correct a false impression that I think my paper made.

In our work we don't reject any man because we want to. Our employment officer, with whom I work, is a big-hearted man, and I don't reject a "C" man usually until I have taken the matter up with the employment officer, and we go over the matter and see if we can't possibly use the man. I can't give you the exact percentage of rejections, but I am sure that it is less than one per cent of examined men.

In regard to venereal diseases: A statement was made that we should not abuse a man's confidence by rejecting him. If I can't find a venereal disease in examining a man, I won't ask him to tell me, but there must be enough evidence that he has it in a contagious form before I will really reject him; and when he is rejected, it is because it is for the safety of the other men. He is not rejected because he is immoral; he is given a chance to get cured. We always tell him that we want to employ him.

The same is true of a man with hernia. If he has not the money, we will have him operated for nothing. Then we tell him we are ready for him just as quickly as his wound is healed, that we want him as a well man, and we want to increase his efficiency before he comes back to us. We usually convince him and get him to do it.

In our work we don't take the place of the family doctor. We only give the man enough treatment or advice to last him until he finishes his turn. We want to keep him on the job. If he is so sick he must go home, we only give him enough medicine to last until he can get the family doctor. Our employment department is enthusiastic about examinations, and they work hand-in-hand with us.

#### OCCUPATION HAZARDS AND DIAGNOSIS SIGNS

*"A plan to aid the Medical Practitioner in diagnosing illness of Industrial Origin and to build up a reference work on the influence of Industry on the Health of the Worker."*

DR. LOUIS J. DUBLIN AND PHILIP LIEBOFF, STATISTICAL DEPARTMENT, METROPOLITAN LIFE INSURANCE COMPANY, NEW YORK CITY

The Statistical Bureau of the Metropolitan Life Insurance Company has compiled a little work the purpose of which is to aid the medical examiners of the company in the field to recognize symptoms of disease of industrial origin. This pamphlet, entitled, "Occupation Hazards and Diagnostic Signs," lists the health hazards under the four principal heads of Dust, Heat, Humidity, and Poison. The last is sub-divided to show twenty-four of the commoner poisonous substances met with in the industries. Each of these health hazards is then related to the symptoms, conditions, or diseases which are to be looked for. Finally the industries, processes, and occupations where such hazards exist are given. This part of the compilation was based largely upon the classic work of Sommerfeld and Fisher but it has been expanded to include the results of the observations

of Doctors Hamilton, Hayhurst, Edsall, Thompson, Kober, and Hanson and others made since 1910 when the list of industrial poisons by Sommerfeld and Fisher appeared. The chief merit of our pamphlet consists in the presentation of a supplementary list of a large number of occupations where hazardous conditions are usually found. These occupations are listed alphabetically and after each is appended a code of letters and numbers, which refer back to the previously mentioned hazards. Thus, the first occupation, "Acetylene Gas Makers," appears with the code D1, 21, 18, which indicate that such workers are exposed to the hazards of poisoning (D) from Ammonia (1), Sulphuretted hydrogen (21), and phosphorus (18); likewise throughout the entire list of occupations. By this means, the general practitioner can readily determine whether the person examined is in fact suffering from the effects of his occupation. For by turning to the particular occupation in the list, he learns what hazards exist and what symptoms and diagnostic signs to look for. His examination is in this way made more illuminating; for he can look for the definite signs of disease and these are more likely to be found and properly interpreted than if no such direction were given. Physicians, not specialists in occupational hygiene, can thus learn to detect the effects of industry and conversely can eliminate the occupation as the cause when certain symptoms are observed which do not fit the usually observed effects of the occupation.

The pamphlet has been widely distributed among the more than six thousand medical examiners of the Company. It has been well received by them and it has demonstrated its usefulness. The general practitioner and insurance examiner cannot be expected to know the hazards of industry and the indications of disease resulting from industrial exposure. This pamphlet apparently has served to overcome these limitations of knowledge and experience. It has also had the effect of interesting thousands of medical men in industrial hygiene; it has widened their horizon and has made them agents for the collection of industrial and hygienic information. As they are widely distributed over the United States and Canada and operate especially among the industrial population, their opportunities for the collection of important data are many.

Very serious limitations of the pamphlet are clearly realized. It is very far from complete either in the list of hazardous occupations or in the list of hazardous conditions or substances met with in industry. The list includes only about five hundred occupations and only the most prominent of the health hazards. Furthermore, as the pamphlet was intended primarily for the use of the medical examiners of the Metropolitan Life Insurance Company, it embraced only those matters which would be important in their special work. A number of important considerations which would have been included in a more general work were omitted. Such occupational disease and conditions as anthrax, caisson disease, electric shock were omitted because they would not occur in the course of medical examinations for life insurance; so also were industrial hazards which have only local or temporary effects, poisons not frequently met with in industry and also such which cause disease, whose symptoms are subjective and require a clear description by the person exam-

ined. In short, the work was limited to an effort to acquaint an insurance medical examiner with the recognizable symptoms of the chronic effects upon health of the more important occupational hazards, excepting the most obvious ones.

The possibilities of and, in fact, the need for the extension of this work are very clear. The realization of such extension must be left to such associations as the Health Service Section of the National Safety Council and the American Association of Industrial Physicians and Surgeons. I recommend that a Committee be appointed from these two groups to consider ways and means for extending the work we have begun. Such a Committee could get in touch with industrial physicians and factory inspectors, send them copies of our pamphlet and obtain from each answers to questions similar to the following:

1. What additional hazards do you note for any of the occupations listed?
2. What particular occupations involving hazards are you familiar with which are not listed in the pamphlet sent you; what are the conditions of work and hazards involved?
3. What symptoms do you note for industrial hazards which differ from those tabulated or which are in addition to them?

The results of such an undertaking if carried out earnestly for a period of years should be very valuable indeed. A reference work of the highest order both in completeness and in scientific accuracy would be produced, industrial hygiene would be much stimulated as a branch of preventive medicine, and much valuable health work accomplished. Thousands of persons suffering from occupational disease would ultimately be discovered and the first step taken to control the conditions which make for such disease.

# Banquet

EIGHTH ANNIVERSARY CELEBRATION

September 30, 1920

---

PHIL A. GRAU, Toastmaster

Business Manager, Milwaukee Association of Commerce

---

**T**HE TOASTMASTER: I was warned this noon by Mr. Price that this is a very dignified occasion. I was cautioned to remember that in officiating as toastmaster this evening, we had our Smile Party two evenings ago, and that too much frivolity on my part would not be tolerated. In order to show you that I appreciate the friendly advice that was so kindly given me, I am going to proceed, in the opening of these festivities, by telling you of an incident that occurred in Detroit not long ago with reference to the conclave of Episcopalian bishops which took place there. Being a dignified occasion, I naturally can not pick out anything much more dignified than that. One of these gentlemen, who happened to be a very high churchman, wore the Roman collar which the Catholic priests and bishops wear, the signet ring, and also the pectoral cross. He was a little late getting to a conference one morning, and as he stepped into his automobile, he said, "Bill, step on her," and Bill stepped on her to the tune of about fifty miles an hour down Jefferson Avenue. As they got to that circle where the Pontchartrain Hotel used to be, a great big, red-headed traffic cop stood there and saw this machine come tearing down the road. He deliberately turned his back and waited until they got a few hundred yards from him and then he blew his whistle. Bill stepped on the brakes and the rear wheels skidded until there was enough smell of burnt rubber to make every manufacturer of tires in Akron as happy as if he were in heaven. The cop, with the usual invective, addressed Bill, "Aw, tell it to the judge. I've heard that before. What are you trying to do? Go long with your gaff. I don't care if your name is MacCarty, that makes no difference to me. You can tell it in court in the morning." Just then the bishop, somewhat impatient at the delay, opened up the door of the limousine on the left-hand side, put out his left hand with the signet ring on it, leared out and said, "How, now, William, what is the delay?" As he said this, the policeman, attracted by the dignified voice, looked up, saw the Roman collar with



the smoothly shaven face above it, saw the pectoral cross swinging in the breeze by a golden chain, saw the signet ring on the finger; he clicked his heels and saluted and said, "I beg your pardon, Your Grace. Please tell the chauffeur to drive a little bit slower, there's a Protestant cop on the next corner."

We are signally honored on this occasion in having a message sent to us by a delegation of distinguished gentlemen from London, England. Lord Leverhulme has sent a letter by a delegation consisting of Major H. F. Doidge, Mr. H. J. Pye and Mr. W. J. Painter, representing the British Industrial Safety First Association. By the authority which has been granted to me for the evening, I am going to appoint Mr. Morey and Mr. Price as a committee of two to escort Major Doidge to the platform where he may read the letter from Lord Leverhulme to you.

(Major Doidge was escorted to the platform by Mr. Morey and Mr. Price.)

MESSAGE FROM THE BRITISH INDUSTRIAL SAFETY FIRST ASSOCIATION

MAJOR H. F. DOIDGE: As we say in our country, some men are born great, others have greatness thrust upon them; I am in that last category. I have a dual honor this evening. First of all, I represent the Thames Paper Company which are the sole representatives from Great Britain at this Congress. Secondly, I am the delegate of the British Industrial Safety First Association. That is your sister association in Great Britain—of course, a younger sister, but as you say, "some kid!" The greatest honor is the privilege of speaking first at this Congress Banquet which is the Ninth one.

On behalf of Lord Leverhulme, who is our President and probably the most successful business man in Great Britain in recent years, I wish to thank the officers and all the members of the National Safety Council for this great courtesy and their many kindnesses which they have shown us in our first year of babyhood. We are living on the experience which you have gained during the last nine years, and we hope with that food to grow more rapidly even than you have. Also, I should like to add my personal thanks and those of my two colleagues for the extreme kindness which every one has shown to us since we landed in America a week ago. We have simply been heaped with kindnesses and cordial comradeship.

Most people I have met have asked me what my impressions are of the Congress. The first impression is its greatness. We have no idea in Great Britain of the magnitude of the work which is being done on this side of the water. I will not inflict myself upon you very much longer, but I would just like to put in three or four words the impressions that I have received of this Congress this week. First, I think the keystone of the whole success of your movement is enthusiasm. The Englishman is stolid and conservative. He doesn't get excited easily, but when he does get excited, he gets thoroughly excited. We haven't got the degree of enthusiasm that you have, but I hope when I go back that I will be the spark in the barrel of gunpowder.

The next point which has impressed me is the co-operation among the

different sections and the different industries, and the organization itself. The safety first movement in Great Britain has existed under various heads and different names for many years. Our laws, too, have enforced safety first probably much more than the laws of America, but we have realized it is no good playing at that game. We have got to get together, we have got to organize and co-operate in the manner that you have, and that is the message that I shall take back to the British Industrial Safety First Association.

Probably the outstanding feature of this conference, as I see it, is the question of education. I believe that that is the fundamental principle of the success of the movement and of its growth. You have got to educate right from babyhood on, and I believe that is where we are to make our progress in the future.

Before I read the message from Lord Leverhulme, I should just say that we left London rather hurriedly and Lord Leverhulme was out of town and I didn't get the message personally. It came by mail and was delayed. I had hoped to have been able to read it at the opening meeting of the Congress. This is signed by Lord Leverhulme, the President, and Mr. Blaine, the Secretary. Mr. Blaine is the general manager of all our underground railways in Great Britain.

"To the President and Members of the National Safety Council assembled in Conference at Milwaukee, United States of America:

"The British Safety First Workers desire to extend to the National Safety Council their warmest wishes for a successful Conference at Milwaukee and to express their gratitude for the information and co-operation which have so continuously characterized the relationship between the Safety First organizations of the English-speaking peoples.

"The prevention of the accident wastage of human life and limb is one of the noblest works to which attention could be paid, and Great Britain sends America its congratulations upon a magnificent and inspiring success."

THE TOASTMASTER: It is my privilege, Major Doidge, to thank you in behalf of this assembly for the splendid message and hearty word of co-operation which you have just delivered to us from Lord Leverhulme, and I know I voice the sentiment of every lady and gentleman present when I say that we hope when you touch off that spark in the gunpowder, it will be heard over here in the United States.

It is but fitting to state at this time, now that we have heard from England, that there is a large delegation present from our neighbor, Canada, and we are very glad to acknowledge publicly that the National Safety Council of our country is doing everything in its power to assist Canada in organizing a similar organization within its own borders. This is but another indication of that splendid spirit of friendship and co-operation which has existed for a century or more between Canada and the United States, and if anything at all it will cement still more firmly the bonds of friendship which already tie us so closely together. We welcome the Canadian delegation with all our hearts.

Before going any further, let me state to you that we are very much

impressed in Milwaukee with the wonderful effect that you gentlemen and delegates from all parts of the country and of the world have had upon our city during this Congress. We expected that an impression would undoubtedly be made upon our town but the way you have gone at it can best be described by an incident that occurred recently in one of our law offices here when the senior member of the firm, after every one from the lowest clerk up, had endeavored to collect a charge account several years old from a firm that never was known to pay its bills. Finally, in a spirit of absolute dejection and perhaps I should say disgust, he tossed the bill upon the office boy's desk and said, "Here, Jimmy, you collect this." About two days afterwards, much to his amazement, the bill came back with a check for the amount. He scratched his bald pate for a moment and said, "By Jove! I wonder what that kid did." He called Jimmy and said, "What did you do with the bill I gave you?"

"I wrote him."

"You wrote him?"

"Yes."

"What did you write him?"

"I'll get you the copy." He went out to the files and brought in the copy sheet and this is what he read: "Dear Sirs: If you don't pay the enclosed bill at once, we will take steps that will amaze you. Yours truly."

You certainly have amazed us, and if this Congress has been the success which we all believe it has, it was not merely due to what the Safety and Sanitation Division of the Association of Commerce has done, but it is due to the splendid spirit of co-operation and to the splendid efforts that you yourselves have put forth to make it so. I want at this time, in behalf of President Carlson of our Association, who unfortunately was unavoidably detained at the last moment and could not get here this evening, and in behalf of our Board of Directors and all of our members, to thank you for coming here to Milwaukee to hold this Congress and say to you that we hope it will not be the last, but that it will be the first of many more congresses which we will be able to have here and at which we will be able to act as your hosts as we are doing this present week. We thank you very much for doing us the honor of coming to our city.

I now have the pleasure of presenting the next speaker, Mr. Arthur T. Morey, of the United States of America.

ARTHUR T. MOREY: A good many things have happened since we met here in Milwaukee eight years ago, and which later led to the formation of this wonderful organization which in many ways is the most wonderful organization that has ever appeared among men. Many changes have come in our lives since then—changes to us as individuals, to our companies, to our organization, to our country and to the world. It has been a period of evolution. Have you ever heard John Leitch speak of the three stages of the evolution of man? The first was physical, when he fashioned a club and caught and subdued the horse and made him work for him; when he made war and made slaves and made physical force the order of the day.

Then came the intellectual stage. He made a wonderful invention at that time—the discovery of the wheel. Out of a log he fashioned the solid wheel which, in the course of time, was followed by myriads of other inventions. He invented the alphabet, the figures, and so forth. This second period was the intellectual civilization that we know.

The third was when man was moved by the spiritual forces, when principles of right and wrong appealed to him, when the moral sense prevailed—the time of ideals, the time of unselfishness, of unselfish service, the time of spiritual power. It is that spiritual power, that spirit of unselfish service, which is the spirit of the safety movement and which, in industry, has transformed industrial relations—that wonderful spirit which meant more than you and I know to this country and to the world, which caused us no longer to talk about master and servant. Now we talk in terms of brothers and co-operation. The spirit of service, that spirit of the safety movement, is the true spirit of America, and that spirit of unselfish service is going to be the salvation of the world; there is going to come a time when we no longer work in the sense of toil; there will sweep over the world like a patriotic or religious fervor the desire to serve, each to do his part.

There is restlessness in America, but why shouldn't we have restlessness? What is America? It is the opportunity and the urge for the individual man to evolve things and express himself. As the saying goes, "All our troubles carry blessings." What there is good of this restlessness in national life will stay, and what there is bad of it will pass away. That which is good will strengthen and adorn our national life. It will all be worked out in the spirit of service, unselfish service—the spirit, if you please, of our safety movement.

I speak this way of that spirit and service to draw to our attention how important it was that the movement was started right, that we had men as leaders who put into this safety movement that beautiful spirit. Robert Campbell and W. H. Cameron took the leadership as they did all things, with a determination to win, and that they took the leadership was a wonderful thing in the life of events and a great thing that they have done for us. Mr. Campbell gave up his business, he gave up much of his home life. He worked and he loved this great cause, and he put under its foundation a spirit of wisdom and statesmanship. This large and successful gathering we have here now might not have been anything like it is, if it were not for what Robert Campbell did in those early days.

I don't believe I could introduce him better than by likening him to that boy whom a man met staggering along the road under the burden of carrying another boy who was unable to walk. The man said to the boy, "Why, isn't he too heavy for you to carry?" The boy said, "Oh, no! He is not heavy, he is my brother." I introduce to you Robert Campbell, who has been that boy to the safety movement.

## REMINISCENCES

R. W. CAMPBELL, CHAIRMAN, CENTRAL SAFETY COMMITTEE, ILLINOIS STEEL COMPANY, CHICAGO

I sometimes think that the good Lord ought to deliver us from our friends. They either speak too well of us or too ill of us. I am overwhelmed with the kindly thought that Mr. Morey has had of me tonight and has expressed to you. I am as much overwhelmed with it as I was at the Philadelphia banquet when Mr. Edson Lott told a story upon me that was equally unbelievable. Some of you didn't hear that story. He told how he had come to Chicago on one occasion, hoping to see me on a matter that related to the affairs of the National Safety Council. He called at my law office, he called at the National Safety Council office, he could find no trace of me; he then went to such clubs as he thought I might frequent—still no trace of me. He went to the hotels, he said,—that part of the hotels where he thought he might find me. Not locating me in any of those places, he hired a taxi and hid himself to my residence. He went to the door and rang the bell. The maid coming to the door asked him what he wanted. He inquired, "Does Mr. Campbell live here?" The maid said, "Yes, bring him in." Now the point of that is that you can't rely upon your friends to tell the truth about you.

I was asked by Mr. Price to speak to you this evening in a reminiscent way. You know old folks always like to reminisce, and are inclined to be garrulous, and if I should be that I am going to ask you now to pardon me, because I am going back a great many years when I start.

It has been my observation that in all economic and social life or activity there have been at least three distinct periods or epochs that are observable. The first might be called the feudal or feudalistic; the second might be termed the individualistic; and the third marks the present phase of our civilization, which might be called the co-operative. The safety movement, like other social activities, has gone through those three phases.

## EARLIEST FORMS OF SAFETY WORK

In 1895 at least, if not earlier, there was safety activity. There were industrial plants then existing which had safety departments. Subsequently there came statutes which were placed upon the statute books of many states requiring safety devices and safeguarding, or factory inspection laws. The work of these safety departments in those earlier days, however, and of these state departments, was feudalistic in that it tried to compel, and the means of compulsion was the punishment for the failure to safeguard—purely feudalistic. It did not take long for it to develop that there was the human element to be borne with, and, therefore, something else had to be done. You could not compel a conscience, you could not legislate a conscience, and from thence we stepped into what might be called the individualistic period, and we found that many industrial concerns, many railway companies, many insurance companies, state departments such as your Wisconsin State Department that was well in

the foreground in that, Bureaus of Labor and Mines in the Federal Departments, the Museum of Safety in New York, the National Association of Manufacturers, and the Association of Iron and Steel Electrical Engineers all were at work independently and individualistically upon safety work, organized safety work, having in mind the importance of education and inculcation of habits of caution as well as the necessity for safeguarding.

This work was not co-ordinated. Each was moving along its own lines, experimenting with this and with that, with no opportunity for comparison of notes, no opportunity of obtaining the experience of others to help and guide them in their work.

Contemporaneously with this, the last organization that I have mentioned, prior to 1912, at least several years prior, through the leadership of Mr. Lew R. Palmer, who was then the chairman of the safety committee of that organization, started safety meetings in conjunction with the annual meetings of that association at which technical electrical papers were read. It soon developed that the tail was wagging the dog, and that the safety meetings at these gatherings were the more important. The annual meetings were losing their fundamental and real function. Hence it was that in the year 1912 that association, under Mr. Palmer's direction, promoted the first Co-operative Safety Congress which was held in Milwaukee, and thus, while a Chicagoan hates to say anything good about Milwaukee, gave to Milwaukee the honor of being the birthplace of the co-operative safety movement.

This organization is entitled to a great deal of credit and a great deal of praise for what it did for the safety movement. Mr. Palmer is likewise entitled to all the credit and all the praise and all the love that we can give to him for the unstinted giving of himself, of his time, and of his money that he put into the work in the early days. I am only sorry that illness prevents Mr. Palmer from being here, for I would like to say these things to his face. You may not know it, but Mr. Palmer was taken to the hospital a day or two ago while here in Milwaukee, and lies there now. I wish that I might be permitted to ask you if you will not let me, or some one else as representing you, send to him the greetings of the members of this Council assembled here tonight, so that he may know that while he is lying ill in the hospital we are thinking of him. May I do so? (Audience arose and applauded.)

#### NEED FELT FOR PERMANENT ORGANIZATION

That wonderful Congress that was held here eight years ago was so great a success and taught so important a lesson that at the meeting which was then held a Committee was created to work on permanent organization. If you will bear with me, I would like to give you the purport of the resolution appointing that Committee. The committee was appointed to take the first steps toward the formation of a national organization for the promotion of safety to human life. This Committee was to organize and to create a permanent body devoted to the promotion of safety to human life in the industries of the United States. At that

meeting, the committee so appointed submitted a report, which report is in part as follows: "That a new organization along lines similar to existing organizations which make the subject of safety in industry a part of their program is inexpedient. There is needed an opportunity for a co-ordinating body which shall serve for future Congresses and safety exhibits the same function which the Electrical Engineers have served in the present case; that your Committee will undertake to act as a National Council for Industrial Safety, adding to their numbers from time to time representatives of such other bodies as concern themselves with its problems; that the National Council will begin at once to formulate plans for a 1913 Congress."

That you may know who some of these gentleman were, I am going to read you the names of the men who composed that Committee:

Dr. Charles P. Neill, U. S. Commissioner of Labor  
 Dr. Joseph A. Holmes, Director, Bureau of Mines  
 Charles C. McChord, Interstate Commerce Commission  
 F. W. Honk, Commissioner of Labor, Minnesota  
 Dr. L. W. Chaney, Department of Commerce and Labor  
 H. M. Wilson, Bureau of Mines  
 Dr. M. J. Shields, American Red Cross.  
 C. W. Price, Wisconsin Industrial Commission  
 James T. McCleary, Iron and Steel Institute  
 John Kirby, Jr., President, National Association of Manufacturers  
 R. C. Richards, Chicago and North Western Railway  
 C. L. Close, U. S. Steel Corporation  
 F. C. Schwedtmann, Secretary, Committee on Safety, National Association of Manufacturers  
 David Van Schaack, Aetna Life Insurance Company  
 R. J. Young, Illinois Steel Company  
 Lew R. Palmer, Association of Iron and Steel Electrical Engineers

#### DRAFTING A CONSTITUTION

That committee subsequently appointed a sub-committee on finances consisting of Mr. Van Schaack. They appointed a committee on the 1913 Congress in the person of Mr. Palmer, and a larger committee, the members of which I do not know, on the creation of a constitution and by-laws or form of organization. That committee had several meetings, and in the month of June, 1913, called the members of the larger committee together with other persons whom they had had added unto themselves in accordance with the authority conferred upon them by the resolution appointing them. That committee met in Chicago. It seemed at that time that the principal function of this organization which they were creating should be to provide for Congresses where there should be an opportunity for conference and the exchange of experiences. At this meeting, however, which was held in Chicago in June, there were a number of new ideas and new phases and new visions of what might be done by such an organization that were brought forward, the result of which was that

a Committee was further appointed which consisted of Mr. Van Schaack, Mr. Morey, Mr. Avery, Mr. Richards and myself, to revise the proposed Constitution and By-Laws and to incorporate into them all of these new thoughts, ideas and visions that had been brought to the meeting and discussed there. Your committee had not much to do more than to frame into practically the present form the constitution and by-laws of the organization, taking their authority from the ideas that had been brought out at that meeting.

I want to diverge again here for a minute and tell you what was also going on at the same time. Mr. Palmer, and his good wife with him, continued to devote their time and energy and money to keeping the idea alive. Mr. Palmer practically at his own expense published and distributed the printed proceedings of the 1912 Congress. He himself made up the program and made all of the arrangements for the 1913 Congress. In the meantime, Mr. Van Schaack had been trying to get subscriptions for the fund that might make possible the work of this organization. Mr. Van Schaack found this rather difficult, because it seemed that people did not care to subscribe to something that might be a charity for a person that wasn't entitled to charity, and, therefore, our problem was altered somewhat when we came to consider the proposed constitution and by-laws, as you will see later. This committee submitted its report to the 1913 Congress.

#### NATIONAL COUNCIL FOR INDUSTRIAL SAFETY ORGANIZED

If I might be permitted to give them to you, I think it would be interesting to you to know some of the principal features of that report. I am going to ask you to bear with me a minute, if you will, because I want you to try to get what the vision of the men who framed your organization was with respect to its possibilities.

"The National Council for Industrial Safety" (which was the name that the organization bore first) "proposes to promote the conservation of human life and its incidents in the industries of the nation, and, to that end,

"(a) To establish a conveniently located headquarters for the maintenance of a clearing house of safety information available to all concerned.

"(b) To encourage and promote throughout the country the organization of those engaged or interested in safety work in the district, and local councils, in affiliation with this National Council.

"(c) To hold annual congresses . . . . .

"(d) To encourage and assist in the practical standardization of safety devices, safe conditions and practices.

"(e) To give the widest publicity through its own publications and other channels, to all matters calculated to promote industrial safety.

"(f) In general, to initiate, promote, co-operate with and obtain the assistance of any and all activities . . . . . in the Nation's industries; and to participate in and aid other activities for the welfare of the industrial workers of the country."



That program was accepted and the National Safety Council, then the National Council for Industrial Safety, was launched on its way.

The first Executive Committee consisted of fifteen men, many of them the men whose names I have just read to you; in addition to those there were Mr. Edwin Wright, Mr. E. G. Trimble, Mr. Charles Pease, Mr. Cameron and myself.

At the time of organization it had been expected that Mr. Schwedtman would act as the first president of the organization. Unfortunately, business reasons prevented him accepting the office and they looked around a long time and finally they had to fall back on me. I seemed to be the only one who might be willing to be the goat. Mr. C. W. Price had been expected to be the first secretary, but through ethical reasons—loyalty to the state of Wisconsin—Mr. Price felt unable to accept, and likewise Mr. Cameron felt called upon ultimately to be the goat. Mr. Cameron and I went back to Chicago greatly honored, very much perturbed, and wondering where we were going to get off.

#### A MEAGRE BEGINNING

There were forty members of the National Council for Industrial Safety and \$1400 in real money in sight. We hired a small room about 20'x30' and got busy. I didn't give the time to this that Mr. Morey would have you believe. I did give a little, but nothing like that which he claims that I did. I had a room there alongside of one that Mr. Cameron had—a little 2'x4' space, but I had the word "President" on the door and I never shall feel prouder again in my life than I did when I sat behind that door.

There was no staff when we started. In a few weeks we had secured Miss Hunt, whom you all know and remember, and later Mr. Lamont. That was the very start of the organization, and I would ask you to compare, just for the moment, and see how wonderful it is that from that little beginning we have today a membership of 4,051 as against the original forty; we have an annual expenditure of \$233,000 against the little \$1400 that we started with. As a matter of fact, the first year's expenses ran just a little beyond what money we had in sight to begin with, so you may see how in point of membership, how in point of finance, the Council has grown and established itself in the minds and in the business sense of the people of America.

The Information Bureau that was to be established had nothing but an empty filing case off in one corner of Mr. Cameron's room. Today, at the headquarters, it is wonderful to see the large, commodious library with more than 10,000 reference subjects available to the members of the organization.

It was not long after we started that the Executive Committee discovered that there was a real function that the National Safety Council could perform, and that was the function of service; thus the bulletin idea was evolved, and you know how that has developed.

I remember that I was called upon by the Executive Committee to

prepare a pamphlet on "How to Organize." Oh, I worked like mad on that pamphlet for days, and I brought it to the Executive Committee with great pride. No paper ever got chewed up as much as that paper did. You can hear David Van Schaack with some of his idle sarcasm pointing to this and that grammatical error even. I was broken-hearted about that; but I rewrote the pamphlet and submitted it again and ultimately it suited the other fourteen men on the committee.

You all know what the service of the organization is today. You all know how it has grown and developed until it is the big thing that it is. I won't waste your time trying to recount that to you. You know what has happened in the local council field. At the end of the first year we had seventeen local councils with loyal, faithful volunteer officers trying to make the most of it. The principal activity was a conference now and then, maybe a monthly meeting at which somebody would read a paper. We had great hopes for them, and those hopes have been materialized in the wonderful local councils that we may point to with so much pride today. There are as many local councils today with paid secretaries as we had locals altogether in the first year.

#### NAME CHANGED TO NATIONAL SAFETY COUNCIL

You know of the many activities that those local councils are indulging in. You know of the public safety idea. It very soon developed that we had the public safety field to deal with as well, and so we changed the name of the organization so that we might deal with it. The work in that department has progressed a little more slowly than it may have done on the industrial side, but today I think we can continue to point with pride, as the politicians say, with our public safety record behind us backing us, to that department.

I wish that I had the time to tell you something of the work that was done by the Executive Committee during the first year or two. Those fifteen men met faithfully every month in the city of Chicago. There was never a time when there were less than ten; there was never a time when there was dissension; there never was a time when each one of them did not give faithful, loyal, hearty support to the ideas that they were trying to frame for the work of your body. I think those of us who had the privilege of being on that early committee will never forget it. It is going to stand out in our lives as one of those experiences that are more than delightful. We made friends. We made associations that will live with us always, and if nothing else ever comes to us there will come the delight that we have had from that association.

What may be said of the Executive Committee is true of the sectional committees, it is true of the local councils, it is true of that intercourse that we have had in our Congresses, and so aside from the great humanitarian benefit that we have all attained from it we have attained a personal reward as well.

Much of that which we formulated and started to do in the early days seemed visionary, it seemed like a dream, it seemed too ideal, too good

to be true, and many a hard-headed business man, when Will Cameron tried to get his membership, snapped his fingers at us and said, "Why, you're dreaming, man!" I wonder if we were! I am inclined to believe that facts have proven that maybe we were not, for today we are seeing the partial fruition of that wonderful vision that those men of 1912 and 1913 had.

#### REASONS FOR COUNCIL'S WONDERFUL DEVELOPMENT

I wonder sometimes why it is that this organization has had so large a measure of success. I am inclined to believe that there are two or three very substantial reasons, and I would say that chief among those reasons was this: That men at that time began to realize that it was more blessed to give than to receive. They gave unstintingly of what they had—their information, their experience, their data; they gave of themselves, they gave of their time and of their money and of their interest and of their thought; and so, by that giving, by that unstinted giving that came to us in those early days, has been made possible that which you have today.

Again, being idealism, we wonder why it succeeded. It succeeded because it was practical idealism. Practical idealism, when it is founded upon right principles, will ever succeed. I think Morey has made the point that, above all, it has succeeded because it was right and just and founded upon the spirit of service. There is a significance in all of this that in closing I should like to point to, and here, if I may be permitted to do so, I will follow precedent. I have, in all of my talks before you, at some time or another, at least at the banquets, tried to get some idea out of the Scripture. Tonight I would call your attention to that portion of the Scripture that reads something like this: "Faith, hope, and love; but the greatest of these is love" I don't mean that mawkish or squeamish thing that we sometimes call love; but I mean that great big human thing that means a love for mankind, that finds its expression in an interest in humanity, that finds expression in activity in civic affairs, that finds expression in all activities that have to do with the betterment of mankind. The progress of civilization, the progress of any activity, depends very largely upon how much of that love of mankind can be put into it.

Tonight, in closing, I would like to ask you to pledge a renewed faith and a fealty unto that white cross of service that is the emblem of this organization. I would like to ask you to continue to make practical this idealism that we have been working for. I would like to ask you to continue to give that co-operation which each one of you has heretofore given which has made the safety movement the greatest movement of our time.

THE TOASTMASTER: That was a very remarkable talk on reminiscences, and I think it was remarkable for another reason. He said, if you will remember, that a Chicagoan didn't like to say nice things about Milwaukee. I am going to return that compliment and say something nice about Chicago, for, do you realize that you have listened to a Chicago

man talk for a half hour, and there hasn't been anybody in the audience overcome by the heat?

It is remarkable, indeed, that after the rehearsal of the Safety Council's organization and good work we in Milwaukee should have made such a wonderful record this week. It is a record of which we are proud, and it gives me very great pleasure to read to you a special telegram or message just delivered by a Western Union messenger from Coroner Franklin here in Milwaukee: "Sunday, no deaths. Monday, no deaths. Tuesday, no death. Wednesday, no deaths. Thursday, no deaths. Same period last year there were seven accidental deaths."

Your work is going on; what you are doing is having its effect. I could dilate on it, perhaps, but I do not want to usurp more time than is allotted to me or than I have permission to take. Therefore, I will hurry on to present to you the next speaker. In asking him tonight whether he had any titles that he wished me to use, he said, "Oh, no, they all know me; just mention my name." For fear that there might be some one here who does not know the next speaker, let me say that he is the six feet two of personification of intellectuality who has been sitting here tonight and posing as a blushing violet between two roses—Mr. Forster.

### "IMPRESSIONS"

H. WALTER FORSTER, INDEPENDENCE BUREAU, PHILADELPHIA, PA.

(Abstract)

My appearance here this evening is visible evidence of the truth of the old adage that "Chickens come home to roost." In the years gone by, when the safety movement was young, and I possessed enthusiasm and youthful instead of mature beauty, I served on sundry program committees. Despotic methods were not infrequently used to get men to go on programs. Those that hesitated were nailed; those that balked were drafted; the printed program was sometimes the first evidence a man had of service expected of him.

At the end of August I returned to my desk in Philadelphia with a delightful vacation behind me. I was full of the joy of life; I had on sundry occasions been partly full of sea water; I wore a glorious coat of tan—regular beach guard stuff that might have caused feminine hearts to miss a beat or two; I was treading on air; and the world was my oyster. Picture me arriving at the office, greeting the corner cop, the staff, the office cat cheerily, and relishing the task of digging into the accumulated mail. Picture, if you can, my state of mind when the second letter I opened was one signed by your Secretary informing me that the program had gone to press and that I was scheduled for "twenty minutes in a lighter vein" at the Milwaukee banquet. I was hoist by my own petard.

Gone was the joy of life, gone the cheer, pallid the coat of tan that had been my pride. For the saddest commission that can be given a shy and unassuming man like me is an order to be humorous. Gradually, however, I got back my courage and realized that there was a lighter side to the

safety movement and especially to the men who have been prominent in it. The great and the near-great look far more imposing from the audience than they do in the committee room or on the golf course. And when you get them on the beach at Atlantic City—but of that more later. . . .

Now in the first place, I take it that some of you, especially after listening to the preceding speaker, have the idea that the thing that put organized safety upon the map—that carried the infant Council through its trying first years—was intelligent, devoted service on the part of our first officers and a few others of the old guard. Indirectly yes; actually no. The real credit belongs to a gentleman of optimistic nature, of ample girth, of dusky hue, of talents in his chosen field approaching the celestial. For know ye that in those first years when the Executive Committee used to gather in Chicago for all of its meetings, it regularly lunched in the dining room of the officials of the Illinois Steel Company, and the cooking of Rufus—may his shadow never grow less—put heart into us when financial disaster threatened and when we fell far short of our ideals of service. After consuming a tenderloin steak with mushrooms, beaten biscuits, and Rufus pancakes soured with butter and syrup, the least among us could have confidently tackled the League of Nations problem. I feel obligated here formally to proclaim to the world the debt that Safety owes to Rufus, and I respectfully suggest, Mr. Toastmaster, that this portion of my address duly engrossed on vellum (or perhaps branded on a ham would be more in harmony with the occupation of the recipient) be presented to Rufus as visible evidence of our sincere appreciation. . . .

Palmer is the most persistent cuss in the safety movement. His motto has always been "co-operation." If people would not co-operate voluntarily they did so involuntarily. He got that way playing football. You members and guests who can think back twenty years recall Palmer as all American end on the Princeton team. He ran the hundred in ten and a fraction in his foot-ball clothes, overcame his weight by fighting ability, and his persistence is evidenced by the fact that his nose was broken nine times in play. I mention this fact so that you will not think that the saturnine look which the southwest by south slant of his proboscis gives him is due to a cheerful outlook on life. . . .

These past Presidents of ours are an interesting and varied lot. There is Campbell the handsome, dignified and laconic; Morey the harmonizer and preacher of the Safety Gospel; Palmer the persistent co-operator; Van Schaack the expert organizer and judge of form par excellence, and finally there is Richards. As I consider him, I am impressed with the fact that his outstanding characteristic is mellowness; he is seasoned and experienced, disillusioned in some ways, but with all the strength of a forceful older man he holds to the necessity for accident prevention and its opportunities. He is dean of organized safety on the railroads, a founder of our Council, a tried and true war-horse, and always a kindly, friendly citizen. I wish we had more like him. . . .

Price is somewhat handicapped by his almost complete lack of enthusiasm, but I am quite hopeful that this will soon wear away, because he has finally found a phase of safety work which seems to interest him. I refer to school safety. It seems that Price wants to get every school child in

Illinois contributed more men to the safety movement in its early days than any other state. This statement is made with due recognition of the fact that Price and Williams and others of their ilk would have us believe that nothing worth while in any field ever came out of any state except Wisconsin. Unfortunately the fact that the National Safety Council was organized in Milwaukee gives them a splendid basis for argument. . . .

But they know and you know that only positive instructions from headquarters to talk in a lighter vein would cause me to hold up to laughter the old guard with whom I have worked almost from the beginning of the organized safety movement, and whom I have loved like brothers. When you work with a group of men for years and see nothing but broad gauged attitudes, fine courtesy, courage, generosity, and optimism, you grow to value them and to be charitable to their idiosyncracies, and peculiar characteristics.

THE TOASTMASTER: Coming from an audience, I would say that that was the quintessence of humor and wit vested in the old power. I am almost speechless after it and, coming from Chicago, that is a compliment.

MR. MOREY: I have been asked to read this list of the newly elected officers:

## NEWLY ELECTED OFFICERS

President—C. P. Tolman.  
 First Vice-President—W. H. Cameron.  
 Second Vice President—L. A. DeBlois.  
 Third Vice President—W. E. Worth.  
 Fourth Vice President—J. A. Oartel.  
 Fifth Vice-President—I. V. Kepner.  
 General Manager—C. W. Price.  
 Secretary—S. J. Williams  
 Treasurer—W. H. Frater.

THE TOASTMASTER: I am going to present to you now a man without whom this program tonight would not be complete. I don't know that there is anything necessary in the line of an introduction, because the man to whom I am referring is your new President, Mr. C. P. Tolman.

PRESIDENT C. P. TOLMAN: It would be idle to take time to tell you that one does not assume this office without a full sense of responsibility. "Safety First" is our principle and our guidance.

There is one thing which has impressed me as particularly an essential of the safety movement, and that is that it depends entirely upon a sense of individual responsibility.

The safety movement in Europe was largely a matter of mechanical exhibitions and an autocratic enforcement of rules. It nevertheless did good. In England the safety movement was more paternalistic and a matter of enforcement of rules of hygiene as well as mechanical safeguarding. In America the safety movement is noticeably a democratic movement, dealing, for the greater part, with the humane consideration and with the individual himself. The safety movement, where it has succeeded largely, has so succeeded because the individual was himself made to feel the responsibility both for himself and his fellow-workers. There are today in America 50,000 workmen occupying the position of safety committeemen and actively promoting the safety of their fellow-workmen. The Steel Corporation alone has 7,000 such men. Again I say that individual responsibility and a complete sense of it are the basis of the success of the safety movement.

The possibility of doing a large work in the organization of the National Safety Council lies largely with the staff which we have under the direction of our able Mr. Price. We have an Executive Committee meeting once a month, spending one day, and perhaps two, and we have a staff which will gather up every suggestion with possible merit of a greater or lesser degree, and which will extract from that one hundred per cent of its possibilities. With such a staff, I am promising to do the best I can to approach as nearly as possible the records of those men who have gone before me.

THE TOASTMASTER: This practically completes our program. May I ask you for the privilege of just a few moments to leave with you the concluding message of the evening. We have heard wonderful reminiscences, remarkable impressions; we know what wonderful work has been done by your organization in the past and what great work it contem-

plates doing in the future. We know what is being achieved here and now at this Congress, and we are proud to be a part of it. But all the laughter and all the applause and all the encouragement that you have given your speakers tonight, or given those who have addressed you and will address you at your convention, means absolutely nothing unless you apply it, each and every one of you individually. If you are already imbued with the enthusiasm of a Cameron or a Price, if you already have done your share, spur yourself on to do a little bit more.

There is a bigger and a broader message and a deeper one than the mere safety to life and limb and health which this organization and its work spell. That message is one not only psychological but practical in that it develops itself into this: If you teach men and women and children to be careful and to be safe, to look out so that they do nothing which will harm them or harm others, so far as their physical selves are concerned, you are laying a foundation for that still nobler and better and bigger and broader principle, the moral basis upon which everything must work, and you will bring up a generation of better citizens than we have even at present. There never was a time when we needed courage, when we needed independence of action yet coupled with co-operation, as we need it now. If there ever was a time when we needed safety first, politically and civically and socially in the United States, it is today. To get that, we must get a new meaning of the word "service." We want service, and we want it with courage and we want it with promptness, because if we get those three characteristics in our civic life, our political life, our industrial life, yes, and in our religious life, we shall have the one thing that makes every man that is worth while proud of himself. We will have loyalty to ideals, loyalty to our principles, loyalty to that square deal that was immortalized by Teddy Roosevelt, and loyalty, if you please, to that principle of all principles, which may be enunciated in very plain language, that nothing ever existed or was put across permanently unless it was on the square.

Now that the war is over, the lid is off, oh, there is such a tendency on the part of most of us to pass the job on to the fellow beside us. There is such a tendency to forget that every man and woman worthy of the name of American citizen owes as much of a duty to their country in times of peace as in times of war.

Inculcate these principles of safety into the children's hearts and minds. Practice them yourselves, apply them in your daily life, in your business, in your religion, in your lodges, in every walk in which your feet may tread, and then you will find, when all the smoke of battle is cleared away, the Constitution of the United States will remain untainted and the Stars and Stripes will still remain floating from the masthead. That is why this message of the National Safety Council means much more to me, and I think to you, than merely taking care of things physically, for we are going to do something for the other fellow, and when we do that, we are doing the greatest thing in the world that is worth while.



# Safety Bulletin Luncheon .

ROUND-TABLE DISCUSSION

Wednesday, September 29, 1920

---

FRED M. ROSSELAND, Chairman  
Safety Engineer, National Safety Council, Chicago

---

**I**T was pretty generally agreed at the Bulletin Luncheon held at the Ninth Annual Safety Congress that safety bulletins may no longer be used continually to scold employees because of accidents that have occurred to them or for unsafe practices carried on, frequently with the knowledge of the supervisory force. The successful safety bulletin service in the future must be a well balanced mixture of critical bulletins, bulletins commending individuals or a group for work carried on without accidents, bulletins on the general subject of accident prevention and the reason for it, and also bulletins warning against specific accident hazards. The commendatory bulletins received special approval at the luncheon, the thought being that a constant stream of bulletins criticizing workers will merely arouse a spirit of resentment which would destroy any appeal that the bulletin might carry. However, critical bulletins should criticize an unsafe practice rather than an individual or a group of workers. It is also agreed that general bulletins are needed in the bulletin service regardless of the industry—that the general appeal to the worker to be careful in his work, for his own sake, for the sake of his dependents, or whatever the reason may be, if well illustrated, is very effective.

Much emphasis was placed on the value of home-made bulletins in supplementing the National Safety Council bulletin service. It was stated that bulletins on specific accidents that have occurred in a given plant (where every employee knows about them and sympathizes with the injured persons) have a very strong appeal, and have a tendency to counteract the impression some workers have that the accidents reported by the National Safety Council bulletin service are unlikely to occur to them or to their fellow workers. Some experiences were given telling how the material for the home-made bulletins was secured and some effective home-made bulletins were exhibited.

"Let the picture tell the story" was the consensus of opinion and it was unanimously agreed that the less preaching that was done on the bulletin

the better. The story should be told as simply and directly as possible. The suggestion was carried throughout the discussion of home-made bulletins, however, that bulletin material as well as actual copies of the home-made bulletin should be sent in to the headquarters of the National Safety Council so that it could be reproduced in the general bulletin service.

The meeting was very well attended and a splendid spirit prevailed. Every one wished to express an opinion although it was impossible to hear from every one present.

## Education Section

September 29, 1920

---

**A. W. WHITNEY, Chairman**

General Manager, Workmen's Compensation Service Bureau,  
New York City

**DR. E. GEORGE PAYNE, Vice-Chairman**

Principal, Harris Teachers' College, St. Louis, Mo.

**C. W. PRICE, Secretary**

General Manager, National Safety Council, Chicago

---

**T**HE meeting was called to order at 2:45 p. m., by Mr. C. W. Price, General Manager of the National Safety Council.

**CHAIRMAN PRICE:** Mr. Whitney, the Chairman of this Section, found it impossible to be here, and our Vice-Chairman, Dr. Payne, has asked me to preside.

The report of the Secretary is the first thing. I think we have a report of a year's work that we ought to be proud of, and I am very proud to present it.

### SECRETARY'S REPORT

As you know, Dr. Payne made the one outstanding address at our last Congress in Cleveland, and we put that address into pamphlet form, and during the year we have used it in all our propaganda work, feeling that it was the best, most complete outline of this new idea of teaching safety in schools that had been prepared. It has served a very useful purpose. Copies of that leaflet were sent to all of our members, 8,000 plants, and went into the hands of managers, superintendents and safety engineers—men vitally interested in this thing, because they are all beginning to see the direct value of school safety upon industrial safety. One of the most inspiring things that has come to me, in going about the country this last year, is the fact that I have discovered that big general managers of industry, presidents, and other executives are more interested in what I say about school safety than in anything else that I say. That is because they are all beginning to see that possibly through the instruction of the child and the child going into the home and talking to the father and mother, we will do more to reach the workman directly and

really get him switched about to the right attitude in this thing, than by any other thing we can do. I speak of that now to emphasize the value of sending those 8,000 outlines of the doctor's plan to these 8,000 plants, strongly urging those men to take that leaflet and go to the superintendent of schools or the school board—in many of these cases those men were members of the Chamber of Commerce and men who were in a position to exert a very marked influence upon the school board. So that I think a great deal has been done by our members. In our National Safety News we have constantly urged our members to go to their school boards and get this introduced.

In addition to that, we selected 285 cities of 25,000 inhabitants or more, and sent to one outstanding member of the Council in each city a copy of Dr. Payne's leaflet and the syllabus, and wrote as strong a letter as we knew how to write, placing this before them in such a way as to show how far-reaching this instruction of children will be. We have received a great many responses from those men, and have reason to believe that every one of them took that syllabus and leaflet and placed it in the hands of either the superintendent of schools or the school board, and urged them to give this matter careful consideration.

#### STATE SUPERINTENDENTS CO-OPERATE

We have sent copies of Dr. Payne's leaflet and the syllabus to every state superintendent, and out of the twenty-nine state superintendents who replied, twenty promised to co-operate and expressed themselves as very much interested. I think that figure twenty is now too small; I believe a number of them have come in since. We propose to follow those superintendents up, sending to them from time to time some of the splendid results of the actual saving in child life in the towns where this system has been installed. We are not going to let up; we are going to keep right after those men month after month and year after year, until they wake up. We feel that if the state superintendents get back of this thing it will be a tremendous force to help us accomplish our object.

I was very glad to see Mr. Lange, of Ohio, representing the Industrial Commission of Ohio here. He gave me an entirely new idea of what an Industrial Commission can do; so I took the experience of Mr. Lange and his Commission, which he will present today, and sent some of their letters and literature, the whole scheme, to every Industrial Commission in the United States, and strongly appealed to them to get back of this movement; emphasizing the value of it to them in their work with the industries, in trying to get the industrial managers really interested. We have received quite a number of favorable responses from the Industrial Commissions and I feel that we can look to them for results. From month to month we are going to send them items of information, and we hope that we will finally get them all in line.

One of the most encouraging things has been the splendid response of the railroads to our appeal for co-operation. I cannot give you the number that have purchased quantities of Dr. Payne's leaflet and have

sent one to each of the station agents, or some representative in each town, asking him to place it in the hands of the superintendent. The North Western Railway is one of the examples that comes to my mind. It has had every station agent go to the superintendent of schools and place that leaflet in his hands. In Milwaukee they purchased sufficient quantities of the leaflet to place one in the hands of each school teacher in every school in Milwaukee, and then they purchased enough copies of the syllabus to place one in each school. That was a splendid piece of co-operation. The street railway companies have also done splendid work, especially the one in East St. Louis, which has reached. I think, all of the schools on its line. I believe that we can look to the railroads and the street railway companies in the future for very valuable co-operation.

Our editor, Mr. Resnick, has reached 125 educational journals with special news letters, with copies of Dr. Payne's leaflet, and with copies of his syllabus. Dr. Payne has contributed a number of articles, himself, to educational journals. Every week, or every month, through our publicity department, through our news letter, we reach 650 industrial magazines and 500 newspapers; and we have included in some of those letters the propaganda work on School Safety. In that way I think we have received a great deal of publicity.

Over 8,000 (probably 9,000 now, because the third edition of Dr. Payne's syllabus is off the press) copies of that book have been sold by the publishers, or have been distributed by the National Safety Council. When one thinks that every one of those books has landed in the hands of a school superintendent or a principal or teacher, you can see what those 8,000 books have done. Over 20,000 copies of the leaflet containing Dr. Payne's plan have either been sold or distributed and practically every one of those copies has found its way to the hands of a teacher or principal. You can hardly estimate the good that that has done; that is sowing seed.

I wrote as strong a letter as I knew how to the publishers of school books, and I pyramided in that letter all of the things that I could think of, that the Council is doing; the influence that we are accumulating back of this thing, the approaches we are making through our members to the state superintendents, and all the other things I have mentioned, to show them that we have gone out to win in this movement; that we are going to create public sentiment and not going to let up until we have won; and I urged upon them the consideration of including in every new school book that is published in the future some of this safety material. I received some very cordial responses. Every one of those ten publishers expressed interest and promised co-operation. Two of them said they had already sent material to two authors who were preparing books. I think three of them said they had already included safety material in their school books. The cordial expressions that I received from those publishers leads me to believe that in a short time we will succeed in getting the authors and publishers to include safety material in all the new books within the next two years. If we do that, we are automatically going to get on the inside of the schools.

## SECTION ORGANIZED IN N. E. A.

Through the efforts of Dr. Payne and Mr. Whitney, our Chairman, we organized a section in the National Education Association. Meetings were held at Cleveland and Chicago, and Dr. Payne delivered addresses at both meetings. Mr. Whitney got a place on the program in Milwaukee at the mid-summer meeting a year ago. He was also sent by the National Safety Council as its representative to the Salt Lake City meeting.

Dr. Payne has addressed numerous meetings of teachers throughout the country, with very, very encouraging results. I know of one city where in one day's visit he established safety in the schools, and a splendid organization has resulted.

As Manager of the National Safety Council one of my jobs is to speak before Chambers of Commerce and audiences of business men all over this country, and in every talk I have given during the last year, I have devoted a good portion to school safety. No part of my speech has met with such response as the part pertaining to school safety. More than that, where I was asked to speak before large groups of plant superintendents, foremen—I mean hardheaded, red-faced, hard-fisted fellows, who are the very backbone of the industries—from the responses I got and the reports I received of committee meetings afterward, I found that school safety was the most interesting topic to them. Why? Because they are fathers of children, because they are citizens of cities and towns, and because they are men who know safety, and because these practical men see what it will mean to their workmen, what it will mean to their children when we really get into their homes this safety program. I am going to keep right on talking at foremen's meetings and superintendents' meetings on this subject during the next year.

Splendid work has been done by the fifteen cities in which we have paid managers. These men have done valuable work by speaking before teachers and by interesting the superintendents of schools and boards of education, and getting this thing installed. I think I can say that in every one of those fifteen cities if they have not already completely installed it, they will within the next year. Those managers are making it their particular business to follow this up persistently until they get it, because they think it is the biggest single thing they can do in that city, not only to reach the industries but to lay the foundation for public sentiment which will be favorable toward this safety movement.

Perhaps the most successful safety drive, barring the one that is now under way in Milwaukee, that has been conducted in this country, was that conducted some two or three months ago in the Lehigh Valley, a valley forty miles long with some twelve industrial centers. The biggest industrial and business men in those centers all agreed afterward that by far the biggest factor in the splendid accomplishments of that tremendous drive was the fact that every child in every school was carefully instructed in safety, and through the children they reached the parents in the home. That is one of the finest testimonies for safety education that I have heard, and that came from them voluntarily—I didn't ask them for it.

Now so far as our reports go, we know definitely of twenty-nine cities that had introduced Dr. Payne's plan up to July, and I think there would be a great many more if I should take the census now. I should say, from the reports which we have received, that hundreds of schools, possibly thousands of schools are now teaching safety, if they have carried out their promise, as a result of this first year's work. For instance, in Ohio practically every school in the various towns is now teaching safety. In Texas every school in the towns is teaching safety, and one-half of the country schools are teaching it; two counties in Mississippi and one in Minnesota were reported. These figures are very imperfect, but I have reason to believe that we shall be able to make a canvass and at the next year's meeting report to you several thousand schools that are teaching safety according to Dr. Payne's plan.

Now I had brought home to me today, in a most striking way, in our public safety meeting, the far-reaching effect of this thing. We have left out the country schools in our discussion. Let me give you just one figure, in closing, to show you the importance of this thing. The East St. Louis Railway is an interurban railway about 235 miles, running through a country district. The first six months of 1920 they did not have a single person killed by accident—I mean outside of the employees.

Since the first of July, they have had twenty-nine deaths from automobiles. Fifteen of them were farmers and their families. No fatal accidents during the first six months—just get that figure into your system—and then twenty-nine deaths in just a few weeks. We must include the country schools, and we are now trying to reach the county superintendents through our members and get safety instruction into the rural districts.

You know, there is nothing that is so convincing as the experience of some one who has gone and done it, so I know that you will be interested in hearing from Mr. Fred G. Lange, Director of Safety, Industrial Commission of Ohio, who will tell the story of what the Ohio State Industrial Commission has done to promote safety education.

#### WHAT THE OHIO STATE INDUSTRIAL COMMISSION HAS DONE TO PROMOTE SAFETY EDUCATION

FRED G. LANGE, DIRECTOR OF SAFETY, INDUSTRIAL COMMISSION OF OHIO,  
COLUMBUS, OHIO

I consider it a rare privilege indeed to tell you what we have tried to do in the matter of introducing safety education into the schools of Ohio. First in importance, perhaps, as my reason for coming here, is that from what we have done and the success that we have achieved so far, other commissions may find inspiration to go and do likewise, and that in the way we have done it they may find some pointers which will help them along the way.

When I took up the work as Director of Safety for the Ohio Industrial Commission last October, I made a thorough survey of the existing accident situation in the State. In going over the accident situation in the

State, we found that whereas about 1,000 deaths a year were being reported to the Industrial Commission, there were a total of 6,500 accidental deaths every year in the State of Ohio; so that as we were the only agency endeavoring to prevent accidents, we were endeavoring to prevent only a sixth or a seventh of the accidental deaths in the State. Quite evidently it was necessary that some agency take up this work of conserving the lives and limbs outside of industry, and so our problem in the beginning contemplated that factor.

Another reason for our taking up the school safety problem was, that it is very difficult to train the older workers in habits of carefulness. It is ever so much easier to inculcate those habits of carefulness into children, and then when they come into industry it will be much easier to continue them in those habits. So I put this proposition before the Industrial Commission and they immediately saw the advantages to be gained from carrying on this school safety propaganda and gave me permission to go ahead with it. I wrote to Governor Cox and I wrote to State School Superintendent Pearson, asking for their recommendation, and the State School Superintendent heartedly endorsed the movement. The Governor wrote me the following:

"I am delighted to learn that you are taking up through the public schools the matter of safety education. I am sure you will find a hearty spirit of co-operation. While great strides have been taken in Ohio toward the elimination of preventable accidents, there is yet much to be done, and assuredly this work can be accomplished nowhere better than in the schools."

That indicates his attitude on it, and it has been the attitude of all the big men in the State whom we have approached on it.

Now in order to get the plan into operation, I sent to the school superintendent in every city, county, and district in the state, close to five hundred altogether, the following letter, which in a way summarizes the whole situation:

"Do you know that from January 1, 1916, to December 30, 1919, there were 2,643 deaths in Ohio industries? Do you know that there were 520,341 accidents reported to the Industrial Commission from July 1, 1916, to June 30, 1919? Do you know that the cost of these accidents to the state is at least \$25,000,000 annually? Do you know that in addition to these accidents in industries, there are even a greater number occurring on our public streets, on the railroads, in the homes?

"Think of the immeasurable misery and woe these accidents have occasioned. Among the children you are doing your utmost to develop into useful citizens there are some who in the glory of their youth or in the strength of their age shall be sacrificed to this ruthless modern Moloch; some who shall go through life never able to see the sunshine nor the flowers; some who shall be condemned to infinite pain and suffering.

"We might possibly reconcile ourselves to this ruinous loss if it were unavoidable, but we know absolutely that it is largely avoidable. Cities which have given thought to conserving the life and limb of their people have been rewarded by reductions in the number of accidents that have



surprised even the most optimistic. Industrial establishments which have tried to reduce their accidents have been rewarded to reductions ranging from 20 to 80 per cent. The possibility of greatly reducing our appalling annual accident toll is so certain and so well known that I need not further discuss it here.

"Let me draw your attention to the fact that to reduce this terrible toll in the future we must now train the children in the schools to safe habits of thought and action. The need of this work has been proved, the possibilities likewise. The method alone remains to be determined. To Dr. Payne and the St. Louis schools this country owes a tremendous debt of gratitude, for they have developed a method which successfully teaches children carefulness without adding any additional study to the present curriculum. This is accomplished by utilizing existing studies as a vehicle.

"In the near future we expect to have copies of Dr. Payne's book for limited distribution. This book outlines in detail the plan which has proven so highly satisfactory in St. Louis. Lessons for each grade are given and a great deal of suggestive material included. I am enclosing a postal card. If you will sign and return we will send you a copy of the book mentioned, *free of charge*. Won't you let us have this assurance that you are interested and will co-operate in this great humane work of conserving life and limb and preventing untold misery?"

About sixty per cent of the superintendents replied, pledging their co-operation to the Industrial Commission and asking for a copy of the book, which was sent to each. At the same time we ran a column of Western Newspaper Union plates, advertising this thing in all the newspapers of the State. We wrote to the presidents of the local Federation of Women's Clubs and to the state president of the Ohio Federation of Women. All of them have given us their hearty support in this work.

Then we sent out a second letter to those who had not replied to our first, and as a result of that second letter 73 out of the 80 city superintendents, 82 out of the 88 county superintendents, and 200 out of the 245 district superintendents wrote in and promised their co-operation to the Commission. Now this was near the end of the school season. There was some question as to whether we should take it up then or wait until the fall session, but we felt that if we got it into some schools before the vacation season, undoubtedly it would be the means of saving some lives during the vacation period. Therefore we took it up at that time. We had a fall campaign recently, and to all of those superintendents who had formerly promised their co-operation, we again wrote and pointed out some things, among them some figures that the National Safety Council recently furnished us that six or seven times more children are injured during the first week of school than during any other week of the school year, and more children are injured in fair weather than when the weather is inclement, and pointed out the necessity of giving that particular attention during the first year. At the same time we sent them the curriculum of safety, which was based on the Cincinnati plan. The plan is this:

- I. The superintendent of schools sends a letter to all principals
  1. Advising that safety education is henceforth to be a part of the curriculum,
  2. Advising that the plan to effect this shall be as follows:
    - a. A CENTRAL SCHOOL SAFETY COUNCIL shall be organized, charged with the development of school safety.
    - b. Each school shall have one teacher representative on the Council, who shall receive full professional credit for work done along this line.
    - c. There shall be a Council President, Vice President, and Secretary, elected by the representatives.
    - d. Such committees as are deemed necessary shall be created. There may be a committee on methods of teaching safety, a statistical committee, etc.
    - e. The Council shall meet every week (two or four weeks) at \_\_\_\_\_ place, to discuss any accidents which may have occurred since last meeting; to formulate ways and means of preventing future accidents; to discuss present methods of teaching safety and possible improvements.
- II. Advising that the person chosen as representative shall have charge of the safety program in the school which they represent, and shall
  1. Inspect the conditions in and surrounding the school and the district traversed by the children on their way to school, in order to discover dangerous conditions and secure their correction.
  2. Organize a school safety council, each class electing one or more pupil representatives thereto. The school safety council shall be charged with the safety of the pupils.
  3. Receive reports on accidents occurring to the pupils from the class representatives. These reports shall be investigated when necessary. All reports shall be tabulated and then transmitted to the Central Safety Council.

In this we have tried to give to the city superintendent a plan that would make it just as easy as possible for him to carry this work into effect. We did not forget those who had not yet promised their co-operation, and we wrote another letter to them, just merely again suggesting that possibly they had forgotten it; and as a result of that 223 out of the 245 district superintendents and every city and county superintendent of Ohio promised co-operation in our campaign for safety—every one of them!

We had a law in Ohio for a long time, requiring thirty minutes of safety education a week in the schools, but it never resulted in very much good, because it wasn't enough. I think I am safe in saying that up to the present time there have been as many books sold in Ohio as in any other five states in the Union—I refer to Dr. Payne's syllabus—and we are going to continue until every school teacher in Ohio has that book in his or her hands and is using it, and we believe that that will reduce accidents of all kinds to an irreducible minimum in the streets, the factories, the homes, everywhere. As Mr. Price said, it is the one thing that

is going to influence the man at work; when his children come home and talk safety, he is going to be influenced and interested by it. It seems to me that this new and high regard for human life which we are implanting in the hearts and minds of children is going to lead to a newer and better relationship between man and man, and who knows but that out of this there may grow a spirit which will be a big factor in carrying America upward and onward?

CHAIRMAN PRICE: You can feel perfectly free to ask Mr. Lange any questions.

#### DISCUSSION

MR. D. P. KENNEDY (Pittsburgh, Pa.): A friend of mine, a principal in Pittsburgh, suggested to me that he was going to get a couple of hundred copies and use them for reading in the grade classes in his school. Is it practicable for that?

DR. PAYNE: It is more desirable to have the teacher use it.

MR. J. T. BRIGGS (Wheeling & Lake Erie Railroad, Canton, Ohio): Just following out what my friend Mr. Lange, from Ohio, said, we purchased 500 copies of Dr. Payne's book and we distributed them in the city of Canton, Massillon, and all the small towns along our railroad. We tried to get enough so that each school might put one copy in the hands of the teacher.

MR. T. R. McCAMPBELL (Cleveland, Cincinnati, Chicago & St. Louis Ry.): I would like to ask Mr. Lange if the Commission of Ohio has made an effort to reach the general officials of our railroads, of the old railroads of Ohio?

MR. LANGE: We have not.

MR. McCAMPBELL: We are hoping that you will. We in Indiana have gone to the Public Utilities Commission there and asked them to become interested in the prevention of accidents to school children, and the teaching of the prevention of accidents in the schools, and they have promised to co-operate.

#### 10,000 CHILDREN KILLED IN ONE YEAR

I would just like to state that we are vitally interested in this subject because we on the railroads in a single year had the horrible experience of killing 10,000 children less than twelve years of age. Possibly you do not realize the enormity of that, and you perhaps wouldn't, unless you saw 10,000 hearses going by this building here, each carrying the remains of a child. It is something in which we are all interested.

Mr. Price said that the railroads had asked their agents to deliver Dr. Payne's leaflet to the principals of their schools. I will say, Mr. Price, that we have ordered our agents to do that, and we are beginning to get good results.

MR. LANGE: The reason we haven't appealed to the railroads is this: I am primarily interested in accident prevention in factories; that is what the Industrial Commission is primarily interested in, but we have taken up this school program because we believed it was vitally essential to

the prevention of accidents in the factories. It may be that sometime there will be a Director of Safety for the State, who will have charge of other accidents. At the present time we have charge only of the prevention of accidents in factories.

MR. HERDMAN (Manager of the Portland, Oregon, Local Council): I would like to state that within the last few weeks, in conjunction with the Industrial Accident Commission in Oregon, we went to the state superintendent of schools, and he has consented to make accident prevention a compulsory part of the course of study for the entire State, and to outline, on the basis of Dr. Payne's book, a course to be co-ordinated with the other studies in the curriculum. The Industrial Accident Commission, like the Industrial Commission of Ohio, has appreciated the situation and realizes that there is the necessity right now to begin at the very bottom.

MR. HENRY SCHOMBER (H. L. Doherty & Co., New York City): In our organization we recently carried on a public safety campaign in Durham, North Carolina, and we went right into the public schools, and I am sure our company is going right ahead and do that same kind of work in all the cities where we have any properties. I was so impressed with the wording of Mr. Lange's letter in behalf of the Commission to the various superintendents in all the counties, and so forth, I was wondering if you wouldn't send to the National Safety Council some forms similar to the letters that you wrote, which could be distributed by the National Safety Council and used as a sort of a guide, so that we can reach the people that we want to reach?

CHAIRMAN PRICE: It has been decided to do that right now. It has been done.

Are there any other questions?

I want to thank you, Mr. Lange, from the bottom of my heart! That was splendid testimony. The splendid response of practically every school superintendent in the State of Ohio to this appeal ought to convince every person in this room of the possibilities of this thing that we are talking about today.

Now there are school men and school men; some are progressive and some are not so progressive, but Milton C. Potter, Superintendent of Schools in Milwaukee, is one of the really progressive school men of the Middle West, and he is going to speak on the "Importance of Safety Instruction in Graded Schools"; and he has a right to speak because there is being organized, and has been organized in the schools of Milwaukee a splendid system of Safety instruction. I saw a wonderful demonstration just the other day. I had the privilege of being asked to speak before 1,300 boys, one boy having been sent as an elected delegate from each school in Milwaukee County, and those splendid boys, 1,300 of them, right there and then were organized into a permanent organization, under the Local Council of the National Safety Council here, to co-operate in planting the Safety seed in those schools. That is an entirely new and unique organization to co-operate in this wonderful work. I am sure that Mr. Potter has a story to tell you, that you will be intensely interested in.

**IMPORTANCE OF SAFETY INSTRUCTION IN SCHOOLS**

MILTON C. POTTER, SUPERINTENDENT OF SCHOOLS, MILWAUKEE, WIS.

In his "Intimations of Immortality," an ode inspired by his recollections of his own childhood, William Wordsworth refers to a child as a stranger come visiting from a foreign land, and "trailing clouds of glory" in the dull drab streets of our humdrum towns. The older strangers who have come to America from foreign shores are now at last receiving the most careful attention at our hands because of their strangeness to American conditions. Their guestship and our family welfare both warrant this attention.

Courteous hospitality is rendered to mere birds of passage within our gates. The most sympathetic heart service is due to those who may become members of the family. As to our young relatives who have come from afar to stay with us, no expenditure of our own comfort, time, energy, or money will be accounted loss to us if only they may be safe and happy.

The Milwaukee School Board spends many thousands specifically for the Americanization of adult strangers in our city. We formal foster parents may make possible the cessation of such expenditure with the decreasing stream of immigration if we fully accept the function of reception and entertainment committee to the annually recurrent host of celestial strangers which in wide-eyed curiosity comes trailing clouds of glory in every schoolroom.

When these heavenly foreigners press with rose petal fingers at our birth-gates they are so overwhelmed with cordial attentions, which at first they do not need at all and would be far better off without, that they are entirely unprepared for the cool aloofness of our strange breed toward their greatest need at the time when they too prematurely believe they thoroughly understand their new home and all its ways. At just this time of deadly danger we old homesteaders are apt to ignore the needs of these still helpless guests. Indeed we very often so far forget ourselves as to condemn or even insult them because they unknowingly do some unsafe thing in the treadmill of life so familiar to us but so unfamiliar to these, our visitors.

Careful safety instruction in the grade schools for these uninstructed visitors to our planet is of great and tragic importance, too, because in addition to their unfamiliarity with mundane traps and contraptions our little guests from other spheres bring with them a divine audacity. Their other-worldliness would be less authentic if they met mere mechanical earth-facts with caution, or considered them of momentous importance. Indeed, it is only iron necessity that drives a child worshipper reluctantly to press to the lips of the children of Eden the fruit of the tree of knowledge. But that categorical imperative rests upon every teacher soul.

Last week a truck driver in this city clambered aboard his five-ton truck without looking around and under his truck, and drove ahead fifty feet only to be brought to a horrified stop by the scream of the mother

over the crushed body of her too-innocent little boy who had confidently laid himself down to dream under the shadow of the nice big car.

And shall we say that that driver is worthy of execration? The noblest soul I ever knew, careful and thoughtful of every living thing, worshipped at the feet of his Apollo-like boy, ordered a wagon loaded with oats to move up to the feeding table and an instant later picked up the crushed remains of the god-like adored one who had been sitting in the shadow of that load of oats. No one dreamed of condemning him as murder-minded. His carelessness is the carelessness of our race and our age. Modern American push has unconsciously animated every man with the stirring slogans "Put it across", and "Get it done", until a reverent forethoughtfulness preceding every daily act has become an impossibility. Even daily traffic accidents and weekly fatalities in Milwaukee have failed to instill that forethought.

It is a noble trait of mind that makes the boy himself careless of his own danger. At least it is biologically inevitable that a boy at certain periods should dare the undarable, should lie down to dream his dreams under a railroad train if it happens to be handy, in utter disregard of personal danger. A boy who does not pass through the "dare" period of constant invitation to accidents will not become the man who will never take a dare in the moral war for state and industrial welfare. Moral qualities must first be played out in boyhood on the physical plane if they are to exist at all in adult life on the spiritual plane.

I was once made aware of the puzzling problem presented by this phase of youth to the editors of children's magazines. Walter McGuire had been elected editor of "Boys' Life". He wrinkled his face at me and spoke somewhat as follows: "They want me to try to make it a real force in the lives of the Boy Scouts. Well, to be that it must be read by the Scouts. It must be 'popular.' It must have thrillers if the Scouts are to do any thrilling. But it does not meet with universal approval to fill 'em up with pep, thunder, blood, and vinegar."

We talked that over for a month at intervals and talked intimately with hundreds of chummy St. Paul school boys before Walter stumbled on his great magazine principle for making "the thriller" consistent with safety principles.

Boys will be thrilled. In fact they must be to live at all as boys. The writers from Defoe to Henty have known it as well as the pot-boiling concoctors of nickel thrillers. But there was always a difference between the "Golden Days" and the "Youth's Companion." The former enhanced the glamour of danger for its own sake, for the boyish zest experienced when enjoying the thrill of it. The latter recounted experiences of peril only in connection with deeds of service. To this day the slogan of the "Youth's Companion" seems to be, not "Play safe and preserve your own life", but "Dare all to save and make safe the lives of others".

On that appeal the "Boys' Life" has achieved a splendid success and is worthily serving in our safety campaign. That is the appeal in "Sure Pop and the Safety Scouts" introduced into the Milwaukee Schools two years ago. Bearing in mind the milleniums of human life when the hu-

man who did not learn to enjoy peril surely perished, the inevitable inalienable instinct of the young to enjoy danger, and the tendency of writers and teachers to use this instinct as a sure means of interest and control, one comes to Dr. E. George Payne's "Education in Accident Prevention" with a sense of relief and new power which arises from his teacherly organization of material in full recognition of those facts. Dr. Payne's book is not a new intrusion on the harried lads' already overcrowded time. It is an attempt (a very successful one) to adjust the whole curriculum to the facts of city life. It is a book for teachers by a real teacher, it makes possible the very best kind of safety training—incidentally and conformably to occasions as they arise in connection with all the subjects of formal instruction. Carefulness for others' sakes emerges without the slightest diminution of manly courage or of personal adventure spirit. The great mass of accidents everywhere show the peak of the curve in the thirties and forties—not in childhood. Fifty-nine such fatalities in Milwaukee in one year resulted from simply falling—either off, down, or on.

Real carefulness means mentality, grace, and skill as contrasted to thoughtlessness, ugliness and awkwardness. If such skills are to be found in our adult life they must be planted in childhood, watered and nurtured, respected and commended, throughout youth.

Prior to the great war we in the Milwaukee public schools had by steady effort gradually reduced our annual intra-school accidents by some 40 per cent. In 1917-1918 we had only 66 such accidents, when the war began to make itself felt in the complexes and reactions of children among the most pitiful and far-reaching results of war. In 1918-1919 we had 85 intra-school accidents, and in 1919-1920 there were 131 such accidents. Fundamentally safety instruction is for the sake of making next generation's adults careful and thoughtful of others. But they must begin to act now if they are really to be careful two or three decades hence.

My boy was reading the other day a safety article in the American Magazine. Suddenly he sucked breath and let loose a delightful gasp. "Gee, Dad!" he yelled, "you gotta stop making a sissy of me. You don't give me a chance for any 'sperience. Just lookahere, if I'd ever really had a chance to run a little risk this American Magazine would recognize it amounts to sumpin, and prob'ly pay me twenty dollars". That American Magazine was merely announcing a prize contest on "The nearest I ever came to death". But the biological and literary heritage of our race emphasized in my boy not the safety thought but the danger thrill. The post-bellum "zeitgeist" still further aggravates the situation. It is impossible to over-emphasize the importance of safety instruction in the schools.

CHAIRMAN PRICE: Thank you, Mr. Potter, for your fine address. With such a dynamo back of this movement in Milwaukee, can a man or woman in this room doubt for a minute what is going to happen in the Milwaukee schools?

Now I am going to turn this meeting over to Dr. E. George Payne, and every one of you will have the opportunity to get from him the sort of

information which will be invaluable to you in reaching your superintendents and teachers and school boards, and convincing them of the practicability of this plan.

### THE PROBLEM OF SCHOOL HAZARDS

DR. E. GEORGE PAYNE, PRINCIPAL, TEACHERS' COLLEGE, ST. LOUIS

The subject of this address is the hazards that cause accidents to children while under school control. That generally means from the time the children leave home in the morning until they reach home again in the afternoon. In case they go home during the lunch period, the time they are at home is not included. With this limitation to the meaning of school hazards, it is in place to say that school hazards are not matters of serious concern. Only two deaths occurred in three years in St. Louis from accidents under the conditions defined above, and a total of one hundred thirty-five deaths from accidents to school children during the same period. Each of these deaths resulted from a street car accident.

There are several reasons why the accidents are not serious either in number or character during this period. First, the children come out of the buildings in groups and therefore, tend to protect each other. Second, drivers are careful at dismissal times and in the presence of groups of school children. Third, policemen guard the crossings at the time of dismissal and taking up of school and prevent accidents. Fourth, teachers have always tried to insure against accidents while the children are under their control. The reasons why teachers are so anxious to prevent accidents is that they feel deeply their responsibility, and also, they are under severe censure from the public and the press in case children receive injuries while in their charge.

It is well to note here that the problem of school instruction in accident prevention is not one designed mainly to eliminate school hazards and school accidents, but primarily the purpose of school instruction is to eliminate accidents to children and adults in the community at other times than when the children are under school control. In other words, the function of the instruction is to develop controls in the children that will make them safe in their activities upon the street and in the homes, and also to create intelligence among the whole population concerning accident situations and how to prevent accidents.

I wish, however, to limit this discussion to accidents to children under school control. First let us note the accidents in the high school from September, 1918, to January, 1920. In the seven high schools in St. Louis, there was a total of eighty-four accidents. Of these, thirty-four occurred in one school, twenty-four in another, and only one accident in one school.

The question arises immediately as to the reason for this marked difference in the various high schools. It can be asserted that there is evidence of no significant difference of conditions that would cause this discrepancy in accident statistics. It would be unwise to assert that there is no difference in the environment of these various schools such as would offer



us dissimilar accident opportunity. For instance, one school is situated in a neighborhood which offers much greater accident opportunity than any other because of street congestion. But the causes of accidents do not show that the street environment has anything to do with the number, character, or seriousness of the accidents. Therefore, the wide variation in the number of accidents is due to the difference in attitude of mind and habits of the children themselves. It is the result of a difference in home education and attitude which has not been largely affected by school training. The data then are symptomatic of a situation that can only be changed through educational endeavor.

#### ENVIRONMENTAL CONDITIONS NOT VITAL FACTOR

The conclusions drawn from the data presented for the high schools are equally true of the grade schools. While the environment of the grade schools differs widely, and if all other conditions were equal, there would be a much larger number of accidents in some districts than in others, actually the environmental conditions are not the vital factor in the statistics at all.

The statistics from September, 1918, to January, 1920, show that of the one hundred twenty-two grade schools in St. Louis, seventeen schools have practically one-half the accidents. This fact cannot be explained as was indicated above on the ground of outside hazards, although outside conditions do affect the number in some certain degree. The history of one school is in point. One school has had systematic instruction in accident prevention for two years, and not a single accident has occurred in this school, on the grounds, or going to and from school. Not a single fatal accident has occurred to a child living in the district. This district, moreover, is one that is most unfavorably situated in so far as the environmental conditions are concerned. Three lines of street cars run through the district. One of the most congested streets in the city lies in the district. Automobile thoroughfares pass through the district in various directions, and most of the railroad lines coming into St. Louis skirt the district on one side. Here then is evidence that instruction in accident prevention may be effective regardless of the social environment by creating the right habits and attitude of mind. It may be said, furthermore, that this same district showed a high record of fatal and non-fatal accidents before instruction in accident prevention began. This district is typical of a few where accident instruction has been carried on.

The results of instruction may be further shown from statistics of fatal accidents. In 1917, there were one hundred twenty-three fatal accidents to persons under twenty. Of these, fifty accidents occurred to children between six and sixteen. The ages, six to sixteen, seem appropriate because between these ages lie most of the elementary school children.

Several points should be noted. In 1917, no systematic work in accident prevention was done, and the number of fatalities was fifty. Nineteen hundred and seventeen showed a decrease to thirty-six when there naturally would have been an increase. This decrease is due to the fact that in September a systematic no-accident campaign was carried on through

the schools and was continued rather systematically for the remainder of the year. In 1919, systematic work was done in only one or two schools, and the number again increased to forty-nine. The effect of instruction in 1917 carried over to a certain degree, and as a result, with some work that was done in 1919, the number of accidents showed a decrease over 1917. In spite of the fact that the maximum did not reach the number of 1917, it would perhaps have reached sixty had nothing been done. Toward the end of 1919, a manual authorized by the National Safety Council was put into all the schools, and systematic work was begun in most of them. The result is shown in the statistics for January and February, 1920. These months show a decrease of more than fifty per cent from 1919, and seventy-five per cent over what might have been had the conditions of 1917 prevailed together with the increase of accident opportunity in the city.

On September first, the record of accidents was fifteen as opposed to forty-nine for the year 1919 and thirty-five up to the beginning of September. The beginning of July we had only nine deaths which shows an increase of deaths during the summer months when the schools were not in session, but even then, the record shows a saving of twenty lives over the number lost in 1919, which was itself a low number as compared with a series of years previously.

#### CONCLUSIONS REGARDING ACCIDENTS WITH REFERENCE TO THE SCHOOLS

This study of school hazards leads us to some very definite conclusions about the whole problem of accidents with reference to the schools. First, in spite of congestion and other unfavorable conditions, proper school instruction and organization will affect favorably, if not eliminate entirely, accidents to children, and even decrease materially the accidents to those children who are not in school. Second, school instruction will tend to decrease accidents among adults because of interest and knowledge of the children in accident elimination. Third, the statistics show that accidents tend to center in certain localities, and that attention should be centered there for the purpose of elimination of accidents. Fourth, nineteen schools with one-sixth of the school population have more than one-half of the fatal as well as the non-fatal accidents. Furthermore, there is no relation between the number of accident opportunities and the number of fatalities. Fifth, the obvious need is for additional play space in congested quarters and instruction in accident prevention. Sixth, the largest number of accidents are caused by automobiles and burns. Therefore, instruction should be centered upon these hazards. Seventh, accidents center around certain holidays, particularly the Fourth of July, and therefore, special effort should be made at these times to prevent accidents. Eighth, each city must make its own analysis and then center its efforts upon its own needs. Ninth, children are safe without any special effort while under the control of the school, and therefore, the effort should be made to develop controls outside of the school.

## DISCUSSION

**CHAIRMAN PRICE:** I would like to hear from Miss Beard, of Detroit, who has charge of the Safety Education of the Schools of Detroit.

**MISS HARRIET E. BEARD** (Detroit Teachers' College): I did not come prepared to give a report on the situation in Detroit, but I thought it might be interesting to you to know how we worked out an accident prevention program in Detroit.

Those of you who know Detroit, know that there the traffic situation is a very difficult one; all the traffic is on one level; there are no subways or elevated roads, and all of the streets converge to the center of the city, so that trucks that have to cross the city all go down to the center of the city. This makes a very congested traffic condition. The character of the industries of course has led to an enormous number of automobiles on the streets of the city. There has been a tendency toward reckless driving.

In the four years previous to last September, there were 2,938 accidents to children of school age, from 6 to 18; so a year ago the Board of Education organized a Safety Education Department, and I was put in charge of that work and the preparation of a safety program and a course of study that would be adapted to meet the needs of the situation as it existed in Detroit. That work has gone on for only a year.

## DETROIT SCHOOLS SAFETY PROGRAM

In this Safety education we work both in the public schools and outside of the public schools. We have a course for the teachers in the Teachers' College. That course covers accident prevention, fire prevention, disease prevention and first aid, and all civic topics that these young cadets will have to teach when they go into the public schools. In the night classes we also have a course in accident prevention for teachers, and that will be a very practical course because all of these teachers will come together and discuss how they can teach these accident prevention topics and work out some of these problems themselves.

We have done no work in the high schools as yet—there has not been an opportunity to develop all of this at once, but we have 115 of the elementary schools, and in those we reach the teachers—we have reached them all this year by a bulletin which is published once a month, and in that bulletin all of the accidents for the month, to school children, are printed, and the school to which the children belong. That includes all of the accidents that happen to children who are members of the school, not only in the school or going to and from the school, but wherever the accident may happen to take place. There is very keen competition among the schools, of course, because they all try to reduce their record and they follow with a great deal of interest the number of accidents that have taken place in other schools. We find competition is a great help in reducing accidents. The teachers are also reached in this bulletin with suggestions from the Police Department. For instance, in November, when the days are short, the Secretary of the Police Department calls up

and says, "Miss Beard, can't you do something to prevent accidents to little children who run out into the dusk?" Last year we impressed upon them the necessity for wearing something white in the dusk, so their figures could be distinguished, and we gave them a lesson in nature study showing that the animals are protected by their bright coloring. The danger course is given on that same principle, creating interest.

We have established a Service Bureau for the different schools. If they have difficult situations to meet, they call up and I investigate, and talk with the Police Commissioner to see what can be done; whether we can have an additional traffic officer or whether the children in that school can protect themselves. In that way we keep very closely in touch with the police.

In the institute meetings we tell the teachers how they can further the success of their work. I think there are three things by which a teacher should be judged. The children should have an intelligent attitude towards safety; in the first place they should understand what safety is; they should practice safety themselves, and they should look out for the safety of other people. If they do those three things I think the safety work in a school is successful.

We have also evenings when we co-operate with the police. In the different districts we invite the parents to come; the children write invitations; they come to the school and we have a little program with some features by the children; then we show pictures furnished by the police, and the community evenings are really a great success. The parents come by the hundreds. The little boys act as ushers and take a great deal of pleasure in showing their parents what they are doing in the school. We find that that feature alone would occupy the time of one person to direct it.

The Police Department furnishes us a record of every accident that occurs, and if they want any help, we are very glad to give it to them, just as they give it to us.

The Fire Prevention Bureau works very closely in touch with the schools in Detroit, and they have assisted greatly in the preparation of a course of study for the community problems of Detroit. The parochial schools also ask us for help, and we are very glad to give it to them. We have had a great deal of publicity in the newspapers.

#### ACCIDENT RECORD ALMOST CUT IN TWO

I want to say just a word about the results. In the year previous to this we had 79 fatal accidents in the City of Detroit; 140 serious accidents, and a total of 810 accidents to school children. In this last year, with just a little work, we reduced our fatal accidents from 79 to 40, our serious accidents from 140 to 71, and our total accidents from 810 to 453: so our accident record was almost cut in two. We have prepared during the year a little pamphlet that is following somewhat the same lines that Dr. Payne has followed, only that this is adapted especially to the work of Detroit. We feel that in another year we shall have greater results.

I think our purpose in the schools is to teach the children to live safely and to give service in a big city.

CHAIRMAN PRICE: I am sure there are a number of people who would like to ask the doctor questions in regard to those things that will help you to go home and convince your superintendents and your school boards.

MR. SCHOMBER: I think that every man who is in this room ought to have been convinced; that he can go home and tell his executives that if it is possible to reduce the number of accidents in the schools, as has been shown here, the same method can be followed in business. I mean this: they make it a special part of the routine of the school work to teach and educate the school children in safety; why shouldn't the employers devote part of the time to teaching safety to the workman? It will certainly work out in the same way.

MR. R. T. READ (Secretary, Delaware Safety Council): Mr. Price, in Delaware we have a large area of our State which is entirely rural. I think possibly there are other states that have large rural districts, but perhaps not in such large proportion as our State. We have hundreds of teachers in our rural districts who are not even graduates of high schools; their horizon or vision is not much beyond that of their oldest pupil. I wonder if there isn't still work for Dr. Payne to do, in preparing an even simpler text-book for the use of just that type of teacher?

DR. PAYNE: I think you business man have an opportunity to make every teacher so trained that she could use a syllabus as simple as that. I would rather bring the teacher up to the point of understanding the point of view of modern education, than to try to put education in some other terms than of modern education.

MR. E. N. BROWN (Hoover Steel Ball Co., Ann Arbor, Mich.): I believe we are all convinced, after what we have heard this afternoon, that it is feasible and desirable to put this work across in our public schools, but I would like to ask what material in the way of simple literature is available either through the Council or otherwise, by which we may be assisted in presenting this matter to our local boards of education, and how can we get it?

CHAIRMAN PRICE: There are two things: the little leaflet, which contains the address of Dr. Payne at the Cleveland Congress, and his syllabus. Those two things are by far the best things that you could put into their hands, and they are absolutely convincing.

We will hear from Inspector May of Cleveland.

INSPECTOR MAY (Police Department, Cleveland, Ohio): In Cleveland the Police Department rather forced its attention on the schools, and we were received with a little coldness because the principals thought we were intruding on their domain. I went to Superintendent Jones and told him about it, and he immediately sent out a letter to all the principals, telling them to permit the policemen to come in and talk Safety to the children.

#### HOW THE POLICE CO-OPERATE

We train twenty-five officers in the Department; give them a set of written instructions, four pages outlining what to teach and how to teach it,

and how long to teach it. We think we are doing a very effective piece of work in having the policeman go to the school and describe accidents to school children who belong to that school, accidents that occurred in that particular section. We think we are doing good work, and yet some of the school principals did not receive it properly, and I wondered whether we were doing the right thing or not, and what effect you think it might have.

DR. PAYNE: Inspector May asked me in Cleveland last year what the police could do to co-operate, but at that time I had not thought of that problem. The police and the schools have been co-operating in St. Louis this year and it has worked like a charm there. A cordial relation between the police department and the school teachers and principals has been developed; they are now co-operating in the finest way. This co-operation was obtained simply by the policemen going to the schools and asking if there was anything they could do in the schools to help them carry on the work of Safety.

MR. POTTER: I think the police are very helpful indeed in the schools.

MR. W. F. RUSSELL (Chicago): I just wanted to say that it seems to me that this Section of the program has altogether a disproportionately small space. It is very easy for us to have fine ideas about Safety in the school and yet it will be a very difficult thing to go home and prevail upon our local boards of education to put the thing across. I imagine that half of this group will never speak to the board of education at all and others will be passed off. I feel that we really need a meeting sometime to show how things can be forced upon a board of education; how local clubs, local people of influence and local newspapers and material proof should be sent out so that those who do come into a community where the board of education has been stubborn can actually put safety across there. It needs a great deal more, I think, than just mere advice and enthusiasm to do it.

CHAIRMAN PRICE: I think that is a fine point and I only wish we could have another Section meeting.

MR. A. I. WANNER (Tulsa, Oklahoma): I know the first thing that the superintendent of schools will ask me, when I put this proposition up to him, is, "How much is it going to cost?" Now we have had a number of people here give some excellent records; we have a number of school people here, and I have no doubt that they have kept some separate accounts of the expense of this program, and I would like to know just about what they have expended.

CHAIRMAN PRICE: What is the population of your town?

MR. WANNER: We have about 75,000 or 80,000.

MR. J. WOODHEAD (Employers' Ind. Corp., Kansas City): I want to answer this gentleman right here. When this thing was up two years ago, I became imbued with it, just as a good many of you have, and the same question came to my mind. After I got my thoughts together, the first thing I did was to send for a dozen of Dr. Payne's books, and I gave them to some of the principals in the schools in Kansas City whom I knew. Then we organized a Local Council there and we organized for Public

Safety and took good care to have the chairman of the board of education as the chairman of the Public Safety Committee, and the thing has just gone across by itself.

CHAIRMAN PRICE: I want to have you answer, Doctor, directly—not how much money, but what would you do if you were to go to that man's town now and, so far as expense is concerned, equip them to install your system?

DR. PAYNE: The first thing you have to do is to get the superintendent committed to it, and if he is a live superintendent he can put it into operation. These monographs and these books, I believe, will be very helpful in suggesting the carrying out of this work. If you can get your superintendent committed and converted to the point of view which you have, I think there is the solution of your problem of carrying it out.

CHAIRMAN PRICE: What would be the minimum number of copies that you think ought to be in the average building, to supply them with what they need?

DR. PAYNE: What we did was to put one book in each building, because we have a library that sends out the monograph to all the schools. Then we brought these people together and discussed the subject.

CHAIRMAN PRICE: Probably \$25 or \$50 would be all the money required to put it across.

MR. M. E. ABRAM (Chicago High School Civic Industrial Association): I would like to know if the Chicago Board of Education has been asked to take any action regarding Dr. Payne's book?

CHAIRMAN PRICE: Yes, the superintendent of schools has promised to install it, and they are now installing it—and, by the way, 3,500 women, members of the Woman's City Club of Chicago, have pledged themselves, each woman in her respective district, to make it her business to see that Safety instruction is not only installed but to follow it out and see that it is done efficiently.

MR. T. C. WYCKMAN (Western Ontario R. R.): Supposing your superintendent should say, "I am overworked and my teachers are overworked," what course would you pursue?

DR. PAYNE: I think, if you will simply go to those places where it has been introduced, you will find there is not a teacher who has undertaken this work, who has not found it an enormous help in relieving her work, because it tends to create interest and to serve as a basis or motive in English, drawing, and all those things, so that the children enter into it with much more enthusiasm and it really lightens the work of the teacher rather than increasing her work.

Mr. May had that experience in talking with Superintendent Conlon. The superintendent said, "It is the very sort of thing I have been looking for; we are required to do it in Ohio, but I don't propose to put any extra burden on my teachers. However, you have shown me something which will not at all burden my teachers but will assist them in their work." They immediately adopted the plan in Cincinnati and the work has been done in a remarkably fine way in Ohio.

MR. A. H. LINTZ (Secretary, Cleveland Safety Council): In putting

across this proposition, I have found that the Association of Commerce has been a big help to me in Cleveland, in selling the superintendent the idea so that he finally got it going. If you feel you have sold it halfway and still have halfway to go, you might try that.

MR. L. G. BENTLEY (Chesapeake & Ohio Ry., Richmond, Va.): I want to know whether any official action by the State Board of Education is necessary in order that a city superintendent may have this system installed in his school?

DR. PAYNE: I don't think that is true in any large city in the country, outside of New York.

MR. C. K. BOXER (Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.): Might I ask whether the State Superintendent of Wisconsin has promised to follow this matter up?

CHAIRMAN PRICE: He has promised co-operation.  
Are there any more questions?

#### ELECTION OF OFFICERS

If not, we will proceed to elect our three officers. The three officers whom we are to elect are a Chairman; a Vice-Chairman and a Secretary. Let me say that Mr. A. W. Whitney, the Chairman of this Section, who has served this Section so well during the past year, informed me that he would not be able to serve another year owing to conditions over which he has no control. Therefore, I cannot recommend that we consider Mr. Whitney for a second term, as I know all of you would like me to.

I shall be glad to hear nominations for the Chairman of this Section.

MR. LANGE: Mr. Chairman, I move that Dr. Payne be nominated as Chairman.

DR. PAYNE: Mr. Chairman, I feel that a man from the business world should be made Chairman of the Education Section; I feel that very strongly, and I feel that he could do much more than I could. I am going to do all that I possibly can anyway; and I would like to nominate Mr. Arthur T. Morey, the General Manager of the Commonwealth Steel Company of Granite City.

CHAIRMAN PRICE: Mr. Morey is one of the most interested men I know of, in school education in safety.

(The motion was seconded and carried unanimously.)

CHAIRMAN PRICE: Nominations are in order for Vice-Chairman.

MR. READ: I would like to nominate Dr. E. George Payne for Vice-Chairman.

(The motion was seconded and carried unanimously.)

CHAIRMAN PRICE: Now we have to have a Secretary.

MR. S. H. COLEMAN (Secretary, Buffalo Safety Council): I would like to nominate Mr. Price for secretary of this Section.

DR. PAYNE: All who are in favor of the motion make it known by saying "aye"; contrary "no". You are elected, Mr. Price, as Secretary of the Education Section.

CHAIRMAN PRICE: Now you know the reason why I accepted that office



last year was because I was situated so that I could use the machinery of my office, with all the clerical help, to serve this Section; and it has been a great pleasure to me to serve this Section in this way—I don't know of anything that grips me and inspires me as much as the work of this Section, this great campaign we are carrying on to reach the school children of this country, and I accept the position of Secretary of the Section with pleasure.

I have just one word that I want to say. It must be a real satisfaction to our good friend, Dr. E. George Payne, to sit here and listen to these testimonies of how this little acorn that he has planted in the ground has grown; these splendid testimonies from you practical, hardheaded men—railroad men, state officials, and all the rest of you—to see you hardheaded practical men right up against it, taking hold of this idea that Dr. Payne gave birth to, which you are putting into operation.

I want to close this meeting by a statement that I made at the opening of the meeting a year ago: that we officers of the National Safety Council feel that the greatest single contribution that has ever been made to this great movement of ours was made by Dr. E. George Payne.

ADJOURNMENT.

# Employees' Benefit Associations

ROUND-TABLE LUNCHEON

September 30, 1920

---

H. WALTER FORSTER, Chairman  
Independence Bureau, Philadelphia

---

**CHAIRMAN FORSTER:** Down in Springfield, Massachusetts, they have a man who leads a double life. About this man I know the facts absolutely. His name is Harold A. Ley. He is president of the Fred T. Ley and Company, Inc. They are doing a tremendous construction business; last year this business totaled about \$20,000,000 about one-third of which went in the pay roll for the employees. He has not come to us on the theories of employment conditions; he really knows something about men who work.

Mr. Ley doesn't admit it but I am informed he has made some money out of the contracting business, and he has tried to find an avenue through which to get rid of the surplus. Today he is president of the Life Extension Institute, with the functions of which all of you, or at least most of you, are familiar. Mr. Ley has gotten that proposition upon its feet so that today it is rendering us full constructive medical service to something like 30,000 people, from executives to plain common workers.

He has put in a plan in his organization which, as far as I know, is unique; it combines a number of good features, and he has come here, all the way from Springfield, for the purpose of telling us that story, and I know you will be glad to hear it. Mr. Ley.

## EMPLOYEES' BENEFIT ASSOCIATION OF THE F. T. LEY AND COMPANY, INC.

HAROLD A. LEY, PRESIDENT, F. T. LEY AND COMPANY, INC., SPRINGFIELD,  
MASS.

Fred T. Ley and Company has been interested in this whole problem of mutual benefit societies, health insurance, and life insurance, and have tried to work out a plan in our organization. I think we were one of the first organizations to give group life insurance to our employees, and for the last five or six years we have been giving our employees physical examinations.

This last winter our welfare man, Mr. Woedtke, who is one of the directors of your National Safety Council, came to me and said, "I think that we ought to give our people health insurance." I told him that I was fed up on giving things. My reason for saying that was this: I find wherever you are giving things to your people, you are starting a very dangerous line of thought. I think the minute you give a thing, the man says right away, "If that firm is making so much money that it wants to give something away, why not give it in wages," and that is a very dangerous line of thought for any of us to start.

I found that probably ninety-five or ninety-eight per cent of the men in our organization appreciated what we were doing, but occasionally I heard of this or that individual who didn't. I think every employer who has had that kind of an experience feels like canning everything he is doing and simply paying his wages.

Mr. Woedtke said he thought these people would be willing to pay part of the expense. I said, "That is entirely a different story; we will go fifty-fifty with the men on anything they want. I don't think it makes any difference what the men want, if they are willing to pay half the expense, any employer can well afford to give it whether he gets anything out of it or not, whether it is a baseball field or brass band or what not. I told him to find out what health insurance would cost."

#### COMPANIES DOING GOOD HEALTH WORK ENTITLED TO LOW RATES OF INSURANCE

He came back and told us that he could buy ten dollars a week health insurance which would begin at the end of the seventh day and run for twenty-six weeks for eight dollars a year. I told him that sounded interesting, but I said, "We are already paying ten dollars a year to have our people examined. I know of several cases where we have saved the lives of some of our men and improved the health of a good many others, and it seems to me that we are entitled to better rates than the average concern that has not been doing this. I will take it up with the insurance companies and see if I can't get a better rate." When I was in New York I went to the insurance company carrying our life insurance, and it didn't take much persuasion on my part to convince them that we were entitled to a better rate. They said they would put their actuaries to work to see what they could do. I went home and started to figure out what we could do. I found that by the men contributing twenty-five cents a week, I could give a man a thousand dollars worth of life insurance, ten dollars a week health insurance and the service of the Life Extension Institute, which included a complete physical examination. I made up my mind then that we would quit giving things and after that everything would be done on a fifty-fifty basis with our men. I made up my mind that there was no sense in offering a man who was earning fifty dollars a week a ten dollar a week health benefit, so we decided to divide our people up into different groups according to their wages. We arbitrarily decided the line between the first and second group would be men earning up to \$1200. I knew that every person in our employ could pay twenty-five cents a week to help solve that problem, so I started with Group A, in which the employee paid twenty-five cents a week and got those three benefits.

The next group included those earning between \$1200 and \$2500, and they paid fifty cents a week. They got \$2000 life insurance, twenty dollars a week benefit, and a physical examination.

The third group comprised those earning over \$2500, and they paid seventy-five cents and got \$3000 life insurance, thirty dollars a week benefit, and a physical examination.

I made up my mind that I would rather pay out thirty-nine dollars a year, which our share would amount to, on the high grade men, than I would to pay thirteen dollars a year on the low grade man. It was the older and higher priced men who were more anxious to help.

#### MUTUAL BENEFIT ASSOCIATION BEST WAY TO HANDLE HEALTH INSURANCE FOR EMPLOYEES

We decided that the only way to handle this thing would be through a mutual benefit society, which would be optional with every individual to join or not as he saw fit. So, to make membership in that mutual benefit society attractive, we agreed to recognize length of service, and we decided to give additional insurance, depending on that length of service. To those men who had been with us three years, we gave \$500 additional insurance; five years, \$1,000; ten years, \$1,500, and fifteen years, \$2,000. It worked out that the older men were the men who were going to get the biggest amount of insurance. For example, here was a man earning \$2800 a year and who had been with us say fifteen years. This man probably is around fifty years old. Under this plan, regardless of his age and physical condition, he could get \$5000 insurance for thirty-nine dollars a year, besides getting thirty dollars a week health insurance and a complete physical examination. It didn't take much of a salesman to sell that man that kind of a proposition. We got our older men together and told them what we proposed doing. We told them that we couldn't put this plan into force until we sold the idea to seventy-five per cent of the men; that the insurance companies wouldn't write that kind of insurance unless seventy-five per cent of the employees would take it. We found that 100 per cent of the men wanted it. There wasn't a man among those older men who did not jump at the idea. A lot of them had never been able to buy insurance. I know of two or three cases where fellows had blood pressure of 200 and 220, who couldn't get insurance at any price, and they were boosters for the plan at once. They would go out among the men under them and sell this idea. It resulted that, as soon as the proposition was put to the men, they came back with over eighty per cent of the men asking if we would do it. The firm said we would do this if they wanted it. The men had to come back to us with the request to put it in.

#### EMPLOYEES MANAGE RELIEF PROBLEMS

Now it accomplished one thing which I think is very valuable. It divided our people into two groups, those who were co-operative and those who were not, and I made up my mind that we would spend all our money

on a group that were co-operative and we wouldn't spend a cent on those who were not.

It accomplished another thing. We have always been bothered to know what to do with the full-time employees when they are sick. That has always been an aggravating question and a hard one to solve, but the firm took this stand: That those who joined the Mutual Benefit Society, we would make up the difference between their full wages and the amount that they got from the Mutual Benefit Society as long as the Mutual Benefit Society paid them. To those who didn't join, we sent out word that every person had an opportunity to help solve that problem and if any individual elected not to join, then we felt that we were relieved of all responsibility; if they were taken sick, it was up to them to take care of themselves, and we were not under any obligations to care for them.

Now the part of the plan that interested me particularly wasn't so much to give these men insurance as it was to get them to take an interest in their health. We find after examinations are made a great many of the men will automatically go ahead and carry out the suggestions of our doctors, but there is always a certain percentage that won't. What I was anxious to do was to see if we couldn't accomplish something that would make these fellows take an interest in their health, so I went to the insurance company and said, "Here, we are not going to spend our money to make money for you, but if you will admit that we can save you money by improving the health of this group, I want you to recognize that saving at the end of the year in the form of a dividend." They agreed and I went back to our men and said, "You fellows can have all the money you make by improving your health." To start the association off, we deposited \$1,000 in the treasury. We said, "This money is yours; you can spend this money any way you choose, but what we hope you will do is to use that money to help the men in our organization who may need financial assistance to carry out the recommendations of the doctor. You can give them the money, lend them the money or make any kind of terms you want, but if we find there is a man who needs to have his teeth fixed and he hasn't the price, it is up to you fellows to decide whether you want to correct that trouble. As long as you are financially interested in the health of this group, I want you to make this dividend from the insurance just as large as possible, it seems to me it would be to your advantage to take an active interest in these fellows and see if you can't improve the health of the group. If you do that, I am going to get what I am after, that is, a healthier group of men in this organization, and I am going to increase my production enough to pay me for all it is costing the firm."

The whole plan is costing us less than one per cent of the wages of the men in the Society, and I am thoroughly convinced that I am getting value received for what it is costing us and a better crowd of men in our organization.

I am not commenting at all on the humanitarian side of the game, which I think is more important than the financial end of it, but I have tried to place it on a financial basis so that the thing will pay for itself and these other benefits will come automatically.

## HOW THE PLAN WORKS

I have been asked a great many times, "How is it working?" I think I can mention two or three instances showing how it has worked out in the last nine months, which will demonstrate it better than in any way I can tell you. The first case that came to my attention was during the "flu" epidemic. Mr. Woedtke came to me and said, "We saved the life of one of the fellows here in the organization." I was naturally interested. I asked him what happened. He said, "Moulton, one of our head timekeepers here in the office, has had double pneumonia, his wife and baby had the 'flu' and it came to our attention that he was down and out financially. I called the executive committee of the association together and we voted to spend \$200 to get that man additional medical assistance and nursing assistance. Then we had to go out and get it, which was harder than voting the money, but we got it and gave them additional service, and the doctors tell us now that if he hadn't had it the fellow would have died." As soon as he was well enough, he sent back word that he was going to repay that \$200, so much a month, just as soon as he could. Woedtke told me this morning that the whole \$200 had been repaid. That was all done without the knowledge of the firm and was all completed before we knew anything about it, and I don't know of any finer piece of work that any group of men could do.

The next case was entirely different. We were doing some work down in Virginia, and one of my New York men came to me and said that one of the fellows down there was in very bad shape. He had become so emaciated he could dislocate his jaw and put it back in place. The doctor said it was due to a relaxation of his muscles. I sent word for him to come to New York to have his physical examination. He was entitled to a physical examination but while he was there we put him through a lot of special tests, an X-ray of his stomach, etc. He was there four or five days and the trouble was diagnosed as ulcers of the stomach. He was instructed how he should live and about two weeks later I got a letter from him telling how much better he was, and stating that he had received a bill for fifty-eight dollars from the institution for these additional services. He said, "I have been put to a lot of expense and I don't know whether you want me to pay for this, or whether the Fred T. Ley Company will pay for it, or the association." I sent word right back that the association had money in its treasury to take care of just such cases and I referred his bill to them. When I got back to Springfield, Woedtke came to me and said, "I don't think we ought to pay this bill. He is earning \$3,000 a year and has just himself and his wife, and he has money in the bank, and I don't know of any reason why we should spend our money on him." I said, "That is up to you." He said, "Have you any objection to my sending him this letter?" and he showed me a letter in which he said before they could pay that bill it had to be approved by the executive committee, and before the executive committee could pass on it they would have to know certain facts. He asked him a lot of pertinent questions in regard to his financial standing. I said I had no objections to the letter. He sent the letter and the next week

when I got back he said he had heard from Ferguson. I said, "What did he say?" He gave me the letter. Ferguson said, "If you fellows expect me to answer all those questions, I will pay the bill myself." I thought that was great.

#### COMMON MEETING GROUND FOR EMPLOYER AND EMPLOYEE

The third case happened about a month ago. We had a group examined in Worcester, and in that group they found two men who had hernias and who ought to have operations. The doctors recommended that the fellows go to the hospital and be operated on. One was a superintendent who hadn't joined the association and the other was a foreman who had. Woedtke came to me and said, "The fellows are going to the hospital and we are going to send them cigars, cigarettes, flowers, etc., but the superintendent has just sent in his application to join the association and the executive committee have considered it and they have turned it down." I said, "What did you do that for?" He said, "We decided that he had a chance to join that association six months ago the same as the rest of us and he elected not to, and now he is coming in because he thinks he is going to get a five or six weeks' benefit while he is in the hospital. We have sent word to him that he can join when he comes out." He was trying to put it over them. Now, if we hadn't had that mutual benefit association, and if all our men were not passing on those things, they would have sat still with their hands folded and allowed this individual to put it all over the insurance company or all over us, but the minute he tried to put it over them, that was an entirely different thing and they wouldn't stand for it for a minute.

I think you can get this same kind of service working in your organization. The health of the employee is one place where your interests are identical, and your men and their employers meet on common ground. If you want the employer to get closer to his men, I don't know of any better way you can start, than by introducing something of that kind and enlarging it just as fast as you want to by bringing in all kinds of collateral benefits, such as profit sharing dances and all kinds of amusements and things of that kind that are bringing our men closer and closer together.

#### FUNCTIONS OF THE LIFE EXTENSION INSTITUTE

Now, just a word in regard to the Institute. I think the Institute functions in this plan in an ideal way. Our service is absolutely confidential between the employee and the Institute. We give no information to the insurance company and we give no information to the employer. What we do is to send a doctor who is specially trained to do this industrial work and to make these examinations. Before he can make these examinations the individual is given a blank in which he explains everything that he knows about himself. He goes into his family history, his habits, his diet, what he had for breakfast, dinner and supper, the amount of exercise he takes, and whether his head aches and how he sleeps at night. We try to cover everything from every angle of his daily life that affects his health. This man will spend the night before he is due for an examination filling out that blank. The only place where I see that the em-

ployer should play any politics at all is in seeing that the man who is selected as secretary of the mutual benefit society and who has charge of this work should be a man who can keep the records of the society and who has a sympathetic attitude toward the men. He must arrange for the appointment between the individual and our doctor, and when the employee comes at eleven o'clock he can talk with that man for two or three minutes. You would be surprised at the amount of information that individual will give him about himself. It takes forty-five minutes to an hour to make the examination and when it is through, I'll guarantee that it is probably a better examination than any man in this room has had. That doctor not only examines him, but he tells him what he has to do to correct his condition. He finds his blood pressure is up to 150 or 160 and he tells him the only two things that he can find in his condition to account for that pressure is bad teeth and his diet, and he tells this fellow he ought to go home and change his diet.

We rate every man "a, b, c," or "d," and when a man comes out from his examination the secretary asks him, "What did they rate you?" If the man says, "c", the secretary says, "What is the matter with a great big husky guy like you?"

"My teeth are bad and I have a high blood pressure."

He can go up to that fellow three or six months later and say, "Jim, what have you done about having your teeth fixed?"

"I went to a dentist and he said it would cost \$100 and I haven't the price."

"Have you any objections to my taking it up with the association to see if we can make arrangements to have it done? You didn't have those teeth fixed and you were out two or three weeks last month on account of rheumatism. That costs the association money and we want to stop it."

It would be an exceptional man who would refuse to let him get that permission from his committee.

Mr. Woedtke tells me he thinks this plan is the best thing we have ever introduced into our plant and the whole thing isn't costing us over one per cent of our pay roll. I hope you will try to work a similar plan in your own organizations.

That is the kind of service we have tried to work out in our plant.

#### DISCUSSION

Mr. J. WOODHEAD (Employers' Indemnity Corporation, Kansas City, Mo.): When a man leaves the employer, what is his relation to the mutual company?

MR. LEX: When a man leaves, he can buy the same amount of insurance from the insurance companies at their regular rates without a physical examination, but the rest of the benefits he loses.

Our business has grown very slightly this last year and we have had to lay off a number of men, and we have had any number of requests from the men to find out how they can continue this insurance at their own expense during the period while they are laid off.



MR. W. V. WINSLOW (The Texas Company, New York City): I would like to ask if the insurance company bases its rebate or dividend upon the report of the Life Extension Institute?

MR. LEY: This is done at their expense at the end of the year.

We have been getting a twenty per cent dividend on our group life insurance for a number of years. I believe that we can get just as much on our health insurance. Our insurance under this plan, I think, ran somewhere around \$18,000 this last year. If we can get a twenty per cent dividend on that, it means a dividend of \$3,600. There are between four and five hundred men in our organization. If I can go to them at the end of the year and tell them there is a check for \$3,600 that they have earned, I think it will make a greater hit and bigger impression on them than anything else I can do. When I gave them the thousand dollars I said, "This is the last money I am going to give you. It will take care of you the first year and any more money you get you have got to earn, and you can earn it by taking an interest in your health."

MR. J. B. DOUGLAS (United Gas Improvement Company, Philadelphia): Mr. Ley, I would like to ask if you know what similar protection costs a man after he leaves your employ.

MR. LEY: I know that a man can't buy for forty dollars the same things we offer him for thirteen.

CHAIRMAN FORSTER: You are paying twenty-five cents?

MR. LEY: We duplicate whatever they pay. It is costing twenty-six dollars a year in all.

It is a cinch to sell those older fellows. When you think of a man buying \$5,000 worth of life insurance for thirty-nine dollars, they all jump at it. The younger men want health insurance.

MR. C. B. DOWNIE (Sargent & Greenleaf, Inc., Rochester, N. Y.): I would like to ask what proportion of his men are foreign born or non-English speaking?

MR. LEY: I think most of our men are American, but we sold this idea into a plant up in Canada, to a paper mill. They had 1,900 employees and most of them were French-Canadians. They sold 1,300 within a week. There is a reason for it. The industrial life insurance companies have been educating the ignorant foreign born to the value of life insurance. Take industrial insurance; a man can buy about \$350 of insurance for thirteen dollars. Now when you go to a man with a proposition showing how he can get \$1,000 of insurance for the same price, besides his health insurance and examination, it doesn't take very much salesmanship to sell that man.

We had a plant where the workmen were all Italian. We got the group of foremen together and they said, "We want it but we don't think our men want it." They came right back and said they were all for it right away.

MR. DOWNIE: Eighty per cent of our employees are foreign born, and to sell them anything we have to work twenty-four hours. Would you advise getting somebody from the outside who can speak the language if there is no one in the firm who can do it?

MR. LEY: Absolutely. We have called in the Polish priests and the

French doctors, and so forth. It is to be explained to them. As soon as they can realize the benefits, it doesn't take any salesmanship to sell it to them.

CHAIRMAN FORSTER: The foreigner is very quick to grasp the value of insurance. In fact, many of these men and women have come from countries where the insurance principles have been emphasized in state legislation and they know much more about it and are quicker to accept the proposition than the American born. I think if there is anybody who has the attitude of not caring a rap, it is the American.

DR. OTTO P. GEIER (Director, Employees' Service Department, Cincinnati Milling Machine Company, Cincinnati): The most interesting thing of this discussion to me has been the statement that there can be bought by companies having a good experience in mortality and morbidity a group life insurance at a lower rate than the standard. This subject has been before our company in the last six weeks, because in the last four years, operating under a mutual benefit plan to which the company gives life insurance, we have had an average saving of about thirty-three per cent over the normal expectancy of that term of group life insurance, and I am seeking for a way of purchasing a lower rate than the average company that does nothing for its men.

We are spending at least ten dollars per man on health work just as you are spending ten dollars for mere physical examination once a year, and we are getting the physical examination.

We were informed by the group life insurance companies that there were but two types of policies, a participating and a non-participating, and they had a standard price and nothing you would do could change that rate. If there is a chance or if anybody is ready to sell us something at a lower rate, we want to buy it. We carry this life insurance ourselves because we do not care to give thirty-three per cent of this total premium each year to the insurance company which does nothing for us at all, whereas we are spending the money to save the lives and the sickness.

MR. C. A. LIND (Commonwealth Edison Company, Chicago): I would like to ask Mr. Ley how many weeks per year his employees are entitled to draw benefits.

MR. LEY: You can buy any kind of a combination you want. For nine dollars a year you can get fifty-two weeks of insurance beginning at the end of the seventh day.

I am not an insurance man and I am not here to sell insurance! I want to make that plain.

CHAIRMAN FORSTER: I think I can answer your question.

First of all, you can buy any form of plan you desire as to the waiting period before which insurance goes into effect, ranging from no days to a month, if you choose, and for any pay period ranging from a week or three weeks to several years. That is the first point.

The second point is this: If, for example, you have a plan such as the Ley Company, under which you wait one week until you get anything at all, then are paid for twenty-six weeks, and if a man has been sick or out any part of that time and comes back on the doctors advice and the next

day has a relapse, they again begin to pay twenty-six weeks once more after seven days waiting period. There aren't many cases like that.

On these reinsurance contracts for benefit associations, the attitude all the way through has seemed to be most generous.

On Mr. Geier's point I might say: There are on the market in the insurance field, both as regards the life insurance and group disability insurance, mutual and stock companies. The mutual company, as the name intimates, is charging a rate on which they hope to pay dividends. They have paid dividends ranging from nothing to very large percentages. On the whole, they take their general experience, then they give weight to the kind of group in which you are—a shoe manufacturer, etc.

The stock companies have devised a plan which is a vital one, especially for larger organizations, under which they charge you a standard rate, and if your experience is better than the average, they will cut the rate; if it is worse than the average, they will raise the rate. If for example you have one good year under the average, the rate reduction is moderate. If the second year is equally good, it is greater, and the longer your periods of good experience continue, the greater the reduction, because it shows it is consistent. It is similar if you have a bad year. The cost is not raised much the first year, but if you run bad for a number of years, up goes the price. Most employers have not asked the stock companies to apply this experience plan. They say that the stuff is cheap enough and they will let it ride. The stock companies and the mutual companies have experience ratios on this form of insurance of about fifteen per cent on group life and twenty to twenty-five on group disability. You can't expect to buy anything at less than cost; you have got to pay cost with overhead.

MR. CARL B. AUEL (Westinghouse Electric and Manufacturing Company, E. Pittsburgh, Pa.): It seems to me there is one big feature which has been omitted. When business gets slack, as you have admitted your business has gotten slack, you are compelled to lay your men off. When you lay a man off through no fault of his, I can't see why you couldn't extend that low rate to him for a given number of years.

#### MEN LAID OFF MAY CONTINUE MEMBERSHIP

MR. LEX: That is just what we are doing. Where we lay any man off that we expect to take on again, we have made it possible for him to continue his membership in the association at this low rate until such time as he comes back.

CHAIRMAN FORSTER: That is a modern plan and ought to be used very generally. It ought not to be a question of years, but say for ninety days or six months, then if the situation has bettered so that he can be taken on, we may extend that period. That is a fair thing to do.

MR. AUEL: You have induced him to insure with you rather than take out an individual policy when he was young and the rates were low, and then you throw him over on his own resources where he has got to give up all insurance or pay this exorbitant rate.

CHAIRMAN FORSTER: The rate which he pays when he converts his insurance is the standard rate for his age, and he is not getting robbed.

MR. AUER: Exactly so, but he can avoid this rate by insuring as a young man when his premium will then be very much lower, whereas you have stood him off and put him unintentionally in this advanced class where his premium is almost prohibitive, especially as he hasn't a job and therefore no income.

CHAIRMAN FORSTER: It would cost him less under this plan than if he carried it all the way through.

The stock company rates for group insurance are, at all ages between twenty and sixty, almost exactly one-third of the ordinary life insurance rates. Now, group insurance isn't the same as ordinary life insurance; you can stop at any time and extend the insurance for the full amount for several years, or for a smaller amount until you die. You have a one year contract—a stupid contract for the individual to buy but a safe contract for a group to buy.

MR. DOUGLAS: I would like to ask Mr. Ley whether the privilege is extended to all whether they are to be taken back or not, or whether certain committees pick out such men as they think may be needed by the company later and give only to those men that privilege.

MR. LEY: The way we did was to offer the privilege to everybody who was working at the plant at that time under these different scales, but we notify any new employee that he has got to be with the company three or six months before he is eligible.

MR. DOUGLAS: I don't know whether I made myself clear. When you lay off your men, do you give every man the privilege or do you give it only to such men as you may want back at a later date, and if so, who decides which men shall have the privilege?

MR. LEY: I don't think we object to any one. I would have no objection until such time as a man found work somewhere else.

CHAIRMAN FORSTER: We always put in a clause to the effect that the employer has the right to withdraw upon reasonable notice, and the employees have the right to disband upon reasonable notice and two-thirds votes.

MR. LEY: Another thing, where workmen's compensation is paid, the other payments are not paid; they cannot draw both during sickness. I don't think that any man who is loafing should draw as much money as when he is working. In the mutual benefit society a committee decides when a man is entitled to his compensation. As long as they are interested in keeping the cost down, they are going to look into each individual case before they allow a man his compensation.

The insurance companies tell me that one of the biggest expenses of health insurance has been the man who stays out when he ought to be back to work; and they have never found any way whereby they can make him go back to work on account of the effect on the rest of the men, but when the men decide they go to this man and say, "You are just as able to work as we are, and you will either go back or we will stop your compensation."

CHAIRMAN FORSTER: It is not uncommon, although not usual, for benefit associations to make provision for work accidents for compensation cases in the following way: For example, the benefit association's pay-

ments start after three or seven days, and compensation starts after seven, ten, twelve or fourteen days; the benefit association will pay, say half wages, between the time that the ordinary accidents will be covered and between the time that compensation starts. Occasionally they will do the following thing: If the compensation law, as in my home state of Pennsylvania, has a twelve dollar maximum, and if a benefit association pays half wages and I am entitled to twenty dollars a week benefits because I earn forty dollars a week, the benefit association will make up the difference between twelve and twenty.

MR. BLOCKLAND: In case an old valued employee who hasn't gone into your benefit association becomes sick, say he has been with you twenty-five years, what do you do?

MR. LEY: I think I would treat every one of those cases separately. I give them to understand that I expect them all to come in, but I think you have got to make exceptional cases in any plan.

MR. BLOCKLAND: In a practical case, you would carry that man, would you not?

MR. LEY: I think so. While I might do a lot of threatening as to what I would do if a case of that kind comes along, I would back down and take care of him, but I wouldn't let him think so to start with.

MR. BLOCKLAND: The point is it would cost you about the same because you would have to carry these men that don't come in.

MR. LEY: I don't think so. I feel very strongly that there have been some cases in years gone by where fellows have put it over the firm, and I have no desire to spend any money on them at all.

CHAIRMAN FORSTER: Mr. Blockland, in the ordinary industry where the men are paid only when they work, it is not the practice of the employer to pay them anything when they are off, except in a very meritorious case where there is serious want.

MR. LEY: The question of what happens to these people when they are sick is a problem that every individual ought to help solve, and when you make it possible that they can solve it and they don't, then you are perfectly justified in washing your hands and saying, "You have had your opportunity just the same as this fellow who did join."

MR. WOEDTKE told me yesterday of one of our old men (This isn't directly bearing on that but I shall cite the case as an illustration) who had been with us for four or five years and left of his own accord; after being away four or five years, he came back and has since become one of our general superintendents. The question came up as to his length of service, how much additional insurance he was allowed on account of his length of service. While this didn't affect the society, it did affect the firm because we were paying for all that. The men decided as long as he voluntarily left the firm, he was entitled only to additional insurance for the period employed since he came back the second time. It was very gratifying to me to learn that they were looking after our interests to see that we were treated fairly.

MR. A. H. YOUNG (International Harvester Company, Chicago): Is it possible, if a company were to take up this plan of group insurance, to provide that all employees leaving the service, whether voluntarily or on

the company's part, might make their payments to the insurance company through their former employer, in the event they leave his employ for a period of from ninety days to a year? Would the insurance companies be willing to accept such a provision that if I quit, or if I were fired by the Harvester Company, I could continue to pay to the insurance company through the Harvester Company's benefit association the regular payments plus that which the company had paid for me and be covered for say an indefinite term up to one year?

MR. AUEL: We are doing that already, Mr. Young, if I might break in; until we turn back the insured to the insurance company, the company assumes that he is in our employ whether he is or not, and he is still insured accordingly, but I have in mind a longer period of lay-off than one year.

MR. YOUNG: Have you only a maximum of one year? Does your insurance company stop you at that point?

MR. AUEL: The man is carried until our arrangement with the insurance company can be terminated which is at the end of every year.

MR. YOUNG: Do you pay any more for that provision?

MR. AUEL: No.

MR. LEY: There is one dangerous thing for the insurance company when the man leaves the company; if there is any big selection of them there is an adverse selection against the company. A sickly man would certainly continue his insurance while the healthy man might drop his.

I should think the insurance company would have to take that into consideration. I don't think any plan is going to be a cure-all for hard times. I think that is a phase of the situation that is very difficult to handle.

We all have men that we would like to keep, and we twist and turn to try to keep them, but when conditions get so bad we can't, we have to lay them off.

MR. AUEL: I want to add that our sickness insurance is quite apart from our group insurance. Our group insurance simply covers death, and we have a thrift fund in connection with it whereby, if any employee will contribute to it two per cent of his wages we increase his insurance at once from \$500 to \$1,000—and after the first year by \$100—until a maximum of 2,000 has been reached.

In other words, an employee after being in our service six months gets a \$500 policy, then if he signifies to the company that he would like to deposit two per cent of his wages in our savings account, that \$500 policy at once jumps to \$1,000, and it stays at \$1,000 for five years, providing he continues to save. At the end of five years it then increases further by \$100 every year, that is to \$1,100, \$1,200, and so on until a maximum of \$2,000 is reached. Any employee can draw out up to ninety per cent of his deposit without forfeiting his insurance. He pays six per cent interest on the amount that he withdraws but continues to receive four and one-half per cent interest on the total amount.

Our sick benefit funds are quite apart from our savings funds and we have no time limit, such as twenty-six weeks. There are half a dozen classes of sick benefit insurance depending on the wages a man receives,

commencing at twenty-five cents dues a month and running up to one dollar and fifty cents a month. Most of our employees are in the highest class and in case of disability from sickness they receive seventy odd dollars a month until the age of seventy years is reached when they are transferred to our Service Pension Plan.

WOMEN ADMITTED ON EQUAL TERMS

MR. M. C. LIPKE (Ahdawagam Paper Products Company, Wisconsin Rapids, Wis.): I would like to ask Mr. Ley to what extent women are permitted to enter the organization.

MR. LEY: One hundred per cent.

CHAIRMAN FORSTER: I am glad you asked that question. We have a number of them with us today and we have many of them in industry.

The life insurance rates on a group basis are not influenced by the presence of many women or few women.

The negro as a life risk is not attractive. On a group basis insurance companies want a surcharge if negroes exceed twenty per cent, because they are more apt to have diseases, living in unsanitary conditions as most of them do.

MR. YOUNG: I want to get back now to the question, will the standard stock and mutual insurance companies accept a provision where the employee can carry the insurance through the company, assuming the cost himself, for a period of one year or longer?

CHAIRMAN FORSTER: I wish I might qualify by giving you an absolutely definite answer, but I am not sufficiently sure of myself to say either yes or no, but I believe it could be done.

MR. LEY: I think you would be interested in just the general cost of this plan.

I found in talking around with the insurance companies that you could buy \$1,000 of life insurance from anywhere from seven to ten dollars. You could buy your health insurance, depending on your particular plan, from eight to ten dollars. It varies depending on the number of men and women in the plant, etc. For the service of the Institute we charge six dollars for groups up to 500 and down to four dollars where the groups run over 1,500, so you can figure out for yourselves very easily about how these different things work out.

MR. J. M. SANDEL (Swift & Co., Chicago): Mr. Ley just remarked that he does not believe that a man should receive more money when he is off than when he is working. A good many men come to us, and we employ them, who carry fraternal insurance policies. Those benefits with what they receive through our employees' benefit association often nets them more than their wages. I would like to ask Mr. Ley if he limits the amount of insurance men of that class are allowed to carry in the benefit association.

MR. LEY: We never have. We never have tried to find out how much insurance they have. I think it would be perfectly safe to leave that to the mutual benefit society. If they think any one is putting it over on them, they will find it out. I think this thing all ought to be handled

by the men and if any man in your organization is clever enough to put it over the rest of the fellows, he has got to go some.

**CHAIRMAN FORSTER:** If my experience is worth anything at all, your committee will certainly see that nothing is put over on it.

**DR. GEIER:** May I ask Mr. Ley an embarrassing question? I am not asking this question to embarrass him but the fact that he is the president of the Life Extension Institute, which is doing a splendid piece of work and which has educated the country at large on the value of health and physical examination as no other thing has done almost, brings me to this question: Don't you believe that the ten dollars per individual working in a plant would be better expended in physical examination with constant supervision, with the selection of statistics and symptoms by the score every year, finally piling up diagnoses of the insidious conditions that even the Life Extension Institute representative could not possibly get? Now that does not reflect at all upon the examiner because we recognize today, I think, that the supervision given by the industrial clinic operated by high grade men will detect disease earlier than any other known system of medical work. It is important for us to get this straight, because if this whole work is what you said at the outset, that it will bring more contacts, therefore more mutuality of feeling and experience between employer and employee, then we should know how best to spend that ten dollars.

**MR. LEY:** I am glad you asked me that question; it lets me explain more what we are doing. In the plants of any size we recommend a service. It is different from our ten dollar service, the service we render for six dollars in groups up to 500. For groups of 500 to 1,000, we do it for five dollars and for anything over 1,500 for four dollars. Our service doesn't take the place of the service you are speaking of at all. I am a firm believer in the plant having the doctor on the job, but I think we can come in with our work as an independent organization in a confidential way between the men and the Institute. We come in simply to make the examination and the recommendations and there we end. We give no treatment; and I believe in large plants, where this work is done, that we uncover and develop work enough to keep two or three doctors busy in carrying out the work and the suggestions that we make. In a plant of that kind we recommend that the work be done on a cost-plus basis as far as the Institute is concerned; we hire a doctor and furnish him with all the literature and all the material and all the backing and training. We have found that men have got to be specially trained to do this kind of industrial work. We tried using local physicians and it was an absolute failure. The only men we use are men who are trained in the Institute in New York to make this examination; not only to make the examination but to sell men the idea. Where we find a man who needs medical attention, we send him to his own family doctor. There are all kinds of legal liability that a firm is liable to when the factory doctor starts to treat men outside of the work in the factory, and I don't think he should go into the home.

We can make the examinations and we will guarantee that it will not cost over four dollars a man, and I think we can get it down to three



dollars and fifty cents a man. I think there is too much work in the industry that is being done by mediocre men with no supervision, and the men in charge of the plant himself hasn't any idea whether he has a good, bad, or indifferent doctor working for him.

LIFE EXTENSION INSTITUTE

CHAIRMAN FORSTER: I believe the Life Extension has not been a money-making proposition; it was in the hole in the early stages. In other words, it is a service proposition.

MR. LEY: Mr. Taft is the president of our board of directors. We have a Hygiene Reference Board, composed of expert medical men, of which Professor Irving Fisher is the Chairman.

We are trying to do the same kind of work in a medical line that you fellows are doing in safety work, and that is trying to prevent the sickness instead of waiting for the man to get sick and then trying to cure him.

MR. BLOCKLAND: I would like to ask Dr. Geier a question. Mr. Ley has spoken of the confidential relations between the Institute and the employee; how confidential should that relationship between employee and plant physician be, or should the plant physician give any information as to what his findings are to any one other than the employee?

DR. GEIER: I think any industry that employs a doctor that doesn't sell his service first to the employee, and who does not retain that confidential relationship that the private physician does, isn't worth the dust in the plant. If the man in the works thinks that the doctor is a cheap spy and that he is going to give his individual problems to the plant manager, of course, then I think that man had better be put out of the plant.

If the work that the Institute does with an employee, the service that it renders, the information that it gets, is only to be between himself and the Life Extension Institute, then the company physician loses the advantage of this contact.

MR. LEY: I think that the attitude of workmen at the present time is such that you must first get their absolute confidence that this thing is being done for their interest. You will find a man perfectly willing to tell you about his bad eyes, his bad teeth, that he needs an operation on his tonsils, or has high blood pressure. There are other things he won't divulge and doesn't want any one else to know, and we take the attitude that we treat everything confidentially unless a person has some trouble where he is a menace to his fellowmen, then we tell this fellow to bring back evidence to our doctor that he is taking precaution so that the other men are not affected or we will go to the president of the association.

DR. GEIER: I don't think we are at odds at all in this thing because I believe that when the Institute finds an industry where the doctor hasn't that confidential relationship, the best service you can render the industry is to let them know they had better change doctors. Then you have helped the industrial situation and have helped to clear up the labor problem.

CHAIRMAN FORSTER: We have not officially gone through this list of suggested topics although quite a few of the points have been discussed somewhat.

Item No. 1. "Relation of Benefit Association to the Safety Department."

Why is the benefit association an aid to the safety movement? Some of you fellows get up and tell us the answer in a few short snappy talks.

MR. JOHN M. EATON (Libby, McNeill & Libby, Chicago): When I went to Libby, McNeill & Libby as manager of their benefit association, in looking over the accident reports which come to the manager of benefit associations, I saw a lot of accidents that I thought could be prevented. I called this to the attention of the office manager and he said, "Now take hold of that, and see if you can't prevent those accidents." From then on I have handled the safety work, the benefit association work, and the welfare work.

CHAIRMAN FORSTER: No matter where you attack the proposition in a co-operative way, you do good. A benefit association is the one best foundation for getting your men to come to you. It is even better than a safety organization, because twenty, thirty, or forty per cent of the members of the benefit association in the course of a year are likely to bring in claims, and the chances are that not a large percentage of the members are likely to suffer seriously. In other words, you get together with your men, and you can build, for example, social activities, athletics, saving plans, and various other things, such as co-operative stores, etc. It is a good way to start. I think that thing is virtually an axiom; I don't think we have to debate it longer.

Item No. 2. "The Scale of Benefits and the Rising Cost of Living."

I presume that most of you who have benefit associations started out years ago with a smaller scale benefit, a dollar a day and five dollars a week, very probably. How many of you here today have benefit associations paying benefits with approximately half wages, or less? About ten.

How many of you have benefit associations operating on the basis of not more than a dollar a day for benefits? Six or seven.

I don't suppose any one is paying 100 per cent of wages?

MR. LIND: We are to salaried people, but not to the factory force.

CHAIRMAN FORSTER: How many are paying half wages or more? About eight.

I think you all agree with me that benefits which do not bring the men something resembling half wages or a little bit more are not likely to be effective either as to attracting membership or holding membership, and particularly as to giving service which is needed.

I am informed, in so far as one can trust information of that kind, that the average industrial worker is two or three weeks from financial disaster as far as money assets are concerned. If I worked for the Commonwealth Edison Company and got sick or hurt and nothing was done for me, in about three weeks I would be out of cash and would have to go in debt or borrow money or pawn my watch or furniture. It seems to me that we have a very grave responsibility as employers, and I think we should see that the workers get, at a cost which they can afford, some-

thing which gives them a feeling of independence or dignity that takes care of them when they are laid up.

MR. LIND: I would just like to read our rates for a man that has been employed for ten years:

"The first week does not count; he is paid full wages by the company.

"After the first week the company and the employees participate fifty per cent each in the benefits. For a man who has been working ten years for the company, he will get after the first week of disability twelve weeks at one hundred per cent, twelve weeks at eighty per cent, six weeks at sixty per cent, six weeks at thirty per cent, sixteen weeks at twenty per cent and fifty-two weeks at ten per cent."

CHAIRMAN FORSTER: The man pays half in each case, but the longer he stays the more benefit he gets.

MR. LIND: A man who has been employed in the Commonwealth Edison Company for ten years gets fifty per cent of his yearly salary from the association and he will get eighty-two and one-half per cent of his yearly salary from the company; or take a man who has worked for fifteen years, he will get fifty per cent from the association and one hundred per cent from the company; then it goes up one per cent per year from the company in addition, so by the time a man has worked twenty-five years, he will get one hundred and ten per cent from the company and fifty per cent from the association.

CHAIRMAN FORSTER: In other words, the longer the service the more the benefit is very common with life insurance, but not so common with disability, and quite impractical in a benefit association where the dues of the employees are uniform, based simply upon earnings, if you will, and the same for all ages and length of service. It is not fair to have the employees out of their own funds recognize length of service if everybody pays on the same basis, but if the company wants to make up some additional benefits, that is perfectly satisfactory.

MR. LIND: I would like to state, Mr. Chairman, that these rates are paid by the employees according to their salaries.

CHAIRMAN FORSTER: Item No. 2, "Basis for Fixing Dues."

That is a very interesting question, and I would like to talk, if I may, very briefly upon it.

#### BASIS FOR FIXING DUES

The most comprehensive work ever done in this country by any individual other than a life insurance company in finding out what it costs to have a benefit association was the work of Lee Chandler, of the Dodge Manufacturing Company. You have heard him many times upon this floor. He has made a study of some 529 organizations, analyzing thoroughly plant government, benefits, dues, and experience.

I presume the only sound basis upon which any of you should organize or reorganize benefit associations and establish your dues is upon the basis of what the insurance company would charge for re-insurance plus a percentage on top of that. You need some surplus. If you are going to carry on an insurance you have got to have surplus because you are too small, most of you, especially if you have only one plant in one com-

munity, to take chances. If you are going to carry your own insurance, be sure you get your dues high enough so you will have marginal safety. If you are going to buy, get your dues high enough so the society will have some money to play with along the lines Mr. Ley suggested, where a man needs help and they want to do something for him, and if you happen to have a bad experience the next year and the insurance company says, "You have got to run the rate up," you have some money with which to do it. It is wise to have a provision that you can make an assessment, with some percentage limit, perhaps, in a year if you have a bad experience. In other words, always prepare the man for the worst before you start, and if you get into trouble he won't be so hard on you.

On this scheme that Mr. Ley speaks of, where you pay a man nothing for the first week, then twenty-six weeks covering half pay, he can be insured for something under eight-tenths of one per cent and dues of one per cent which generally will be large enough to provide adequately. One per cent, in other words, is the approximate figure you have for a modern generous plan.

Now who disagrees as to that proposition?

MR. DOUGLAS: I would like to ask where the pay roll is limited do you include salaries in your one per cent proposition?

CHAIRMAN FORSTER: You limit the benefit to \$40 a week. Half wages means that a man pays dues on his salary or wages up to \$80 a week. If he pays fifty-two times on \$80, he pays no dues on the surplus. If you have a \$10,000 vice president who belongs, he pays on \$4,160.

MR. LEY: I have been trying to work out a problem which I would like the men in the safety movement to consider. We have done everything that we can by the installation of safety devices to cut down accidents, everything we can to educate our people, but I feel that there is a limit to what we can accomplish that way, and I would like to see some one work out some plan whereby we could give to our employees, the members of this mutual benefit society, the additional saving that results by preventing accidents.

I don't know whether I make myself clear, but I am trying to make this mutual benefit society a very active and generous organization. Now, I think our safety plan can go a certain distance in preventing our accidents and losses, but I think if I could once give my men some share of the saving by stopping these accidents, they would function better than at the present time.

We have been able to cut our premiums down a third on our liability insurance, and we have been able to get a thirty per cent dividend, but I think that there is even something further that can be done, and I am willing to divide some of that saving with my men if a thing can be worked out on a sound basis. I am waiting for our accident department to come back to me with a well thought out plan. I think you can work it out in your organization, and you will then accomplish more along your line than is being done at the present time.

CHAIRMAN FORSTER: Is there anybody here giving the employees all or a part of the savings?

Let's suppose, for example, a company had a loss ratio on industrial accidents representing a cost of four-tenths of one per cent on the pay

roll. Let's suppose that company said to the benefit association, "Anything you can do to help us cut the accident cost below four-tenths of one per cent of the pay roll will be divided fifty-fifty with you, and you put it into the benefit association." In other words, give them a boggy and let them save money against that boggy.

MR. E. B. TOLSTED (Independence Bureau, Philadelphia): I know of two cases where that has been tried unsuccessfully. These companies promised their employees all the savings that they could make. The thing worked nicely for a year or so, and then the employees in another year failed to make a saving and they turned around and demanded that their wages be increased to offset what they didn't get.

MR. DOUGLAS: There have been dozens of instances where this has been tried by railway companies, some think successfully and some think unsuccessfully. In railway work one of the greatest obstacles was that some failed to record accidents. The claim departments found that in endeavoring to make a good record the men didn't report certain accidents they thought could be ignored and these came to the company later as blind accidents—unreported accidents—which cost the company a great deal of money.

I believe the American Electric Railway Association has scheduled a list of companies that have tried such plans, and this list is available to any one who is interested to write for it.

CHAIRMAN FORSTER (Employers' Mutual Liability Insurance Company): Mr. James on my left here, says that these are cases of public liability rather than of accidents within a given plant where it is pretty difficult to cover up anything, especially if there is a first aid department on the job.

I remember some years ago that Close, of the Steel Corporation, stated that they had reduced the accidents in the National Tube Company year after year until they got down to something like an irreducible minimum. Then the directors decided to act upon a suggestion of the safety department that they give to the foremen, subforemen and others, the entire saving that might be made in accident cost thereafter. They cut the cost down to a third. Some of the older men said, "Close, for the first time in our safety history we are convinced that the company means what it says, namely, that it wants our absolute support in this accident prevention proposition. When you are giving us all the savings, we realize you want to prevent accidents."

Item No. 5. "How Employers can Stimulate Membership by Giving Group Life Insurance to Those Joining."

What have some of you men proposed to do along those lines?

MR. WATSON, of the Hooker Company, here before me has been working on a plan of this kind. Will you tell us about it?

#### HOW EMPLOYERS CAN STIMULATE MEMBERSHIP

MR. A. L. WATSON (Hooker Electrochemical Company, Niagara Falls): Through a suggestion from the plant service committee, composed of workmen in the plant, our benefit association is about to be started along the same lines that have been talked over here today. To each member of the benefit association who joins, the company will give a life insur-

ance policy starting with \$500 after three months' service, \$750 after six months' service, \$1,000 after a year's service, and \$100 additional for each succeeding year up to a maximum of \$2,500. That is the plan in general. The benefit association dues will be one per cent of the regular salary, exclusive of bonuses or extra pay of any kind, and the benefits will be one-half of the regular weekly wage.

In connection with that, I would like to call attention to one point of law that has come up in case anybody proposes starting such a scheme. The insurance laws of New York State, where we are located, provide that employers giving group life insurance to their employees cannot discriminate against any class of employees other than upon conditions of employment. In other words, an employer can say to an employee, "After you have worked a certain period of time you will get life insurance," but he cannot say to that man, "You will not get life insurance unless you join a benefit association." That is a point of law that has been brought out in our investigation. Now, upon further investigation, I believe that the insurance authorities of New York State have made a statement that the spirit of that law is not to prohibit the sort of a plan which I have described and which we are about to start. As I understand it now the insurance department will permit us to go ahead with our plan and not stop us on account of the discrimination.

CHAIRMAN FORSTER: That is a rather interesting point, and one which wants to be given consideration. The insurance laws differ in different states. For example, in Massachusetts you cannot start a group life plan unless all employees on the pay roll at the time it goes into effect are covered, but after it is once in effect, you can have a requirement that future employees shall have a waiting period of three, six, or twelve months.

In New York State the law, as Mr. Watson stated, reads that a condition of employment alone may bar you from membership, and also if employees have an association for life insurance, seventy-five per cent or more must join. Now, a condition of employment in this case has been interpreted, as I understand, by the insurance department, to mean that if a benefit association is being formed and the employer says to his employees, "Everybody may join without prejudice on the same basis," and if seventy-five per cent or more come in, the spirit of the law is met. I want to point out in this connection, because I have had some contact with that problem, that the insurance laws very often are based upon a very small amount of experience, and, particularly, since this benefit association reinsurance idea is relatively new, the insurance commissions have ruled that the thing is entirely within the spirit of the law.

MR. WATSON: The actual cost of the insurance, as I remember it, on the benefit association is something like between seven-tenths and eight-tenths of one per cent and we are proposing to charge one per cent for the "kitty."

There is one more point I would like to mention with regard to payment of benefits to an employee in addition to compensation that he might get through the compensation law. The committee that drafted our regulations decided that the man should get his benefits from the association in addition to any other benefits that he receives, and the

feeling was that the man needs it when he is laid up. In New York State he would get two-thirds of his wages from the compensation law and he would get one-half from the benefit association, which would give him one and one-sixth times his regular weekly wage, but this committee decided finally, after much discussion, that they thought he needed it so they are going to give it to him.

MR. H. A. FIFE (Commonwealth Edison Company, Chicago): I think there is one point that ought to be made in connection with these mutual benefit associations where you have term life insurance. Every employee ought to understand absolutely that this cannot take the place of ordinary insurance which the man should buy. The man leaves the employ of his company and he drops his insurance. Now most of these associations sell a man insurance at the very lowest rate but for a term period, one year, five years, whatever it is, but it does not take the place of life insurance, and that was demonstrated very forcibly during the war when the government brought out its war risk insurance. This term insurance will not take the place of ordinary life insurance.

CHAIRMAN FORSTER: I am glad you made this point. I want to explain, if I may, although it is an old story to some, why group life contracts all have the so-called conversion clause under which the man who leaves you is permitted, within thirty-one days, without medical examination, to buy an equal amount or less of insurance in that clearing company of the ordinary class or higher. They will not sell him term insurance on that basis but ordinary life. The reason the insurance commissions of the states made that requirement of the group life companies was this: Suppose for example I go to work for Mr. Ley. I have been carrying \$2,000 of life insurance through a stock company or mutual or fraternal organization, and I get \$5000 from Mr. Ley. I might be tempted to drop my insurance. After a while, for a reason, I leave Mr. Ley. Now, I have been there some years and I have developed a disease or flat feet, or whatever the cause of insurance rejection may be, and I go to a company again and say, "I want some insurance," and they say, "We are sorry but we can't take you; you are no longer an acceptable risk." Mr. Ley has done me out of my family's protection.

Now, therefore, the insurance commission says, "If you do take your men on this basis, you have got to sell them insurance under a plan whereby they can take it out themselves afterwards." In one sense of the word it would seem to defeat the purpose of group life insurance, which in a selfish way has been acknowledged in order to reduce labor turn-over.

I want to say to you that group life insurance reduces labor turn-over very little by itself, but in the broader sense what you are doing is to provide the blessing of life insurance, which is greater, and extend it to the rank and file, because not over a third of men in the ordinary organization carry sufficient insurance to leave the children enough to live on after they die. They have this total disability privilege so if a man is hurt and cannot longer work, due to sickness or accident, the face of the policy is payable to him either in a lump sum or on an installment basis as the employer may elect. They have tried to make the contract broad and fair, and I can testify that they make good.

ADJOURNMENT.

## Employees' Publications

September 29, 1920

---

E. A. WANNER, Chairman

Assistant Editor, "Jeffrey Service," Jeffrey Manufacturing Company,  
Columbus, Ohio

---

### TUESDAY MORNING SESSION

**T**HE meeting was called to order at 9:30 a. m., Mr. E. A. Wanner, Assistant Editor, "Jeffrey Service," Jeffrey Manufacturing Company, Columbus, Ohio, presiding.

**CHAIRMAN WANNER:** Each speaker will be allowed fifteen minutes, and five minutes will be taken for discussion after each topic. These discussions are to give you men a chance to bring up any difficulties you may have in your work, and we hope we shall all get some benefit from this exchange of ideas.

Editors get so full of enthusiasm sometimes that they simply must let out steam. A minister was addicted to the golf habit, and if any of you have ever played golf, you know that you have to have a few "cuss" words in order to keep yourself on even keel. He wasn't a remarkable player, and when he would make a poor shot, he would just stand there helpless. He couldn't express himself as the other players could, so his fellow clubmen got together in the club house one afternoon and tried to help him out. They made out a list of twenty-two of the choicest combinations of "cuss" words and presented them to the minister. Well, he understood it very clearly and knew just what they were endeavoring to do, so when he got out on the golf links and made a poor drive, he would say, "Number 17." That let the steam off and yet it was a means of safeguarding himself. At another time he would make a poor putt, clinch his teeth and say, "Number 22".

One day he was having a game with a friend from another city, and he was telling him the remarkable progress he had been making in the game, and he was doing his best to make a showing. Just as they were about to finish up the ninth hole, he made a beastly poor shot, and he folded his arms, looked at the ball as it rolled, and said, "One to twenty-two, inclusive." So you men will have a chance to let out steam.

The first speaker is Mr. Elmer Durgin, Editor, "The Case Eagle."



# GETTING EMPLOYEES ACQUAINTED WITH EACH OTHER, WITH THE COMPANY'S OFFICIALS, AND WITH THE COMPANY'S PRODUCTS

ELMER DURGIN, EDITOR, "THE CASE EAGLE," J. I. CASE THRESHING MACHINE COMPANY, RACINE, WIS.

The subject of getting people acquainted is a very broad one, and one, that can be considered from many, many angles. I will, therefore, limit my remarks solely to the ways we have found it to work out best in our own experience.

It will be necessary first to give you a very brief outline of our local situation. The home plant of the J. I. CASE THRESHING MACHINE COMPANY, of which the "Case Eagle" is the employees' publication, is located at Racine, Wisconsin. We have in our employ between five and six thousand people. Our plants are divided and scattered over several sections of the City.

The Down Town Works is located in the center of the City and is devoted to the manufacturing of threshing machines, steam engines, road machines, etc. The South Works is located at the extreme City limits, several miles from the Main Works. Here is manufactured tractors. A third plant is the Motor Works located in another section of the City, and is devoted to the manufacturing of automobiles. Besides these plants, we have plants at Dixon, Illinois, and Milwaukee, Wis. We also have thirty-four Branch Houses scattered throughout the United States and Canada.

## TRY TO DEVELOP UNIFIED SPIRIT AMONG EMPLOYEES

It is therefore the purpose of our publication to try to develop a unified spirit among the employees of these various plants with their different interests and activities. We have an established department that appears each month always in the same place in the issue called "Whose Who in the Big Case Family." In this department we picture each month, with an appropriate story, some interesting character around the factory. It is our purpose to present on this "roll of honor" some old and faithful employee. The story is never handled in anything but a serious and dignified manner. In it is given a brief history of the man from the time he entered the organization, tracing his steps through the various jobs he has held. Of course we always show all the pictures of the various Athletic teams, etc. We also publish various pictures, very informal, of groups of workers taken at the noon hour or odd moments, always giving their names. For in reality, we are all alike, none of us are greatly displeased to see our name in type and if a halftone is used, we are not very much hurt. The use of pictures creates an unlimited amount of good will and also aids in the matter of getting people acquainted.

Another stunt we have is a monthly "Guess Who It Is" Contest, in which a unique or childhood picture of some one in the factory is printed together with a more or less humorous article giving hints as to whom the "puzzle" might be. There is always an article published each month

entitled "Results of last month's Guess Who It Is Contest," in which we publish the list of all the people who submit answers to the contest. This creates a great deal of interest and we experience no trouble whatsoever in getting "subjects" for this column.

Of course the use of halftones only allows for showing a very few people. We constantly strive by our editorial policy to get the men to get acquainted. We print articles on "The New Man" in which we appeal to the older men to take a little interest in the new fellow and tell him something about the "bunch" and the "place."

As to Officials of the Company, it has always been our fixed policy to keep the officials very much in the background. This might be contrary to the ideas of others in this meeting, but it is our idea. We want our paper to be the *men's paper*, not a place to praise up with pretty phrases the "higher-ups" or bosses. We do not feel that it is a wise idea to throw bouquets at our officials in the publication. We have however in years past produced an annual "Branch Manager Number" at the time of the annual Branch Managers' Meeting, and in this issue we always picture all of the officials. This is the only exception we make to the rule.

Our plants produce not a single product, but an extensive line of "Power Farming Machinery." We manufacture threshing machines for all grains and seeds, also peanut, rice, alfalfa, clover and peas and beans, steam traction engines, portable engines, skid engines, kerosene tractors, hay balers, road rollers, rock crushers, road graders, automobiles, and other equipment. It can thus be seen that no single worker can be fully posted on all the products.

A workman enters our employ, and is put to work—for instance, making gears. He becomes a specialist. He makes gears "day in and day out." As far as he is concerned, the Company is a gear company. It therefore becomes the duty of the house organ to sell the man on the idea that he is not merely a cog in the wheel, but a real important factor in the final analysis of the complete product. This again we do by the aid of pictures. For example, when a year ago we brought out a new size tractor, we devoted the entire double spread to pictures of the new "iron horse." We did the same thing with the automobile.

#### PICTURE PRODUCT AT WORK IN THE FIELD

We make it a point to publish each month a number of what we call "Field Scenes." These field scenes show our product actually at work in the field performing either their usual task or something new, novel or unique, for example, the use of tractors for switching purposes during railroad strikes.

Another feature which we have found very, very successful is occasionally to publish a page of foreign views—for example one of our cars in Japan, a plowing outfit in Havana, a threshing scene in Greece, a tractor demonstration in Denmark. We find that these numbers are eagerly sought after by the foreign people who send them back to the old country proudly telling the folks over there "See what we make at our shop. See they go all over the world, even back to my own country. I work in the shop that makes the gears."

We try not to get too much of this kind of material because we do not want our people to think that we are making the organ a sales organ. Such is not the case in any sense of the word, although the instance has been known where a sale of a car was traced directly to showing the car in the employees' publication.

We also have other departments in our sheet of which we are justly proud, but which do not rightfully belong in this talk, but I cannot refrain from mentioning them, very briefly. We are, we believe, absolutely unique in publishing an extension course in shop mathematics. We publish an elaborate monthly hospital report by factory departments. Our column "Carelessness Never Pays Dividends—Safety First Does" is another interesting feature.

#### DISCUSSION

MR. T. H. CARROW (Pennsylvania Railroad): I want to ask how you determine whether your publication is of value or not; if so, to what extent do you consider it valuable?

MR. DURGIN: Our company would not for a moment consider dropping the publication. The very fact that, if we are a day or two late, we start hearing from all parts of the plant shows that it is wanted. The men look forward to it, and the day after they are distributed you will not see any lying around. The men seek it very eagerly, and they take it home to their children and their families. They read it; and we have gone into many homes and found that they have copies of our publication from the first issue four years ago. They haven't missed a single, solitary copy and they keep them on file.

As far as putting an absolutely definite value on it from the dollar and cents' standpoint, that would be a hard thing to do.

We try to develop what we call a family spirit in our publication. We call it the "Case family." People around town say, "Why, he is a Case man," the same as they say, "He is a Harvard man," or "He is a Wisconsin man." They don't say, "He is an employee of the Case Company." They say, "He is a Case man."

MR. E. H. BROWN (American Cyanamid Company, Niagara Falls, Canada): I would like to ask Mr. Durgin if they make any special effort to reach the foreigners. We find the largest turn-over in Niagara Falls among foreign workmen, and I am particularly interested to know just what is done along the line of interesting them.

MR. DURGIN: We do not publish anything in a foreign language at all. We aim particularly to please the foreigners. About two years ago I ran a baby number, and I was particularly anxious to get pictures of the foreign-born workmen's children. We also run pictures of groups of foreigners, and we always speak of them in the same terms as we would speak of anybody else. We try to make them feel that they are a part of the Case organization and that they are just as welcome as any other employee.

CHAIRMAN WANNER: We will move on to the next topic by Mr. Huston, "How to Keep Your Contributors enthusiastic." Mr. Huston is Editor of the "Coke and Iron Monthly," By-Products Coke Corporation, Chicago.

**HOW TO KEEP YOUR CONTRIBUTORS ENTHUSIASTIC**

J. A. HUSTON, EDITOR, "COKE AND IRON MONTHLY," BY-PRODUCTS COKE CORPORATION, CHICAGO

At the request of our Chairman, Mr. E. A. Wanner, Assistant Editor of the "Jeffrey Service," I consented, perhaps very unwisely, to talk to you who are interested in employees' publications on the subject of "How To Keep Your Contributors Enthusiastic."

While endeavoring to discuss what many of us in this field believe to be practical ways and means to keep our contributors registering high with enthusiasm, I hope I shall not fail altogether in this rather momentous undertaking which happens to be my first attempt at trying to keep an audience of fellow editors enthusiastic—for even so short a time as ten or fifteen minutes.

For the past few years I have been trying, not always successfully, I'll have you know, to encourage plant correspondents to contribute regularly and in the right spirit, suitable, wholesome copy for the "Coke and Iron Monthly," a magazine published by and for the employees of the By-Products Coke Corporation in Chicago.

The extent of our success in keeping contributors enthusiastic depends in a great measure upon whether we get them that way at the outset, or at least whether we get those to serve who have sufficient of the essential qualifications to afford some promise of success.

**SELECTION OF CONTRIBUTORS' STAFF**

The first step then of great importance, as it appears to me, is to see that the right sort of material is selected for the contributors' staff. By the right sort, we mean such employees who are not only sufficiently educated, but who are in a position to get and will get the news from their co-workers. One need not in every case be clever with his English or rhetoric to qualify. More important is it to find the type who is of the correct disposition or humor toward his associates, who knows them thoroughly, and who can express himself in their typical shop vernacular.

One who is a poor mixer, lacking popularity with the fellows, though he may be a perfect speller and an expert at the making of phrases, will never be capable of producing the right sort of reading matter to interest those for whose very benefit the news is being prepared and published. You can very readily understand how the handicap under which the latter type must work would make the problem of keeping him enthusiastic most difficult to solve. Briefly then it is well first to select as representatives of the various divisions of the plant, a staff of correspondents each of whom possesses a fitting personality to represent those for whom he is reporting, and who can express himself through the news columns so as to gain the good will and co-operation of those he represents.

A character that best meets these requirements can usually be dis-

covered by discussing the matter of selection with the head of the department for which a correspondent is to be chosen. When the decision is reached it is not a bad practice to have the department head call in the candidate and put the proposition up to him in the presence of the editor or the latter's representative in a manner similar to the following: "George, we need a correspondent for this department. Bill and I have been talking over who we thought would be the right fellow to make a good job of it. We have agreed that you are best qualified to get together a good bunch of news about our boys. We want to find out how you feel about this job. Are you willing to help us out by taking hold of it?" In this way the announcement comes in the nature of a compliment from the big boss. The idea that he has been selected as the best stimulates in him enthusiasm to make good. Invariably the answer will be in the affirmative. Immediately following his acceptance an outline of what is expected of him can be made by the publication representative.

Although an employee may be made to feel honored by his appointment to the position of contributor, and although he may be started out with considerable enthusiasm he, in spite of excellent qualifications, will too often grow stale on the job and fail to remain enthusiastic unless appropriate encouragement is received.

This announcement may come from three principal sources: namely, from among the employees of his department, from the editor, and through inspiration received from contributions of other good correspondents.

Encouragement from fellow employees may be in the nature of social conversation or "kidding" stimulated by and concerning the reporter's news contributions following each appearance of the publication and preceding each new issue. If he is fortunate enough to succeed in getting the boys of his department talking about his stuff he will not lack a good supply of suggestions emanating from them for each new number. In this way the voluntary co-operation of his associates, and the interest and response he finds himself creating among them, spurs him on with enthusiasm to more and more faithful effort.

#### REVIEW PAST ISSUES WITH CORRESPONDENTS

The editor may lend no little encouragement through means of the following methods: He or his assistant will find it profitable to call on each correspondent shortly after each issue of the publication appears. Together the two may go over the past issue discussing arrangement of news items, and planning on the next issue. On such occasions the reporter should be reminded of the staff photographer and artist whose services should be at his disposal to help carry out ideas for illustrating his department news section.

Care must be taken at all times by the editor to accept and use contributions submitted by any correspondent, if at all printable. If precaution is used in selecting those who are to prepare the notes little censorship will be required. On occasions, which should be rare, where

a rejection of copy seems to be imperative, it must be handled with considerable tact—depending in each case, of course, upon the sensitiveness of the particular correspondent.

A pretty safe plan is to take the piece of copy in question to the contributor and find out how he himself feels about it. If it was meant to provoke a laugh, have a good laugh over it in his presence. Don't admit that you have made up your mind not to run it, but lead him to believe that you are merely in doubt as to whether it would be the best policy to shoot it through. Usually he will decide the matter for you and tell you to leave it out. If he does not concede the wisdom of this you may always take the stand that you agree with him, but that you are afraid to take the chance for fear of being criticized by others for running it.

The regular contributions of one's best correspondent is always inspirational and educational to other correspondents. If any reporter is a little weak or awkward about getting his news copy together, he will soon follow the style of some contributor who consistently furnishes an interesting collection of news. There is generally a certain amount of pride or the spirit of competition sometimes among the departments, sometimes among the individual contributors, that will urge the slow correspondent to improve his copy until it compares more favorably with the best contributions in the publication.

We cannot fairly expect contributors to remain enthusiastic unless we see that suitable recognition or acknowledgment of their efforts is periodically provided.

Appropriate publicity, given in honor of both the new appointees and the long service correspondent is a good scheme. *Jeffrey Service* follows an excellent custom of advertising the fact that a new reporter has made the staff by means of running his photo surrounded by cartoon sketches illustrating the new man's hobbies and the whole appropriately captioned "Introducing a *Jeffrey Service* Reporter."

A number of employees' publications follow the more common practice of giving an occasional banquet for the complete staff of reporters. Such periodical affairs when properly staged help to inject the right spirit into the game, and keep enthusiasm running at a keen pitch for a considerable time afterward.

Most editors have adopted the method of printing the entire list of staff correspondents on some page of each issue. This generally appears conspicuously in a corner of the editorial page. *Jeffrey Service* here again goes still further to the extent of having the reporter's name appear with each piece of copy, making doubly sure in this way that the full credit to the contributor in each case is never overlooked.

A very good practice by way of acknowledgment of long service is to present to each correspondent who has been on the job a full year a bound volume of the publication. This is very much appreciated and has a good effect.

All these things tend to impress those who are on the official list of contributors that their job has a certain amount of importance attached

to it which goes a long way toward keeping them enthusiastic about their work.

#### REFER DEPARTMENTAL ITEMS TO CORRESPONDENTS FOR APPROVAL

Editors themselves must never overlook the necessity of respecting the contributor's position. The departmental correspondent should be regarded as the one responsible for all news from his department. Voluntary contributions from others in his department if pertaining to departmental news, when handed in directly to the editor, should, out of courtesy to the departmental correspondent, be referred back to him for approval before it is permitted to appear in print. The same treatment of respect should be accorded to contributors responsible for other special sections of the publication, when copy overlapping their territory arrives in a round-about way. Otherwise recognition of others in their attempts to go over the regular reporter's head may cause offense which will ultimately destroy the feeling of responsibility and the very enthusiasm we are striving to maintain.

Summing up in conclusion: Appointments of correspondents should be made in such a manner that they will not fail to start out full of enthusiasm to make good. Then it is only by employing appropriate means of encouragement and recognition—that we may hope to keep our contributors enthusiastic.

#### DISCUSSION

MR. J. M. SANDEL (Swift & Co., Chicago): Do you find it a good practice to assign to each reporter a definite amount of space to be filled in your publication?

MR. HUSTON: I have never found it necessary to do so as yet. I try in every case to find space for all the copy they hand in. Once in a while a correspondent will hand in about four times as much as you figured on, but you can usually go to him and ask him if there is any part we can hold over until the next time. I usually allow two or three pages of my magazine for that very thing, such as a "Did you know that?" page or a "Helpful Hint" page. I usually have one or two of those made up ready to run in the magazine. If anybody overdoes what I expect of him. At the present time our sixteen page magazine goes to 1,500 employees. We publish it once a month.

MR. DUGIN: Don't you find, in publishing your magazine just once a month, a great deal of the news has become stale, whereas, if the publication were weekly, it might be more up-to-date?

MR. HUSTON: Of course it would be much better if we could get one out more frequently. It seems to me that our reporters have gradually come to understand that and they prepare their news accordingly. They don't have so much stuff like, "So-and-so did something yesterday," and "So-and-so is going to happen next week; last week so-and-so happened." They hardly ever put anything in that way any more, because it is frequently true that they hand in their news twelve days or something like

that before it appears in print. When they phrase it that way it loses its usefulness.

CHAIRMAN WANNER: I would like to show the bound volume that Mr. Huston mentioned. Every year we take the twelve preceding copies and have them bound. We put the man's name in the lower corner and a man that contributes for a year looks forward to receiving that bound volume. Some of our men have six bound volumes in their library and they seem to appreciate them very much. I think that is a fairly good method for keeping your contributors enthusiastic.

The next topic is "How to Keep Up Interest in a Publication When the Plants Are Widely Separated," by Mr. William R. Julius, Semet-Solvay Company, Ashland, Kentucky.

#### HOW TO KEEP UP INTEREST IN AN EMPLOYEES' PUBLICATION WHEN THE PLANTS ARE WIDELY SEPARATED

WILLIAM R. JULIUS, SEMET-SOLVAY COMPANY, ASHLAND, KY.

With fifteen minutes at my disposal I feel like the man Oliver Wendell Holmes tells us about, who on making his first public speech, talked half the time allotted and felt that he had told everything he knew.

It seems to me that the way to keep up interest in a plant paper when the plants are widely separated is to proceed along the same lines as you would in a single plant. The mechanical and literary make-up would be exactly the same, keeping the news separated under the various plant headings.

You might find it necessary to assign a definite amount of space to each plant according to its size or number of employees. So far we have met with that difficulty but once. I was asked why one plant had three pages, while another had but two. My answer was "send in the news—we printed everything you sent in." Occasionally you may have to control the number of illustrations in the same way.

You may be editing a paper for two or more plants where the employees of one plant do not know any of the employees on the other plants. I shall not attempt to solve that problem except by suggesting changing the conditions that make it. You always like to read about your friends and you always make it a point to read about your rivals or competitors. The combination—friendly rivalry—creates interest between plants. We encourage friendly intercourse among the personnel of the various plants—foremen, gang leaders, and better workmen from the rank and file are sent to other plants to study their operation and methods and to get acquainted with the men in the other plants. We have had foremen's get-together banquets where all the foremen get-together and have a good time. Business is forgotten at these meetings.

By the way, we do not encourage this friendly intercourse or rivalry to make the employees' publication interesting, we use the publication to help create friendships and rivalry.



We stir up rivalry among the plants in every way and at every opportunity. Production, safety, athletics, housekeeping or clean plant competitions all are called upon.

You may be editing a paper for two or three plants where the average intelligence of the employees is very different. One plant group may be high average intelligence and another of low average. One group may be interested in community or social affairs while the other may not respond to such activities. Fortunately we do not have this problem in our plants and I do not feel competent to offer a ready-made solution for it. What I would suggest—and this should really be the keynote of my entire talk—is “Work your mileage book overtime.” Personal contact with as wide a range of employees as possible will help solve that problem. In this connection Mr. Huston's talk will be very helpful. The editor will not have time to make personal contacts with a very wide range of employees, he will have to depend on his contributors and correspondents for that. In order to get from them the information and assistance he needs he must keep them informed as to what he is trying to do. May I tell you what we have done? On May 4, we had a meeting of the editor and the chief correspondents at Ashland where we discussed matters of policy, typography, special articles, future plans, getting departmental correspondents co-operation and the editor's difficulties. It showed them what we were trying to do, why and how. We made up a report on the proceedings of this little conference, had copies made, and sent one to every departmental correspondent. Let them in on the problems and they'll help solve them.

#### PLAN AHEAD FOR FUTURE NUMBERS

At this meeting we planned ahead for future numbers and on the tenth of every month a letter goes to each correspondent outlining the plans for future issues, asking for special photographs, articles or suggestions which will fit in with the plans for special numbers, etc. It keeps you ahead of the game all the time and keeps everybody working along the same line for each issue.

The best solution to any form of this problem is personal contact. First—know exactly what you are trying to do; know the answer to “Why is an employees' publication?” Second—have a guiding plan or even a fixed plan in mind; most people say “Have a definite policy.” Third—with the first two points well established in your own mind, make the rounds of all your plants as often as you can—at least as often as your publication is issued. If for any reason this is impossible, visit your correspondents once or twice until you know each one personally and have become intimate enough so that you can thereafter use the mail very informally.

My time is up but with the Chairman's permission I will read you one paragraph from a letter which Mr. Wanner wrote to me on this same subject.

“It seems to me that discussing the next issue is worth while and I would welcome any criticism or suggestions they have to offer. If they offer none, I would even go so far as to attempt to draw them out. If

you have heard any good news (bouquets) regarding contributions, I would not hesitate to pass them along, as few people object to flattery even when it is applied with a trowel. Many editors do this when they are on very intimate terms with their contributors, but I think it could even be done when it is necessary to resort to the use of the mail. Loosen up in your conversation to your contributors and let them on the inside of the game."

CHAIRMAN WANNER: The key-note in Mr. Julius' talk is to plan ahead. I wonder how many of the editors have their December issues under way. Do you have any idea what your January cover is going to look like? Be looking around, and if you find something that you can't use in your next issue, lay it aside until you can use it.

We have just a few minutes for discussion on this subject.

#### DISCUSSION

MR. T. H. CARROW (Pennsylvania Railroad): I should like to ask the gentleman if he could state in a couple of minutes the definite purpose of his magazine. It is a simple matter to get contributions and written matter; as a matter of fact, the most difficult thing is not to get it, because in very many instances you get so much that is unfit to print. I should like to find out at this meeting today something tangible to justify a publication.

MR. JULIUS: I think that is a very good question. It really was the reason for getting our contributors together to let them know just what an employees' publication is and what it is for. After we talked that all over and outlined the policy, they understood a little better that everything which was sent in had more or less to jibe with that policy. That was the reason for the meeting of the contributors or chief correspondents.

#### FUNCTION OF THE PUBLICATION

I can only answer the first sentence of your question in a stereotyped way by saying our paper is to promote better relations between employee and employer, to reduce labor turn-over, to carry a certain amount of safety education, and to increase general goodfellowship. We think it pays and pays well.

CHAIRMAN WANNER: The function of a publication that I represent is to get the employees better acquainted, and I am convinced that when you know a man you don't fight with him. We get him to realize more clearly every day that all of our difficulties and troubles are almost invariably misunderstandings. If you know the men you are working with, you are going to have less trouble with them.

MR. CARROW: Do I understand you to say acquaintance between the men and the management?

CHAIRMAN WANNER: Among the men, between men and the management, with our product.

That is the service of the "Jeffrey Service," I am quite positive of that—getting our men better acquainted with each other, with their foremen, with the officials of the company, and with the product we make.

MR. HUNTER (Kansas City): I should like to ask what would be the outstanding features of a policy. What would be included? What should it cover?

CHAIRMAN WANNER: Our policy is to give our shop men preference over the office men, because we have many more of them.

MR. CARROW: What preference?

CHAIRMAN WANNER: We give them much more space and we give them more prominence.

We try to get photographs from every department. Each correspondent turns in photographs of the men in that department; also baby photographs, or a picture of some workman's goat or rabbit or what not. He gets photographs of that kind—anything that will get the men in that department interested in his particular column.

Now, we find that the men are interested in the department next to theirs, or in the next shop. We also find that there have been men around the plant that have worked there ten or fifteen years, say two different men, and they have seen each other hundreds of times or more and they don't know each other by name; the publication serves to introduce them.

On our editorial page we print editorials from our employees if they will turn them in. I will admit very frankly that very few of the members turn in editorials excepting those on the editorial staff. We do get some but not very many.

Then we have a "Who's Who" column and we have a "Safety First" page. Then we have a sort of scandal page; of course it is all in good fun. We have our humorous write-ups there. Then we have various announcements of events that are to come and also write-ups in regard to welfare work that is going on about the plant, for example, our Mutual Benefit Association for the men who are injured and off on account of sickness, our Building and Loan Association, our hospital, and our co-operative grocery stores, bakeries, and butcher shop. All of those things are mentioned in the publication at various times. When any new feature is added, it is played up so that the employees are made acquainted with it.

MR. SNYDER (Postum Cereal Company): I have a specific instance in mind that might give this gentleman a little light on the subject of publication.

Some time ago in one of our plants there was a matter brought up affecting the employees in general. A rumor coming from some unknown source was spread among the workers to the effect that a certain young fellow employed at the plant was spying on the rest of the employees. It went from mouth to mouth, was very quietly circulated around the shop, and every one looked with an evil eye upon this young fellow. He had a position that necessitated his going through the shop more or less, and it came to my notice by and by, as things generally do, and I looked into the matter. I went right to headquarters and found out that the thing was absolutely wrong. I was really very much surprised to see how far this had gone. The employees were very much dissatisfied with things in general, simply because this rumor had been spread throughout the shop.

Later our paper smoothed the whole matter thoroughly. I discussed it from all angles and proved conclusively that the idea was wrong. The ill feeling passed away just like a thunder-cloud, and there was sunshine again. That was one benefit of our publication.

MR. H. J. KELLEY (American Seating Company, Grand Rapids, Mich.): That point regarding favoring the man in the shop is very good, but I believe it has been overdone. If your relations are proper, there is no reason why the man on the so-called "white collar job" shouldn't be entitled to just as much space in the house organ as the man in the plant.

CHAIRMAN WANNER: I think your point is well taken. What I mean in giving the shop men preference in space is simply recognizing numbers. We don't feel justified in giving 300 men as much space in the paper as 2,000 men. We have many more shop men, many more departments in the shop than we have in the office, so we can't give 300 men in the office as much space as we do the 2,000 men in the shop, but we assign space in ratio to the number.

We shall have to go to the next topic, "Illustrating the Employees' Publication", by Sam Wingfield, Editor, "Pyralin Articles."

### ILLUSTRATING THE PLANT PUBLICATION

SAM G. WINGFIELD, EDITOR, "PYRALIN ARTICLES," E. I. DU PONT DE NEMOURS AND COMPANY, ARLINGTON, N. J.

According to an old Japanese proverb "One picture is worth a thousand words," and this is very true for the illustration speaks the universal language and can be made to tell the story much better than the printed word.

The first written language was a picture language. Back in the dim dark ages when the cave man felt the need of self expression, he with a rude and hairy hand carved crude illustrations on the cavern wall that man who came after him might see and understand.

Illustrations are to the plant publication what seasoning is to our food. They make the publications palatable.

The first thing the average person does upon picking up a magazine is to look at the pictures and, nine times out of ten, his opinion of the publication is formed from the illustrations in it.

National advertisers all use the illustration to help them sell their products to customers; the plant paper can also use the picture to sell the concern to its employees.

We are a suspicious race and we believe what we see and very little else. If the story can be told with the camera it will be much more convincing than if told with words.

A single column cut of Annette Kellerman in a one-piece bathing suit will convey a better story of her physical perfection than a two-page write-up, and the same thing is true of a picture of the Plant Hospital or Cafeteria. Group insurance may be graphically described and only awaken a languid interest, but a two column cut of an insurance check

made out to the widow of deceased employee will leave a lasting impression.

Pictures of plant picnics, excursions, dances, etc., tell, not only the workers themselves but others not working for the concern, that the employees of that Company have a good time and that that plant is a good place in which to work.

An illustration showing a large pile of wasted material will tell a more convincing story than a long editorial on waste. A snap-shot of the general manager, clad in a bathing suit being ducked in the water by a gang of husky pipe-fitters on a plant picnic, will do more good than anything which could be written about his democratic spirit. A photo of the president of the company in overalls working at a lathe, taken when he was a young man, and another picture of him sitting at his desk today make a most powerful inspirational editorial. We all like to think that we are playing important parts in the scheme of things. A cut of the product of your plant in use in foreign countries will show the employees that their work is of importance not only in their own but foreign countries as well.

#### LOCAL COLOR AND HUMAN INTEREST ESSENTIAL

Two things are essential in illustrating the plant publication. They are local color and human interest. We are all—whether we admit it or not—very egotistical and self-centered; hence, illustrations of local people and scenes are what we like to see.

O. Henry is supposed to be the authority for the assertion that "There is an epoch in every man's life which would make a successful novel." This may or may not be true but there is certainly enough human interest material among the workers of every industrial plant to fill the plant paper or magazine.

In the Du Pont Plant at Arlington, New Jersey, we have, in six months among the workers, discovered a former world champion prize fighter who has earned seventy-two thousand dollars by swinging his two fists; a floor sweeper who was given a diamond studded solid gold medal for continuous service in the National Guard; a carpenter who was for twenty years a feature with the Barnum and Bailey circus; a forelady who was at one time head nurse in a large hospital; and a clerk who began life as a bartender in the old "Bucket of Blood" Saloon in Phoenix, Arizona.

Action pictures always make good illustrations; but, in order to get "action" in a picture, a good camera is necessary. A machinist would not be expected to do any wonderful work with five and ten cent store tools, neither can a toy camera, with a chunk of glass for a lens, be expected to take good "action" pictures. A camera capable of taking speed pictures is required.

#### CLOTHING THE PLANT MAGAZINE

The cover page of the plant publication is the clothes it wears and whether you want your brain child dressed by Lucille of New York and

Paris, or by the Blue Buckle Overall of Lynchburg, Va., is a matter for you to decide. Some editors who would not think of wearing the same suit of clothes year in and year out, send out their publications every month dressed in the same stock cover design.

It is a good plan to change the cover design frequently and, whenever possible, to run the cover in colors. A cover page locally illustrated means more to the workers than a mere pretty picture.

Before closing I want to tell you, if I may, five things which have been of great assistance to me in illustrating the plant publications with which I have been connected. Doubtless many of you know them but I will pass them on for whatever they may be worth.

#### FIVE POINTS IN ILLUSTRATING

1. I never print a picture just because it is a pretty picture. It costs a lot of money to make cuts now-a-days and, before I use one, I have a concrete idea of some mission that particular illustration is to perform.
2. Whenever possible I always try to tell the story with the camera.
3. For years I have kept a "morgue" of good illustrations and art layouts. Whenever I come across a good picture or drawing—whether it is in the "War Cry" or "Police Gazette"—I clip it and file it away. Once or twice a month I go through this morgue for ideas.
4. I try to get the pictures of as many people as possible in each issue. I always run pictures of plant employees in preference to office workers, and I try to have at least one picture of some employees, or group of employees who have accomplished something in the way of production.
5. I always bear in mind that a man may have a face that would stop a ten-day clock, he may be bald-headed, pug nosed, cross-eyed and lantern-jawed—but that's his face. It is the only one he had ever had and he is proud of it and, when you put a picture of that face in the paper where a lot of people will see it, you have made that man feel that he is an important cog in a big organization, and when any plant publication accomplished this it has done a great deal indeed.

#### DISCUSSION

MR. A. E. FRAMPTON (Hammermill Paper Co., Erie, Pa.): About how many cuts do you run in each issue?

MR. WINGFIELD: I am inclined to run too many. I generally run about twenty-two or twenty-five small cuts. When anything big comes up we make a smear of it. You see here, there is a full front page layout. That was a plant field day. We call that one. There are about twenty-one in this publication including that layout. My cut bill runs about one-third of the cost of the publication, which is a little high; but I am a great believer in pictures. If a story can be told with a picture and a caption I think it is better. I know it is better than anything that I could write, and I think it is better than anything that most of my editors can write. I am inclined to put too many pictures in there, if such a thing is possible.

MR. FRAMPTON: Do you use cartoons?

MR. WINGFIELD: Yes, we do.

CHAIRMAN WANNER: I have asked our reporters to keep their eyes open after the papers have been given out and see what page the people turn to. The reporters tell us that everybody will turn to the cartoon page. Investigation shows that the second thing a person looks at is the article written by himself; after that the attractions vary, but the cartoon page is the one the average reader turns to first.

MR. FRAMPTON: Mr. Wanner, do you make your cartoons a regular feature?

CHAIRMAN WANNER: Yes. I use a cartoon every issue. Our publication comes out every two weeks; it runs usually sixteen pages, and we use considerable art, although not as much as Mr. Wingfield does. My cuts run possibly from twenty to twenty-two, which is a little more than one to a page. Frequently the cartoon takes a whole page.

MR. FRAMPTON: Do you bring as subjects for your cartoon the management of your plant, that is to say, your executives, or do you confine your cartoonists to jokes among the men?

CHAIRMAN WANNER: The officials are left out usually. The different reporters send tips to me, and if they pass censorship, I turn them over to our cartoonist, and he works up the idea to suit himself. Occasionally an official does get on that cartoon page, but we use a great deal of discretion; we usually look before we leap.

We will now hear from Dr. Ferguson on "Best Method of Collecting Material".

#### METHOD OF COLLECTING MATERIAL FOR EMPLOYEES' PUBLICATIONS

DR. CHARLES L. FERGUSON, CINCINNATI MILLING MACHINE COMPANY,  
CINCINNATI, OHIO

There is a sort of shop paper called a "House Organ" which is little more than an elaborate device advertising the shop's wares. Then there is another sort, a shop magazine replete with newsy articles and current events, well edited, which may furnish interesting reading for employees. But it is the collection of material for a third sort, a paper dealing with the men and women in a plant and their activities, which is to be the burden of this report. The object of the latter paper is not to promote sales but to further and awaken company spirit. A dynamic and living loyalty is born of friendliness, enthusiastic esteem, and personal pride.

Before material for such a paper can be collected, it must first exist. Neither shop news nor anything else will materialize out of thin air. A moribund management will have a deadening effect on any possible shop spirit, and the most resourceful editor can not make a shop paper in such a plant ring true. There is a death-like pallor about a shop paper which derives its news from a paternalistic management.

There must be things of interest happening to employees before interesting news can be written about them. Deny the editor news of shop athletics, such as baseball, football, tennis, volley ball, basketball, bowling or quoits; let him know nothing of the foremen's clubs, co-op clubs, glee clubs, checker clubs, entertainments, picnics, outings, and the rest; let him never hear the good tidings from the educational courses in English, shop mathematics, or drafting; in a word, keep him ignorant of the employees' activities and he may be able to supply an editorial or two, or perhaps a column of lifeless "personals", but you have reduced his paper to a meaningless dead issue.

But when under good promoters and skillful organization these and other activities have been established, when athletic rivalry and competition for prizes is keen, and when a lively interest furthers and sustains the clubs, the work of editing a shop paper is half done. Hearty co-operation between employees and the employer will have expressed itself in a general good spirit which will make genial writing possible. Now the editor will find ready to his hand an inexhaustible source of the liveliest news for his purpose.

As the various activities develop, the editor or his assistants should take an active part in them, for in that way he may gain that vitally important thing, a large acquaintanceship. He will also find opportunity in this way continually to study the habits, characteristics, and abilities of different employees, to single out those who take the keenest interest in the activities, and those who have the most ability and initiative in their various departments. Such employees, always interested and always enthusiastic, make the best reporters.

It follows, then, that in order to collect the greatest amount of material for an employees' publication there must be a large number of live reporters. It is well to appoint one for each department, or more than one if the department is large. The editor should ever be studying the employees in the several departments, so that he may determine who is the best qualified for this kind of duty.

A daily newspaper secures the brightest and most intelligent men procurable on its staff of reporters. The editor of a shop paper should by no means be remiss in this. By close observation he can select those who are interested in the welfare of other employees, those who are always willing to co-operate in carrying out any good suggestion, and those who think beyond their actual pay. He need not do this rigidly nor irrevocably,—indeed he may find it expedient to change his staff from time to time and try new men with new ideas. But he should always be careful and well informed in his selections. Shop photographers and shop cartoonists form a very important part of the staff. Pictures are always interesting; and a good cartoonist silently and amusingly says much.

#### KEEP IN PERSONAL TOUCH WITH REPORTERS

The editor or his assistants should now keep in constant personal touch with the reporters. He should instruct them to keep their eyes



and ears open for information regarding the various incidents taking place among the employees; he should train them to note any humorous, sad or serious things of interest; to record vacations, marriages, accidents, everything, in short, which will make for news. Not trusting to notices or messages, he should see his reporters once, twice, or three times a month to discuss the type of news which they send in, to request special material for special issues, to criticize and encourage. In this way there will gradually be formed an efficient reportorial staff, a smooth-working reportorial system. Good news will then find its way to the editor's desk with almost automatic regularity. As time goes on the editor will be confronted with fewer undesirable manuscripts that must be rejected, and thus save heavy drain on his editorial tact.

Aside from the periodic collection of news for the regular make-up of a shop paper, there are many promising sources of material, such as special or occasional plant activities. Take for example, an annual picnic. The very organization of it will supply much news. There will be a man, for instance, in charge of athletics, a musician in charge of the band, a person responsible for organized play and the equipment for toyland, an industrial physician in charge of a better babies contest and first-aid station, a dentist in charge of the dental exhibit, a man in charge of fireworks, and so on, and soon throughout the hundred and one features of the holiday you will find employees assuming the responsibility for each special event. The men in charge of these events are the ones who know most about them and they can furnish the editor with stories or reports. Then, too, the picnic should keep three or four photographers and the cartoonists busy. An energetic editor might question the winners of prizes, have interviews with the members of their families and thus secure a fresh slant on the winners, editors from other plants might be able to assist on that day in collecting interesting material from an unbiased source. So by a number of devices information and stories which are unusual, useful, and above all, interesting, are procurable. This material, well-illustrated, will make a fine special issue or picnic number, conserving regular news to swell the next regular issue. Special events vary the monotony of the appearance. In a more limited way other recreational and special entertainments and occurrences furnish the opportunity for special numbers. The Fourth of July number, for instance, represents possibilities for patriotic appeal to good citizenship. Americanization work, etc., just as the Christmas number permits of appeal to other fine emotions.

#### SPECIAL ARTICLES

A resourceful editor need never be at a loss for special articles. The industrial physician can furnish one each month touching the more common ills. But let these articles be written in such a way as will instruct the laymen. Highly scientific treatises on physiological chemistry or pathology are not acceptable. Such contributions should always be lucid and clearly intelligible to the readers. Again, the doctor through his cor-

respondence with sick or disabled employees at home or in sanatoriums will have a lot of human interest material reciting the condition of the absent employees and their appreciative attitude toward the shop Mutual Aid. This affords another chance of demonstrating the advantages of membership in a sickness fund. Figures pertaining to the Mutual Aid's financial standing and the amount of insurance received by beneficiaries should be printed. Proper memorial notices ought never to be neglected.

The safety department will be glad to make use of the paper, for only by publicity can the safety engineer accomplish some of his aims. He should publish a lively article each month concerning safety. A list of those hurt in accidents, and the number of hours lost through carelessness should be given. In the same way the commissary manager should write about the commodities which offer the greatest saving for employees. He can notify them about market fluctuations, shortages in crops, and give them other information which will enable them to buy at the proper time to save money. Employees long in the service of the company can write most interesting stories of its development, or its condition when they first came to it. The possibilities in special articles are nearly limitless. Finally, if you wish to moralize or preach upon some special topic, do it if possible by quoting from great writers or statesmen, past or present.

In a plant where the management views its employees from a broad humanitarian standpoint, the editor with a worthy ideal of a shop paper always before him, need not suffer from dearth of material. News will come to him in profusion, because interesting things are bound to happen in such a plant. The editor's chair will never be easy. He must constantly be organizing, exhorting, and criticizing. There will be constant and difficult demands on his tact and judgment. However, the net result of such successful organization as suggested will be that the employees will await each issue of which they are a definite part and which they have helped to make.

And so let the shop paper be a real shop paper. Let it be written for and by the employees themselves. Avoid that lamest and most pathetic of shams, the shop paper purporting to be the organ of the men in the shop, when in fact all its ideas come from the management and its very form is set and fixed in a remote editorial sanctum. Let the paper be the men's own, let it be something in which they may take interest, in which they find self-expression, then it will stimulate their pride in the company and each other, and voice that pride simply and honestly.

CHAIRMAN WANNER: I think the Doctor's closing statement there had a good point to it. He said, "Remember that you have a shop paper; a shop paper should be by shop men."

This finishes this part of our program.

ADJOURNMENT.

## LUNCHEON MEETING

**T**HE meeting was called to order at 1:45 p. m., Chairman E. A. Wanner presiding.

**CHAIRMAN WANNER:** Without any preliminaries, we will wade right into our first topic, "How to Foster Loyalty to Company and to Country". Mr. Gunnis is going to take care of the first topic. He is the editor of "The Conveyor", a publication that is edited right in the city of Milwaukee. Mr. Gunnis has the floor.

### HOW TO FOSTER LOYALTY TO COMPANY AND TO COUNTRY

**ROBERT J. GUNNIS, EDITOR, "THE CONVEYOR," MILWAUKEE COKE AND GAS COMPANY, MILWAUKEE, WIS.**

A man who is loyal to his country usually will be loyal to his employer and vice versa, although you might have a man who is loyal enough to his country but who is not extremely loyal to his company. He may go around spreading propaganda that will make the other men both disloyal to the country and to the company. I will give an example that happened at our company. One of our oldest men was told that the country was in danger of going into bankruptcy and for proof was told to look at the current prices of Liberty bonds. The result was that the man investigated the price of Liberty bonds—he had spent practically all of his savings for Liberty bonds—and he became panicky. He immediately telephoned to his wife and sent her down town to sell the bonds. We heard of it, in the meantime, and got hold of him just in time to have him telephone to his wife not to sell them. We showed him that there was no danger of the country going bankrupt and that if he would buy more Liberty bonds at the present time, he would just double the earning of that amount of money. He cancelled the sale order of the Liberty bonds, and we immediately prepared an article for publication in our organ, "The Conveyor," demonstrating to the men that Liberty bonds were then about the best investment that one could have. In that way we helped to foster loyalty to the country, and showed the workmen that their employer had not brought them into any loss.

Another way by which you may promote loyalty is to use the propaganda which is sent out by the federal government in regard to thrift and the value of the government securities. We use this propaganda freely, and it has had very beneficial results.

Another thing we do is to devote a great deal of space to naturalization propaganda. If you have a foreign element in your plant it would be well to run a series of articles on naturalization; play up the propaganda that the government is now sending out in regard to night schools, the study of English, of American history, and the things necessary for the men to learn in order to obtain citizenship papers.

We always have on hand what we call our date calendar. There are any number of these published, which give every date of importance in

the history of the country and little articles commemorating that date. We manage to play up as far as possible any date at all, no matter how insignificant, that has any patriotic bearing. We play it up mainly for the benefit of our foreign born workers, so that they may get some sort of insight into the history of our country. In this way I think we promote loyalty to the country and by so doing promote loyalty to the employer. I think every house organ should play up these dates.

The need, now, I believe, is to combat those who are fighting us from within our own ranks. You may call it Bolshevism. If you will pardon the personal reference, I had the experience of spending nine months in Northern Russia combating Bolshevism. I will mention this fact. We were on the front about three hundred miles south of Archangel and the so-called Russian white guards were handling our artillery about one mile behind the front line. They were supposed to be loyal Russians. At that time General Miller, who was in command of the loyal Russian force, issued a proclamation that all Bolsheviks in the province of Archangel would be granted safe passage to the Bolshevik lines if they would register within ten days. Half of that artillery corps that was manning our own guns registered. They were Bolsheviks, handling our own guns about a mile behind us. That is the thing that we have to combat in our companies. This can't be done by combating it along political lines. I think you will agree with me that, in your articles combating disloyalty, you should keep away from all politics and combat it by showing stability of the government, not by playing or hitting at any political party.

Another series of articles that can be run in the house organ are Americanization articles. You can get these by applying to the Department of Labor. The federal government will be only too glad to send you all the propaganda that you may need.

CHAIRMAN WANNER: The next topic on the program is "Selling Safety Through Printer's Ink". Mr. Grover Kingsley, Editor, "The Melting Pot," Halcomb Steel Company, Syracuse, N. Y., is to speak on that topic. If you folks have seen the "Melting Pot," you surely have enjoyed it. I get it every month. I am quite sure that Mr. Kingsley will have something to tell you that will be of interest.

### SELLING SAFETY THROUGH PRINTERS' INK

GROVER KINGSLEY, EDITOR, "THE MELTING POT," HALCOMB STEEL COMPANY, SYRACUSE, N. Y.

I have a little confession to make and that is this: I am a safety engineer by profession and an editor by compulsion, so if what I say kind of grates on the ears of you professional editors, you will just have to overlook it, that is all.

"Selling Safety Through Printer's Ink" might lead one to believe that the subject refers to the monthly advertising publication known as "Printer's Ink". Presenting safety through printed word is what this subject refers to, and it is an advertising proposition, of course.

How can we arouse interest and educate by means of the printed

word? There are two sources of safety information that we may draw upon. There is a local source which comes from within the plant, and there is the outside source which comes from such an organization as the National Safety Council. There is no doubt but that the news coming from within the plant is the most productive of thought. We have got to have the local color; we have got to maintain it. We have got to have the little personal articles about the different men in the plant as to what they have done to promote accident prevention. If there is any new safety device invented it certainly should have a story. We had a device invented recently for taking care of alloy barrels. The picture of the man who invented the device was printed in "The Melting Pot", and since that time he has invented two other devices. I can't help but feel that the publication of his picture spurred him on to further work.

Reports of meetings of safety committees and meetings in general should be published. The safety records of individual departments should also be published. I might say that in our plant the foremen are charged directly with all accidents and in this connection, through the means of "The Melting Pot", we have published, ever since its inception, a "Who's Who in Safety." The names of the foremen who have gone through the entire month without having a lost-time accident are published on one side of the column, and then up here is the comic phrase, "Those who spilled the beans", and under that caption are the names of the foremen who have not gone through the month without having any lost-time accidents, and the number of accidents that are chargeable to them. Then down here appears the department accident standings. This has been run in connection with the contest that we have been running in our plant between our two works. Of course, the matter of publishing names in connection with accident standings is a matter of long discussion. There are good arguments pro and con. We have found out that the publishing of the names of the foremen who have had accidents has not had any detrimental effect.

#### SHOULD HAVE ADEQUATE SENSE OF PROPORTION

In presenting safety through means of an employees' magazine, we should certainly have an adequate sense of proportion. The idea of dominating a magazine with safety dope is entirely out of the question. Our paper, "The Melting Pot," was primarily a safety paper, but it didn't take me long to realize that about six doses of "The Melting Pot" chock full of safety dope was a little bit too much for a man to stand.

The distribution of material is another important thing. This brings up the question of whether you will have a safety page, or whether you will have your safety literature distributed through your magazine so your men will come across a little article here and there. I think when it is scattered they will come onto it and absorb it, but if they get too much safety at once, I think it is a little detrimental to the cause.

Now, as to the outside agency through which we may obtain material. We all, of course, recognize the National Safety Council as one of the organizations where we may get authentic information. We are all fa-

familiar with the publications and the service of the National Safety Council. The "National Safety News", which is a splendid publication, a model for appearance and for real safety dope, is something that the editors of employees' publications ought to read, and some splendid articles could be taken from this magazine and printed, acknowledging, of course, that they are taken from the "National Safety News".

As to the bulletins, there are some plants that publish or reproduce National Safety Council bulletins. I know that we had a National Safety Council bulletin posted, and a fellow in the plant wrote a splendid poem on it. We reproduced the bulletin and printed the poem and got it across in good shape.

As to comic cuts, such as appear on the National Safety Council's calendar, I see the General Electric Company has been publishing those, and it is Mr. Wilkins' opinion that they attract the employees toward safety.

There is a series of small cartoons that is being conducted by the "Solvay Life", Solvay Process Company, Syracuse, of which Mr. Redmond is editor. These show a little girl who has a comic safety saying, and it wouldn't come amiss, I think, if he would tell us what it does toward bringing safety to the attention of the employees.

#### DISCUSSION

CHAIRMAN WANNER: One thing that Mr. Kingsley has persuaded me to try when I get back, is to use the foreman's name on the safety reports. I have never had the foreman's name on that safety first report. We just say, "Department 17 has 81.4," etc., but I am sure if we had the name of the foreman after that department it would mean a whole lot more, and I am going to try that when I go back even though I get thrown out.

MR. KINGSLEY: I advise you to get the consent and the advice of your safety man.

CHAIRMAN WANNER: I shall be very discreet about it. I believe in using safety all the time.

MR. A. E. FRAMPTON (Hammermill Paper Co., Erie, Pa.): Relative to this subject of using the foreman's name, I might say it is our practice to use the name of the man who is injured. If that is done carefully and the injury written up in a kindly spirit, drawing attention to the fact that the injury took place in such and such a manner, the man either came promptly to first-aid or did not, and that he lost so much time because of this accident, there is no bad effect from it. We have been doing this for some months and have not yet had any kick from any man whose name has been on the safety page.

I differ from the speaker because I feel that one shout is better than twenty-five whispers. We run pages devoted to safety and have all of our safety stuff on about two pages. We have our department news, that is accidents by departments, using the names of the men and the extent of their injuries, filling up the page with photographs—propaganda photographs—taken within the plant, having men demonstrate unsafe prac-

tices and using those on the page, but the question of using the foreman's name seems to me very readily solved because we use the name of the men who have the accidents and so far, having twenty or twenty-five of them written up every two weeks for quite a number of months, we have had no unfavorable reaction. On the other hand, I believe it is beneficial.

CHAIRMAN WANNER: On account of illness Dr. Schram, of Fairbanks, Morse & Company, was unable to come but he sent his righthand man, Mr. A. W. Bloss. He is editor of a publication they call the "Name Plate." Mr. Bloss has the floor.

### HOW THE EMPLOYEES' PUBLICATION PROMOTES PLANT SPIRIT

A. W. BLOSS, FAIRBANKS, MORSE, AND COMPANY, BELOIT, WIS.

I am not going to cover Dr. Schram's topic because I don't feel I know it well enough, but instead of that I want to tell you about a problem we had in organizing the Fairbanks, Morse "Name Plate," our house organ, which I think is a problem that is probably a little more complicated than most of the concerns are up against.

When the management decided to establish this house organ, I was employed to create it. I came into the organization expecting to find one factory and possibly fourteen or fifteen branch houses, as many concerns had, but instead they had six factories in the United States, thirty branch houses, two factories in Canada and fourteen branches in Canada. It was up to us to organize a house organ that would cover the entire factory organization which was a big problem. We set to work, and after three months we came out with a very modest sheet which was not all it should have been, but it caused a little comment in the organization.

I might say further that the Fairbanks, Morse, and Company is the outgrowth of the A. N. T. Fairbanks and Company, established in 1830. There are a great many men in the organization who are of the old school and have been with this concern for forty years. In the early days when they started to work, there was no such thing as a house organ. It has been a job selling them the house organ idea, but I think they are thoroughly sold. We established it, and the first news didn't cause much comment, but later on the news began to roll in. At first, it was sixteen pages 6x9 inches and each month it got a little easier. Five months later we adopted the present size of 7½x10½, with thirty-two pages, which we have held ever since.

This morning the question as to the value of a house organ to an organization was raised. When I made my first trips to the different factories and branches, I found that there was very little known at the branches concerning our factories except by some of the sales managers who had visited the factories. The men and some of the clerks knew practically nothing about the various factories. In fact, some of them didn't know where they were located, and on the other hand, at the fac-

tories the workers and even a good many of the executives knew very little of the branch houses.

The first issue of our house organ was sent out in May, 1919.

In May of last year I went to our factory at Three Rivers, Michigan, and asked them what the possibility would be of organizing a baseball team. We have had one in our Beloit factory, which has 4,000 employees, for a number of years and I think most of you have heard that the Fairbanks, Morse team succeeded in whipping the White Sox on one or two occasions, and the Cubs also. They will stand up with any of the big teams. It is pretty well known in the Middle West. The Three Rivers factory had never had a team of that kind, although they had 1,200 people. The executives and employment managers and others said they didn't think the people there would be interested in such a proposition as they were a home-loving bunch (as though the people in Beloit were not) and they didn't think they could get enough of them out to support the ball team as the people didn't care about it. They had never tried to have it and they didn't think it could be done.

#### ATHLETICS PROMOTE PLANT SPIRIT

We, however, through the house organ, have written up the athletic activities, the various picnics and social activities of the summer, and comparing them with the summer of last year I find that where last year we had two factory outings and about five branch picnics, this year we had seven factory outings and seventeen branch picnics that I know of and probably there were others that I haven't heard of because some of the branch reporters do not send in the news as they ought to. A year ago we had one athletic association—the one at Beloit—and one or two amateur teams made up of the factory people at some of the other factories, and today we have athletic associations in practically every one of the factories which is organized to hold social affairs, and they have baseball teams and usually bowling teams and other athletic teams. Also, at the branches they have organized various clubs known as the Fairbanks, Morse Club or other social organizations, and they now hold their dinners and dances, whereas a year ago they didn't because they simply didn't know what the other branches were doing.

When the movement to establish the Three Rivers team was started last February, a tract of land was purchased and an association was organized with ninety-eight of the employees as members. The association was not able to provide the labor for building a big park unless the Company would come out and say, "We will give you twenty-five or fifty thousand dollars," and the men in Three Rivers didn't think that was necessary. They got out under the leadership of various foremen and organized themselves into little gangs, and the different departments got together and did their own labor in clearing this tract of land, building the grandstand, and doing most of the painting. The women furnished the "eats," and they had their parties there about two or three times a week. The result is that we have today one of the finest athletic fields in the southern part of Michigan. I don't believe that that thing would



have been possible if it hadn't been for the house organ. That is what the athletic organization tells me.

I was down at our Indianapolis factory last May and the employees there had no baseball team. They said Indianapolis was a large town, and they didn't think they could get the men together to have it. Today they have a team, and although it hasn't broken any records, it is coming along nicely. Our factory at Moline, at St. Johnsbury, Vermont, and at Ontario all have baseball teams.

In our house organ we make it a practice to show a great many of our products in use. We have a broad line of products. We make the Fairbanks scales at the St. Johnsbury, Moline, and Sherbrooke factories; railway motor cars, sand-pipes and marine engines at Three Rivers; fire and large stationary engines at Beloit, and at Indianapolis we make electrical motors and starters and other electrical apparatus. In addition we make windmills and pumps. It would be very hard to educate the employees in these various lines without a house organ; therefore, we have devoted a good deal of space to the selling end to show where the products are actually used, and we find that not only the salesman are interested but also the factory people themselves. They like to know where the products go after they leave the factory. Instead of a man feeling that he works only on the gear or on a particular part, he feels that he plays a part in making the final product, and when he sees this engine or motor car or marine engine in use, he feels that he has had something to do with the making of it. They are very much interested in the use of the products. We find also that this has been beneficial from the sales standpoint, as the men in one branch will learn what the men in the other branches are doing. Very often the road men will carry the house organ with them and point out to their farm engine dealers what dealers in other territories are doing. It is also of use to the branch managers. For instance, one man in Canada said on the strength of one article which occurred in this magazine he was able to sell two of our 150 horse-power engines. He did it simply because we had written of an installation where one concern uses fifty-seven of our engines. A customer came to him and said, "How do you know your engine stands up in use?" He said, "I will find out," and he wrote to this concern that had used fifty-seven of them and they wrote back and said, "The fact that we are using fifty-seven is sufficient proof of what we think of Fairbanks, Morse engines." He showed the letter to the man and had no difficulty closing the sale. That is a sale directly traced to the house organ. That shows what it will do in promoting selling work.

I might say in answer to the gentleman who asked what value a house organ is to an organization that there is a record that would be pretty hard to beat.

#### WHAT SHOULD APPEAR ON THE SAFETY-FIRST PAGE

CHAIRMAN WANNER: Let us go back to the topic "What Should Appear on the Safety First Page?" I think all the editors here really ought to get in on that discussion.

The first thing that ought to be on that page, I think, is the universal

safety emblem. We ought to insist on that; it should be on your page every issue, and also that little line, "Member of the National Safety Council" should appear on the page, and then it should be illustrated. Don't put in an illustration that has no punch, because if you are going to do that, you might just as well tear your page out and throw it away for it won't do any good. Make your safety first page interesting.

I have heard men in our own plant say a few years ago that that one page showing how the departments stood in regard to accidents was dry. Since that time we have used a stunt which has changed matters about somewhat. We have a young fellow named Graham that can draw cartoons and he has started a race idea, a sort of marathon. It has been running for some months, and he shows the race tracks with marathon runners going around the track. Now, all departments whose standing is 100 per cent are up in the front row, and those with lower percentages are strung out along the race track. A very short time ago, one of the men said, "Where is department 67 on this race course?" I said, "How have you fellows been running?" He said, "Not very good." I said, "Look down toward the tail end." There he was, the only thing you could see was the numeral 67. It gave them sort of a sporting interest. Now they watch that safety first column to see how they are coming in that race.

#### SAFETY-FIRST SLOGANS

On our own page, we always have two or three safety first slogans or mottoes. They are not very good sometimes because I make them original, but you can find a lot put out by the Safety Council that are really good.

I am only assistant editor on our paper. The editor in chief is the blue pencil man in the board of censors. After I have slaved through for months, he will say, "Very good, Eddie," or "Take this out," or he will put in a blue pencil mark here and there, but he has insisted on one thing, that our paper is for Jeffrey men. Lots of times you find dandy articles that you would like to run in there but he says "No", and for that reason we have to dig up our own safety first slogan. Once in a while (I'll fess up, fellows) we take one of these National Safety slogans and put a new hat on it and dress it up a little bit so that Price and some of these fellows won't recognize it, but the boss insists on it being by some Jeffrey man.

One of the speakers mentioned the fact that when a man is injured he runs a photograph of that man in their paper. I think that is fine. Perhaps your company wouldn't permit it. It happens that my company is a little bit delicate on it. The officers are a little afraid sometimes, and they caution me to go slow. They always make me investigate the other end of the line to see that it is satisfactory with the man.

When you take a photograph to put on your safety first page, get it in some site about your own plant, some familiar corner. Don't try to borrow a photograph from somebody else that you can go out in your own yard and get.

MR. A. M. SULLIVAN (Submarine Boat Corporation, Newark Bay Ship-

yard): We publish an honor column once each month and the picture of the man showing the best record is put in that honor column. This has a good effect. Our safety curve in the shipyards dropped, in about fourteen months, from 1.5 to .8, which is almost in half.

CHAIRMAN WANNER: I would like to call on Mr. Frank Redmond, the editor who originated this "Safety Annie".

"SAFETY ANNIE"

MR. F. E. REDMOND (Solvay Process Co., Syracuse, N. Y.): "Safety Annie" is a little character that we originated in our magazine that goes directly to the home; it isn't distributed in the plant. It is sent through the mail, and when a man comes home at night on publication day the magazine is there waiting for him. In that way we appeal to the children, and in reaching the children we reach the grownups. Children first, because a child will teach a man or a woman safety much better than a man can teach it to a man or to a woman. If you can teach the children you can teach the older people, and that was the reason for "Safety Annie."

We made a little grotesque figure, not using very good English and not spelling very good, and each month we have her doing some little thing like riding on a kiddy-car or scooter, anything that will interest the children, and then we have her giving some little slogan like, "If the hospital don't get the reckless feller, the jail will," or we will have her say, "A week on the job is worth two in the hospital". The men tell me that the children can't get hold of the magazine quick enough to see what she is doing, so we feel "Safety Annie" was not born in vain.

MR. S. B. HORD (Eastman Kodak Company, Rochester, N. Y.): I would like to speak a word about this safety page. I don't believe in the stereotyped heading every month. I believe in playing up the safety page. I think putting a safety story in every month has a good effect. For example, my secretary, like most other girls, likes to wear very high heels, so it happened she was going down one of our stairways the other day and her heel, being wood with sort of a wooden peg up the middle of it, broke and she got a tumble. Now I could have made a straight safety bulletin out of that and they wouldn't have read it, but I am writing a little story about how this thing happened, and I am going to head that little story, "And along came Ruth". They are going to bite on that and read it. Now, for instance, when a man gets hurt, you can write a humorous story about that and put a little heading like, "What happened to Jones?" and they will start in and read that. If you put that in the straight bulletin on the safety page, they are going to turn that page over. That is one way to put those stories across. On the other hand, if there is a "flu" epidemic this winter, we are going to come right out with a straight medical article on that headed by our medical director, and it is going to be straight stuff, and I know people will read that because they know what we all went through the last two winters.

I am convinced that you will get it over to more of your employees if you give it to them in homeopathic doses, sugar coated. If you disguise the pill you will get more of them to read it.

Mr. H. L. Krum (International Harvester Company, Chicago): I have a few copies of our publication. I think the safety first page should be something of interest. We start out with, "Something to crow about," showing the crowing rooster in all his glory. Along with the lost time injury roll we show a rooster more or less delapidated on a crutch with his leg bandaged. We used that in the June issue. We like to have a great variety. We are working on another idea now. Here is one of a lion, "Old King Lion feels mighty proud as he loudly makes his boast to the crowd," applying to the "No lost time injury department". For those of the lost time, "When old King Lion feels the worse for wear, he holds the pain and largely tears his mane".

Next month will be a bear and following that will be a tiger.

That gets to the home and the children read it and they look forward to it each month. That is exclusively safety.

Now when a story hangs around broken goggles or dropping elevator gates or something that can well be illustrated, we run that in as a casual item through the rest of the magazine, and I think it gives variety.

Mr. E. B. Lewis (Gillette Rubber Company, Eau Claire, Wis.): Our plant publishes bare facts. Our trade-mark is "A bear for wear". Nevertheless, we have a regular letter in our plant magazine which is called the "Be Careful" letter. We don't start it out in a stereotyped way but we say, "Be careful. Why be careful?" The idea is to get the attention of the people right at the beginning. We run that letter together with other items of safety.

Recently a man had a minor injury on his finger. He had run a splinter into his finger. Although we gave the first-aid treatment, it developed blood poisoning. We sent him to the hospital, and he thought he was cured and he went home, but he had to go back. It got around in the factory that we were not taking care of accidents as we should; nevertheless, we were doing everything possible. That man was finally discharged, but in about two months occupational disease developed and he died. I played that up in the center of our bulletin boards all over the factory, giving the entire history of that case. They said they thought that man wasn't taken care of in the first place. You see your employees are not sold on safety altogether, and you have got to sell them. I think the best way to play up these accidents is through your bulletin boards and by getting the facts to your employees.

ADJOURNMENT.

## Engineering Section

September 29 and 30, 1920

---

C. P. TOLMAN, Chairman

Chairman, Manufacturing Committee, National Lead Company,  
New York City

L. A. DE BLOIS, Vice Chairman

Manager, Safety Section, E. I. du Pont de Nemours and Company,  
Wilmington, Del.

S. J. WILLIAMS, Secretary

Secretary and Chief Engineer, National Safety Council, Chicago

---

### WEDNESDAY AFTERNOON SESSION

**CHAIRMAN TOLMAN:** The purpose of organizing the Engineering Section was to give special technical service, particularly to the other industrial sections of the Council, and to provide a medium for the special investigation from a technical standpoint of matters relating to safety in industry, also to establish a medium for contact with other professional societies and institutions. This function we are just beginning to exercise and I trust the following year will find things in full operation. The one thing which is in mind as a special field of operation of the Engineering Section is to get after that zone of accidents which heretofore has been considered outside the pale of prevention.

We have in our audience today, I am glad to see, Dr. Chaney, who sounded the key-note some time since in the matter of engineering revision as compared with engineering supervision, meaning by the latter the patch-work done in the attempt to make safe those processes and machines which had not been fundamentally designed from the standpoint of safety. That, I think, is the particular field of the Engineering Section, although it does not mean that we will not continue with the supervision and the attempt to make safeguards as effective as possible.

We must throughout, I believe, work toward a redesign of the whole machine or process if by so doing we can make it fundamentally safe. That is a rather startling idea. It sounds radical; to other than engineers it might sound absolutely unpractical. To those of us who have investigated such matters, the reverse is true. I do not believe there is a

single piece of apparatus that has been designed on that basis that has not shown a profit exceeding the wildest expectation.

We hope, in the course of the year, to ask a number of industries to submit as a memorandum the groups of accidents which in their opinion cannot be fundamentally corrected. As a test in this line of work, we received from one industry a list of eleven items specifically described which were felt to be beyond remedy by structural changes. Out of the eleven, certainly three can be absolutely eliminated.

You will be reached through circular letters in the course of the year along this line.

I am now going to ask Mr. Williams to report as Secretary.

#### SECRETARY'S REPORT

SECRETARY S. J. WILLIAMS: I do not need to repeat the general story of the Council's entry into the membership of the American Engineering Standards Committee for the purpose of participating broadly in the work of standardization. I think you all know that, and I think probably most of you know that the Council turned over the immediate direction of this standardization work to this Engineering Section and further that the Council has so far been definitely given the sponsorship of safety codes on power presses, on paper and pulp mills, and on construction work. As a practical beginning on one of those subjects, namely power presses, the Section at its meeting in Chicago in June had a very interesting round table discussion on the safeguarding of power presses at which some very valuable information was brought out that will be used in formulating the code on that subject.

Each of these codes is to be formulated by a representative committee that includes representatives of all the organizations that are interested as well as the Council itself. During this Congress we are having a meeting of each of the three committees that have been appointed to formulate these three codes that I have mentioned, and the Council is now in the way of being appointed in the near future as sponsor or joint sponsor for two or three or possibly a half dozen additional safety codes—quite all that we can practically handle with the time and the money that we have to put into this work. That, if I may express an opinion, is certainly sufficient in itself, if we haven't done anything else, to justify the formation of this Section.

I have already referred to the meeting of the Engineering Section in Chicago in June. There was a similar meeting in New York in April, which I think it is fair to say was quite as valuable both in getting us started in our work and in interesting other men in the engineering field in the subject of Safety as an element of engineering. For we have two principal jobs—one, to work out the importance of engineering in safety, and the other to work out the importance of safety in engineering. At these meetings that we have had in New York and Chicago, I think we have gotten the permanent interest of some of the really big men in the engineering field.

I am sure all our officers will welcome suggestions or discussions from

the members of the Section or from anybody else as to the lines of activity along which the Section may be of the greatest service.

CHAIRMAN TOLMAN: Before we convened today, Mr. Tolsted asked me if I would ask any of those present particularly interested in the computation of stresses in fly-wheels, to signify by raising their hands so that we can get together with Mr. Tolsted following this meeting and arrange a further meeting on that particular subject.

Mr. Tolsted also suggested that among us there may be a number of groups particularly interested in certain particular subjects and that now would be an excellent time for such groups to get acquainted and arrange a basis or course of action.

Are there any other subjects that any one wishes to submit?

DAN L. ROYER (Chief Inspector, The Ocean Accident & Guarantee Corp., New York City): Riveted joints would bear discussion of that kind.

CHAIRMAN TOLMAN: We have for our first speaker, Prof. J. G. D. Mack.

## THE ENGINEER AND PUBLIC SAFETY WORK

JOHN G. D. MACK, STATE CHIEF ENGINEER, MADISON, WIS.

Possibly the most curious phase of the safety movement is that its advent was so long delayed.

I have often tried to analyze the reasons for its comparatively recent development, extending as it does over but a few years. The reasons are many, and while individuals took serious thought on the daily toll of accidents, the public was not particularly moved except by some surpassing horror. As we read or heard of the accidents one by one we got comfort from one of those proverbial phrases which we learned with the language, such as "accidents will happen", and let it go at that.

Students of safety had long known that accidents happen because the conditions were made so that they not only will but must occur. In most cases there is no "happening" about it. The designer of an unguarded punch or exposed gears has unconsciously designed them to produce accidents as surely as he has designed them to perform their regular work.

Enthusiastic workers for the benefit of their fellow men recognized this condition of things and turned their efforts to the education of others in the belief that the terrible loss could be greatly reduced.

These enthusiasts had many a hard road to travel but their faith was justified.

The safety engineer has made an honored place for himself in the engineering profession, for he has reduced an economic loss and prevented untold physical suffering.

He is engineer, designer, missionary, and teacher all in one, and his work is spreading over the whole field of human endeavor, as is shown by the program for this meeting.

Reduced to the most simple terms the safety engineer obtains results by one of several methods, as

First, by mechanical devices in which the effort is made to keep a person separated from the danger spot, as a machine guard.

Second, by the removal of potential dangers, such as projecting nails or by the illumination of a dangerous stairway.

Third, by the use of physical devices to replace human watchfulness, such as an automatic elevator lock.

Fourth, by education in safe practices, such as to keep from under a crane load or avoid leaving articles where they may cause another to stumble.

Each of these four principles has many direct illustrations in public safety work, for example the first, by some device to keep the person separated from the danger spot. For example, a highway-railway grade crossing.

#### GRADE CROSSING ACCIDENTS

There are many devices for reducing accidents at such crossings and of them there is unfortunately but one which is positive, namely, a separation of the grades. Unfortunately, because the expense of grade separation is in most cases so very great.

During the three months ending July 1 there were 20 highway-railway grade crossing accidents in Wisconsin resulting in 9 deaths and 21 injuries.

These crossing conditions are being constantly improved by the highway and railroad commissions. Whenever possible highway relocations are made to eliminate railway grade crossings, some separations are in progress, crossings are being cleared for better view, and more warning signals being installed.

Probably the most serious menace in the way of a public danger is that of automotive traffic, both to the walking public and to the occupants of other vehicles. It is probably the largest of all safety problems of today.

Each day brings forth a new crop of inexperienced drivers, the cities are becoming more crowded and thus the conditions get worse. The wonder is not that there are so many accidents, but that there are so few in terms of the total possibilities.

In this field the safety work is largely educational coupled with close and firm police supervision.

Legible and properly located signs have become as necessary in crowded streets, at turns, and in other danger spots as are signals in train operation.

The walking public has its part to play in street traffic as well as the driver in order to get satisfactory results. We walk across streets midway in a block, taking our risk in avoiding vehicles, and this we should not do.

In some cities the crossing officer will not allow a person to walk diagonally across a street intersection—an excellent rule. In other cities only people who are waiting to cross the street are allowed to stand in the square of the sidewalk formed by the curbs and the extension of the building lines. This is another good rule as it gives those waiting to cross a better chance to watch for the opening.



Safety zones, non-glare headlights, parking rules, proper marking of detours, and other devices have done much toward preventing what would by this time have been intolerable confusion in street traffic, but probably in the whole field of safety work there is no portion in which all who are interested will have to keep so everlastingly at it as in this work of public safety.

#### DISCUSSION

PROF. MACK: On this matter of street traffic, I should like to know what experience is being had in the cities where certain streets are limited to one-way traffic. It is possibly safer for the vehicles, but I know it is confusing to me when I try to cross one of the streets which has one-way traffic. I had that experience in St. Louis recently. In crossing behind a street car I was looking for vehicles to come in the direction opposite to that from which they were coming and I had to jump.

E. B. TOLSTED (Independence Bureau, Philadelphia): In Philadelphia we have a great many one-way streets. I think when a person becomes accustomed to one-way streets he finds it less confusing to cross than to cross a street where he has traffic coming in both directions.

FRANK PERKINS (Public Commissioner, Buffalo): I would like to ask Mr. Mack his opinion as to the use and the practicability of having tunnels or short subways on extremely busy corners. In my own town of Buffalo the traffic on Main Street is exceedingly congested at certain hours of the day. Would it be wise to provide at the corners small tunnels, six feet wide, seven feet high, crossing the street, porcelain-lined or enamel-lined and well-lighted, so that in rush hours women and children, cripples and others could pass over without crossing on the surface at all?

PROF. MACK: It seems to me that that plan is not only desirable but it is absolutely essential because the crowding is getting worse every day. There is an illustration of that same device in many railroad terminals and in some small stations where you go down and cross under the tracks and come up on the other side of the double track. Then, of course, there is the saving in time for the pedestrians. On a busy corner like one of the State Street crossings in Chicago, it would save probably thousands of hours a day for the people who otherwise have to wait until an opening can be made for them to cross.

I noticed this morning, in the limited area in which I walked around this part of the city, that the City of Milwaukee is doing a good work in cutting the corners to widen the roadway, particularly between the street car track and the corner where at present it is often not wide enough for a single vehicle.

MR. PACKARD (Northwestern Casualty and Surety Company): Mr. Perkins probably hasn't investigated the public utilities that utilize the streets. I believe he will probably run into conduits, pipes, and sewers that even the public utilities companies have failed to report to the City Engineer, either as to the actual location or as to their depth.

MR. PERKINS: In 1919, the Department of Public Works arranged for a

subway across Main Street and found that the sewers were nineteen feet below the surface, and I think in the heaviest traffic streets they are that low. There might be some change as to the conduits, and the pipes could be arranged without much difficulty to be above or below the subway.

MR. WOODHEAD (Employers' Indemnity Corporation, Kansas City): The great question that is brought out by Mr. Perkins is that of public comfort stations. If any of you gentlemen happen to be Englishmen or have been recently over there, you know that in cities in England public comfort stations are common and frequent. It is one of the most crying necessities of the day that in some way municipalities should furnish public comfort stations. If this can be done, as Mr. Perkins suggested, and at the same time provide crossings under the streets, that is a real engineers' problem and worth while.

CHAIRMAN TOLMAN: This question of the tunnels for passing under streets and the possibility of providing those tunnels with public comfort stations presents a decidedly engineering aspect, because so much can be done in the design of those tunnels from the standpoint of making them easy to clean, sanitary in themselves, and at a minimum cost, as well as including in the tunnel structure the means for the passage of public service mains of all kinds, and the like of that. I can see the possibility there of some very beautiful and very useful engineering work being done and of a sort, too, that could be made standard practically except for certain major dimensions. Being standard, they would be correspondingly cheap to install—cheaper than though each one were worked up in complete detail as a separate proposition.

SECRETARY WILLIAMS: Before we leave the subject of Public Safety on this program, I want to bring out a point which would have been brought out if Mr. Talbert had been here to discuss this paper, and that is the reason why fundamentally this subject was put on an Engineering Section program. The reason is this: That the Public Safety work of the National Safety Council has so far, probably necessarily, been mostly along the organization side and the educational side. We have been talking a great deal about the necessity of educating motorists to be careful when they approach grade crossings of railroads. We haven't said very much yet about the necessity of making the grade crossings safe for the motorists by engineering methods, as the State of Wisconsin has in many cases, by making grade crossings safe or by abolishing them by engineering methods applied to the highway and to the railroad and to the crossing. The Program Committee of the Section, in putting this number on the program, had in mind that we ought to see a development of engineering study for the prevention of public accidents as well as industrial accidents. In addition to the civil or highway engineering problem of grade crossings, there is the mechanical engineering problem of automobile construction, to minimize accidents from failure of parts of the automobile or accidents due to the absence or imperfect design of the accessories such as headlights, brakes, and bumpers.

Then there is a field which isn't exactly engineering but is about half

engineering—legislation with respect to all the features of automobile traffic, the weight of cars as related to different types of pavements, and all those things.

E. S. CHAPIN (Safety Inspector, Insurance Department, Pennsylvania R. R., Philadelphia): I would like to offer a resolution in connection with that phase of the work.

#### RESOLUTION

"RESOLVED, That the Engineering Section urges the appointment of at least one engineer on the Headquarters Staff of the National Safety Council to collect and study data on engineering and mechanical methods of preventing accidents and to assist in co-ordinating the work of the Committees of the Council engaged in public safety activities."

(On motion the resolution was adopted.)

CHAIRMAN TOLMAN: Our next subject is a round table discussion on "Safeguarding Circular Saws," led by W. S. Paine, Engineer, Research Division, Aetna Life Insurance Company, Hartford, Connecticut.

SECRETARY WILLIAMS: I would like to explain that this is another of the subjects that is now being worked into a safety code, not by us but by our friends in the Workmen's Compensation Service Bureau and the State Industrial Boards. It was thought that we could contribute towards that by putting on today a good, live, general discussion by you men who have been right in the midst of the practical aspects of this problem. To that end, we have done the same thing that we did in Chicago with punch presses and we have prepared a little outline, which is now in your hands, in order that the discussion might not run all over the field.

#### THE DEVELOPMENT OF UNIFORM STANDARDS FOR SAFEGUARDING CIRCULAR SAWS

W. S. PAINE, ENGINEER, RESEARCH DIVISION, AETNA LIFE INSURANCE  
COMPANY, HARTFORD, CONN.

One of our country's ablest writers on efficiency made the following statement:

"A short time ago I talked with the highest salaried man in the world. I asked him how he had succeeded. He quietly answered: 'I haven't succeeded. No real man ever succeeds. There is always a larger goal ahead.'"

It has been a similar spirit to this that has been the dynamic force back of the safety movement in this country. A splendid record has been made but success will not be reached until we have reduced to a minimum the numerous causes of accidents now on our accident record.

Many agencies have been at work trying to devise ways and means of cutting down the terrible and unnecessary toll of life and limb of our American workmen and while a high motive has prompted these efforts there is no doubt but that the safety enthusiasts who have had authority

but little knowledge of the measures they are trying to enforce have unduly aggravated the manufacturers upon whom they practically forced in many cases the selection of various types of safeguards. This statement does not disparage the great amount of highly technical and practical safety work which has been done in all our industries, but it illustrates the great need of uniform action to bring out the best and most practical safety devices and measures which have been developed by this safety movement and to eliminate the worthless.

Every new mechanical invention, chemical discovery, or social movement for the development of the race must have its trial period, but as soon as possible the experimental stage of a new development is subordinated to its practical application in order that the greatest good to the greatest number may be derived at a minimum expense. In the further development of our safety codes and standards would it not be a good plan to keep these fundamental principles uppermost in mind.

Not long ago the writer had the privilege of reading a letter from an officer in one of our large American industries saying that he had read the standards for safeguarding but before compliance he desired to obtain the latest fall styles in safeguarding which were applicable in his particular State so that he could be up-to-date in safeguard fashions.

We will agree that this was a bit of satire but it well expressed the righteous indignation of a manufacturer who had been provoked by the many changes asked for in standards or by the divergent interpretations of city or state inspectors, fire or compensation insurance inspectors, or perchance the interpretation placed upon such standards by his own safety engineer. This difficulty can be overcome only by uniform codes which have been thoroughly tried and found practical before being forced upon the public.

No class of men better understood this difficulty than the engineers, and it was the engineers, together with others deeply interested in safety development, who started this universal movement to standardize a number of our codes, which are not now uniform and which contain vague and indefinite rules and regulations; this condition often existing because of individual or local pride. It was realized that this inefficiency must eventually give way to the combined opinion of technical and public knowledge based upon practical experience.

As most of you know, a representative safety meeting was called by the Bureau of Standards at Washington the first of this year and after careful consideration it was resolved:

#### BUREAU OF STANDARDS—RESOLUTION

"That the American Engineering Standards Committee be asked to request the International Association of Industrial Accident Boards and Commissions, the Bureau of Standards and the National Safety Council to organize a Joint Committee on Safety Codes, this committee to include representatives of these bodies and such others as they may consider advisable; and that this Joint Committee report upon the Safety Codes required, priority of consideration of the codes, and sponsor bodies for their preparation——."

A joint sponsorship for a national safety code on woodworking machinery has been given the National Workmen's Compensation Service Bureau and the International Association of Industrial Accident Boards and Commissions. The subject, "Safeguarding Circular Saws", has been placed upon this program by the Woodworking Section of the National Safety Council to bring out the best information possible covering this subject and we solicit any constructive criticism as to the present standards for circular saws.

May we state in passing that this committee in part is composed of organizations vitally interested in this subject, such as the users of circular saws, the manufacturers of woodworking machinery, and the operators of woodworking machinery, who have a first-hand knowledge of the dangers which it is sought to eliminate. Furthermore it is only through discussion of this subject in a broad way, similar to this meeting today, that we expect eventually to produce a code which can be uniformly adopted.

In placing greatest weight upon the circular saw in the consideration of the woodworking machinery code, are we merely guessing at the point of operation which is still the greatest destructive force in this branch of American industry? I think not. The following figures may be of interest to you.

The statistics covering woodworking machinery, which were compiled jointly by the Insurance Department of Pennsylvania and the Statistical Department of the Pennsylvania Compensation Rating and Inspection Bureau for the years 1916, 1917, and 1918, record 81 deaths and major permanent disability cases, 52 of which were attributable to saws. The accidents were sub-divided as follows: Seven of the eight deaths and permanent total disability cases were attributed to saws; thirty-six out of the fifty-eight accidents involving the loss of hands and arms were attributed to saws; six of the ten eye cases were attributed to saws; of the five indeterminate cases three were caused by saws. These figures are corroborated by other records which I have reviewed and these statistics indicate that the saw is the first point of attack in the safeguarding of woodworking machinery.

By merely placing a guard at the point of operation of a machine we are not going to eliminate all accidents or even the greater number. Carefulness alone can prevent the majority of accidents. No man should be placed at work on a woodworking machine until he has been fully instructed as to its use. Thus by the co-operation of the foremen and workmen, together with discipline and safety organization work, both carelessness and ignorance (to which many severe accidents have been attributed) will be displaced by a careful working corps of employees.

Although safeguards will not eliminate all accidents, they may prevent many or greatly decrease the severity of accidents which they cannot avert. As to installation we are practically of one mind that if the builder could be persuaded by the purchaser to place safeguards upon the machine during its construction, the result would surpass those of any home-made device installed after the machine is set up at the mill.

In the discussion of circular saws we will first consider the rip saw.

Almost every code or set of rules seems to indicate a general opinion that every rip saw should be equipped with an adequate splitter (spreader) to prevent wood pinching and at the same time act as a safeguard to the back of the saw and protect the off-bearer. In some cases the splitter has been extended over the crown and front of the saw, thus providing a fair degree of protection to the operator.

A number of rip saw safeguards have been so constructed as to be fastened to the splitter or designed so as to act as a combination guard and splitter wherein both are adjustable. The main question before us today is: Under what circumstances should a rip saw be guarded? In answering this question the legislative view-point should receive careful consideration. May we also have expressions as to the necessity of a dog attached to the spreader to aid in holding down the wood.

As to cross-cut saws most of the codes make it compulsory to provide a guard for this type of saw. It is conceded that the cross-cut saw does not involve as much risk as the rip saw and that it can be guarded more readily. Under this heading may we have the views of any who believe it impracticable to guard any special type of cross-cut saws:

In the use of cross-cut saws, where either the saw or the table is movable we should discuss the guarding of the saw at all points of its travel.

While considering swing saws we should give special attention to three features: (a) guarding of the saw, (b) fastening the counterweights, (c) limiting the swing of the saw toward the operator.

Other questions covering the guarding of circular saws and band saws are before you in tabulated form for consideration and we solicit a clean-cut discussion of these items on the program.

#### CIRCULAR SAWS

##### *Rip Saws:*

1. When should a rip saw be equipped with a hood guard?
2. Should every rip saw be equipped with a splitter (spread) behind it, to prevent the wood from pinching?
3. What type of splitter is it most advisable to use on a rip saw?
4. When, if ever, should rip saw be equipped with a combination splitter and hood guard?
5. When a hood guard is provided for a rip saw, should it be
  - (a) supported from the ceiling
  - (b) supported from a standard at the side of saw table, or
  - (c) attached directly to saw table
6. Is it advisable always to use the type of hood guard that adjusts itself to the thickness of material being sawed?
7. How would you guard that portion of the saw under the table?
8. When, if ever, is it advisable to equip the hood with a steel dog to keep the material from climbing up the saw blade?
9. To what extent can a roller feed be used on a rip saw? If used, how can it be guarded at point of contact?
10. Can roller feed on a re-saw be guarded?

*Cross-Cut Saws:*

11. Are there any operations on a cross-cut saw for which it is impossible to use a hood guard?
12. Should the guard be adjustable to the thickness of the material being cut?
13. Should the hood guard for cross-cut saw (Stationary saw and stationary table) be
  - (a) fastened to the ceiling
  - (b) supported from a standard at the side of the saw table
  - (c) attached directly to saw table
  - (d) Is it necessary to have an open hood so the operator can see the work?
14. Should the hood guard be equipped with a steel dog to keep the wood from climbing up the saw blade?
15. Is it advisable to use a hood guard that can be swung out of the way?
16. How and when should a push stick be used?
17. What type of guard is most effective on a tilting table?
18. How would you guard a bolter saw?
19. If the saw or table is movable should the hood guard protect the saw at all points of its travel?
20. Can equalizing saws be guarded successfully?
21. How should a swing saw be guarded?
  - (a) What is the best method of fastening counter-weight to the swing bar?
  - (b) Should a safety chain always be used to limit the swing of the saw?

*General:*

22. When can suction hoods be used to advantage? How should they be fastened?
23. Should suction hood be installed on the under side of saw as well as on the top?

This morning, Mr. Schreiber, Deputy, Industrial Commission of Wisconsin, brought out a point in relation to saws that I have never heard in any one of the Engineering Committees where the saw problem has been discussed, and before we enter upon the discussion of the questions you have before you, I am going to ask Mr. Schreiber to bring out this one point concerning the circular saws.

SECRETARY WILLIAMS: Gentlemen, Mr. Schreiber was born about six feet away from a circular saw and has been working in woodworking plants all his life; he ought to know something about it.

## DISCUSSION

HENRY SCHREIBER (Oshkosh, Wis.): Almost all saws have guards, but still the men cut themselves.

Here is a circular rip saw on which accidents have happened. This was picked up in one of the shops in my district. This saw hasn't any

teeth at all. I don't call these teeth. They are too short and they don't clear themselves if you push the lumber in. They haven't any chance to clear themselves. That saw should be gummed. Some shops haven't even got a gummer. They should have by all means. They expect a filer to take a round file and yank away at that. With a gummer it wouldn't take any time. These teeth on this saw won't cut, they won't clear themselves. If you push the lumber in and try to work it, the saw will wobble and shake, burn and kick the wood right out at a pretty swift rate, and if the operator makes an attempt to catch it his fingers will come in contact with the saw teeth and be cut badly.

Here is a saw similar to the first one except that it is a larger saw, but it is fixed up right. If there are any expert filers here in the room I wish they would take a look at this and pass their opinion on it. These teeth are long enough to run the lumber through properly. This is fixed up for soft wood, and if you run it at a speed of 9,000 feet at the periphery, you will get a pretty good job. Of course, for hard wood, I wouldn't run it as fast at that; it would have to be fixed up a little different and the speed reduced perhaps a little less than one-third, going down to say about 6,800 for hard wood.

SECRETARY WILLIAMS: What is the main difference between those two saws, the length of the teeth?

MR. SCHREIBER: Yes.

Here is a circular crosscut saw that was picked up in one of the shops. If you get close to it you will see that you could ride on it and it wouldn't hurt you—it is so dull. A good many shops have these old man-killers. They file them once in three years, perhaps. A lot of the employees use them for all sorts of purposes—cutting up pitch, making mail boxes, and a lot of things that they do and the employer never sees; and those fellows come in for a good share of the accidents. A fellow has a piece of pitch and he wants to take that home in a dinner bucket. He cuts it up in fine pieces so as to save doing that at home. He does it on the boss's time. I know because I have done it myself. I know that in one factory in my district three accidents were caused by cutting up pitch on one of these instruments. They should be looked after just as much as any other saw.

Here is a little circular crosscut saw. This was cracked, or had begun to crack. When they begin to crack, a man knocks a hole at the end of the cracks with a punch and that stops them from cracking any farther, but this fellow made three holes and it cracked farther. When I got hold of the saw the piece broke off easily. This was actually taken off of a machine in that cracked condition. When a saw begins to crack I wouldn't punch any holes in it, I'd throw it away. That is the safest way, because after it cracks it isn't any good.

SECRETARY WILLIAMS: Do you mean to say that you would discard the saw the minute it starts to crack?

MR. SCHREIBER: Absolutely. I wouldn't do any hole punching and try to save it.

All shapers turn out finished products and you can't use any dull



knives. No foreman or superintendent will stand for that. Therefore, there are very few accidents on shapers. They have a guard, of course, the same as the saws, and the accidents are practically eliminated.

Any man that is going to run a saw should know all about it; don't pick up a greenhorn and tell him, "Here, push this in and that is all there is to it." That doesn't always work. Moreover, with a saw fixed up like this, experienced man or green man, and no matter how many guards you put on it, you aren't going to get satisfactory results. You haven't got enough bevel: the back of the knife will hit your stock and cause a commotion and the operator is liable to yank the piece out and get his hand into the cope knives or cylinder knives.

Last Thursday I was in a shop upstate and they had a rip saw there about this size and three of the teeth were broken off. They weren't there at all. I turned it all the way around—I was afraid I would find some more off. The saw undoubtedly had been running that way for some time. Of course, they haven't had any accidents yet, but perhaps they will have if they keep on.

The whole thing is this: Sharpen the teeth up and fix them up right, get a man that knows how to file them—don't hire a shoemaker to build a house, it won't pay. If you follow those instructions you will eliminate the saw accidents at least seventy-five per cent and increase your production accordingly.

CHAIRMAN TOLMAN: The first point in our outline is: When should a rip saw be equipped with a hood guard?

MR. S. H. KERSHAW (Hercules Powder Co., Wilmington, Del.): I made up my mind after about twelve years in safety work that an all-purpose rip saw could not be guarded; the thing to do is to make sure that the saws are in good condition, that the men know how to use them. You can teach a man to stand to one side of a saw so that pieces thrown back will not strike him. You can teach a man to lock one finger over his guide so that that hand can't slip into the saw.

MR. SCHREIBER: The only thing I would do would be to put something on the top to prevent the man from throwing his hand in from the top or on to the saw. Then keep the saw in shape.

MR. DAVID NEILL (Standard Steel Car Company): In our shop we have an all-purpose saw. It is used in all classes of work. We use a guard on that saw ninety per cent of the time. Why not use it that length of time?

MR. KERSHAW: I would like to ask the gentleman whether or not he thinks that if that saw guard is used ninety per cent of the time the hazard the rest of the time is increased due to the fact that the men are not accustomed to having the guard off.

MR. NEILL: I do not believe so.

MR. A. L. THOMAS (E. I. du Pont de Nemours & Co.): I don't agree with Mr. Kershaw because when a man removes that guard he is generally the man that is using the saw and it is brought to his attention that he is removing a safeguard from a dangerous piece of work, and rather than make him more careless it makes him a little more careful.

SECRETARY WILLIAMS (Now Presiding): There is some difference of

opinion on the question of the general purpose rip saw. I don't know that we can get any further on that. I would like to ask for what particular operations can a rip saw not be guarded.

MR. KERSHAW: There are two operations that I can call to mind. One is when a fellow desires to cut a narrow strip and he has to bring his gage so close to the saw that his guard won't fit in place. Another is when he wants to cut a groove in a board and thus run his piece over the top of the saw blade. The guard cannot be used for that unless it is a pretty thick piece of wood that you want to run over and a comparatively short piece.

SECRETARY WILLIAMS: Take the second of those operations first, if you please—the operation of grooving. Is there any dissent from the proposition that a rip saw cannot be guarded for grooving? Mr. Schreiber has already amended that to say that you can put a guarded piece over the top of the whole operation.

MR. KUNKLE (Queen City Bending Company): I have been in business for fifty years. I run a factory of my own now, and I find that generally your saw doesn't go through so you don't need a guard. I think the most trouble you will find is in little shops in lumber yards, for instance. I recently saw an instance where a man was sawing and the lumber was smoking. I said, "Stop, I want to look at your saw." I found that the saw was filed just as Mr. Schreiber told us—the back was higher than the front; the trouble comes with just such things as that. In all big factories they have filers and they have gummers and I don't find so much trouble there.

JAS. C. WILSON (Lumbermen's Mutual Casualty Company): Mr. Kershaw raised two points. To one I will say that in my opinion when a rip saw is used for grooving it cannot be guarded. To the other I will say (and this is something that I learned today) that there never is a time when a guard cannot be used for ripping a thin strip. If your guard is set over to the right side of your table far enough you can take a piece of board the same thickness of the board you are going to rip and set it right alongside and measure from the front of your saw to the piece of board the proper thickness of your ripping strip, bring your guard up to it, then your guard is about three or four inches to the right of the saw and comes down where it belongs. If there is any argument on that point I would like to have it brought up.

MR. KERSHAW: That is all right except that it is going to be very difficult to get the plant men to do it when it is easier to move the guard than it is to make the strip.

SECRETARY WILLIAMS: Are there any other operations besides grooving and sawing thin strips where it is difficult to use a guard on a rip saw?

MR. G. E. SANFORD (General Electric Co.): We had an accident some time ago to a man using a guarded rip saw. He was siding some stock. Some of the waste pieces were very thin. One of those thin pieces caught between the saw and the guard and flew back. If you have half an inch wastage you are all right, but if you are under half an inch I'd rather not be there at all myself.

MR. W. E. HOWARD (Oxford Paper Company): We have been up against this all-purpose rip saw proposition the same as the rest of you. We have found that when we use our rip saws for rip saws they can be guarded on all occasions. When we try to use them for a shaper or a matching machine, it is a more difficult job. On this question of cutting a thin strip, we have got over that by putting in an inserted piece that sets forward with two thumbscrews. We use an overhead guard that you can raise and lower.

SECRETARY WILLIAMS: The next question is, should every rip saw be equipped with a splitter or spreader?

MR. KUNKLE: You can not use a splitter on a grooving operation.

MR. LOVETT: I would say that a grooving saw can be guarded not by a standard guard but by a projection from the fence or the gage in most cases, extending over the top of the saw, provided the groove is not too far removed from the gage. If he is grooving narrow stock he can use a shoe with a handle on it and a heel, if necessary, which keeps his hand away, or he can use a pressure bar to hold the stuff down. I have seen operations performed many times when a man would shove one piece through behind the other—a spring on the outside to hold it to the fence, a spring on the top to hold it to the table, a lock on either one or the other, on the top preferably.

MR. KERSHAW: Isn't it true today that you hit it pretty squarely if you guess over fifty per cent of the saws giving real hazard conditions are those that are used in repair shops and similar places where the men would even use them for cutting pipe if it wouldn't break the saw?

MR. TOLSTED: Isn't a splitter pretty effective usually if it comes up to a sixteenth or an eighth of an inch of the top of the saw? I have seen saws where the splitter moved up and down as the saw moved up and down. Then the splitter stayed a fraction of an inch below the saw. Isn't that just as effective as one a half inch away?

MR. KERSHAW: I don't believe that any splitter is effective, no matter how high it is, unless it equals the width of the set of your saw. For an all-purpose saw you have practically got to have a number of splitters available to change from one to the other. When you change the saw you have to change the splitter.

MR. SCHREIBER: Nine times out of ten the splitter would be on the floor.

SECRETARY WILLIAMS: The splitter is fastened to the saw frame, isn't it?

MR. TOLSTED: It comes up through the table.

MR. LOVETT: There are certain types of machines made where the splitter travels up and down with the saw. I refer to a variety saw with two spindles where you reverse a rip saw for a process. It works first class for grooving. It depends a good deal upon the nature of the material being grooved. If the saw is cutting clean the spreader might not bother, otherwise it might cause trouble.

MR. FRANK ELWELL (Delco-Light Company, Dayton): We made an adjustable splitter on a job, and it is never off the saw and never lying on the floor. We made it wedge-shaped. We raise it a little when we have a

saw with a wide set or lower it a little when we have a saw with a thin set.

MR. SANFORD: The General Electric Company's practice, on saws that move, is to use a splitter which is normally set just below the top of the saw. That type of spreader is adjustable for different diameters of saws on the same table within reasonable range of diameters, and if the Chairman so wishes, I would be glad to send a blue print of that when I get back to the office.

SECRETARY WILLIAMS: We should be very glad to get it.

No. 3. What type of splitter is most advisable to use on a rip saw? I think we have pretty well covered that already with the discussion on the splitter.

No. 4. When, if ever, should a rip saw be equipped with a combination splitter and hood guard?—a spreader that comes up and goes over the crown of the saw and beyond the front of the saw.

MR. LOVETT: I do not like the spreader extending over the top of the saw. It is all right for certain purposes, but splinters and things of that kind from the rear end of the saw will not be obstructed by it. In one case a man lost an eye, using a spreader extending over the top of the saw, by a splinter the size of a toothpick flying over. My twenty-five years' experience in woodworking teaches me that the average man on a rip saw prefers a hood guard attached to the splitter rather than a guard attached to the ceiling or other places, but I do not approve of a wooden guard. It is not substantial enough. It is all right to keep the dust and shavings down from the man's face or keep his hands off the top of the saw, but it is liable to break and fly off.

SECRETARY WILLIAMS: You would consider a metal hood guard attached to the splitter as being not only permissible but actually better than one attached to the ceiling or the saw table?

MR. LOVETT: Yes. In my experience coming in contact with practical men I find they prefer that, because it stays in place and doesn't wiggle around and they can work all around it.

SECRETARY WILLIAMS: No. 5. When a hood guard is provided for a rip saw, should it be (a) supported from the ceiling; (b) supported from a standard at the side of the saw table, or (c) attached directly to the saw table? Mr. Lovett has given one opinion on that.

MR. SANFORD: It seems to me that depends entirely upon the location of the saw. If you have a low ceiling, it may be all right to fasten the saw guard to the ceiling. You cannot fasten it to the ceiling in all cases because sometimes your ceiling is clear up out of reach.

MR. TOLSTED: The shops I have been in where the men were most enthusiastic about the guards which they had were the shops where they had the ceiling attached guards. I think that is something in favor of the ceiling attached guard.

SECRETARY WILLIAMS: Let me add some testimony to that. I have seen only two woodworking shops of any size where all the saws were guarded and all the guards in use—there may be others. One of them was the Westinghouse Electric at Pittsburgh where they have their own

type of guard, attached to the splitter. The other was the Commonwealth Steel Company's pattern shop where they had a guard attached generally to the table. That doesn't prove anything except that either method is all right if it is properly used.

MR. ANDERSON: I don't believe that a guard hanging overhead for a rip saw is as effective as a guard attached to the splitter.

MR. CONNOR (United Gas Improvement Co.): The guard should be placed in the location where we get the greatest rigidity. A case came to my attention of a suspended guard where the guy ropes worked loose and slackened so that the side of the guard came in contact with the revolving saw. Fortunately there were no personal injuries but pieces of the saw flew all around the room. It shows the necessity of having your hood as rigid as possible.

MR. EVANS (Wisconsin Industrial Commission): I would like to ask if anybody in the state of Wisconsin has seen a guard that is attached to the ceiling down within a foot of the saw in the past year? I haven't.

MR. LOVETT: The same thing applies to Ontario. You find all the overhanging guards swung up out of the way. In the majority of cases, in two-story buildings, the moving of loads on the second floor makes ceiling guards unsatisfactory because they are very unsteady.

SECRETARY WILLIAMS: No. 6. Is it advisable always to use the type of hood guard that adjusts itself to the thickness of material being sawed? In other words, is it wise to use an automatically adjustable guard, one that moves up and down automatically depending upon the thickness of the materials? I would like to say that perhaps it is advisable except on machines where you use always the same thickness of stock, in which case it would seem permissible to have the guard rigidly fixed for that certain thickness.

Is there any dissent from that proposition? We apparently agree on that.

As it is getting so late I am going to take first the questions that Mr. Paine tells me are most important for the Committee, and if we have time we will come back to the others.

No. 8. When, if ever, is it advisable to equip the hood with a steel dog to keep the material from climbing up the saw blade?

MR. PAINE: There have been a number of guards sold where the dog has been fastened to the hood, and one or two of the best woodworking men that we have in New England claims this is advisable. We made an objection to that, believing that the dog should be fastened to the spreader in order that it may be more rigid.

MR. LOVETT: I believe Mr. Paine's contention is correct—that the guard should by all means be attached to the spreader.

SECRETARY WILLIAMS: No. 10. Can the roller feed on a re-saw be guarded?

MR. SANFORD: I believe it can. I don't want to say definitely how it can because I want to see what the results are on an experiment that I have got under way. I expect to be able to give information on that matter at a later date.

MR. PAINE (Now Presiding): No. 11. Are there any operations on a crosscut saw for which it is impossible to use a hood guard? A number of the codes make it compulsory to provide a hood guard for crosscut saws.

MR. LOVETT: Do you refer to the swing crosscut saw?

MR. PAINE: No. Does any one make objection to the statement that all crosscut saws can be guarded? The various Commissions have signified that that is their opinion because they placed in the code "It shall be guarded".

MR. SANFORD: The State of Massachusetts is working now through a woodworking code, and I am certain that crosscut saws have the provision, "should be guarded." In other words it is not mandatory.

MR. LOVETT: The code should be that the rip saw shall be guarded and the crosscut saw should be guarded. There are types of operation on a crosscut saw where it would be practically impossible to use a guard.

MR. PAINE: No. 12. Should the guard be adjustable to the thickness of the material being cut?

MR. ANDERSON: Absolutely, if possible.

MR. PAINE: No. 14. Should the hood guard be equipped with a steel dog to keep the wood from climbing up the saw blade with a crosscut saw? The same as with a rip saw?

Should the dog be fastened to the hood or to the spreader?

MR. LOVETT: In the majority of cases on a cut-off saw, the man passes the work over the saw and brings it back. You do not do that with a guard.

MR. ANDERSON: You could not very well use the dog on a cut-off rip saw on the table. The dog would be a detriment instead of a help in that case.

MR. PAINE: No. 15. Is it advisable to use a hood guard that can be swung out of the way? (This pertains to crosscut saws.) You have heard expressions here this afternoon, and some were made this morning, that no such type of guard should be installed because it will be left out of the way most of the time.

MR. SANFORD: I should say that it might be advisable, in some cases, to have one that could be taken out of the way; but it has been my experience that the guards that could be readily swung out of the way were generally out of the way.

MR. PAINE: No. 17. What type of guard is most effective on a tilting table?

MR. LOVETT: A guard that hangs over or is attached to the side of the table is the most common type used and the only one that can be used on the majority of machines. We have gotten after the manufacturers of saw machines to make a bracket attached to the column of the machine under the table and carrying a spreader which will hold the guard. No matter how the table tilts the spreader stands with the saw.

MR. PAINE: No. 19. If the saw or table is movable should the hood guard protect the saw at all points of its travel? There have been two or three types of guards for saws of this type—one where the saw is

guarded while it is not in operation, while it is not traveling; another where the hood travels with the saw, and I believe the Westinghouse Company has a guard of this type, and it has proved most effective, but this has been questioned by some practical operators.

MR. ANDERSON: It is practical; it can be done.

MR. PAINE: Has any one objections to that point—that that type of a guard is practical and can be installed?

MR. LOVETT: I have seen it in use in a good many plants where the guard travels with the saw usually attached to an arm at the arbor of the machine or to the spreader of the saw.

MR. PAINE: No. 22. When can suction hoods be used to advantage? How should they be fastened?

MR. SANFORD: The General Electric Company practice on circular hoods—not swing saws—is to put the suction hood underneath the table. I don't recall any case where we had the suction hood on top. I don't see what effect the suction hood on top of the saw would have anyway.

MR. PAINE: We agree with you, but there have been five or six pictures forwarded to us of actual cases where a suction hood system has been installed over the saw and there has been a request that this type of hood be given consideration. We wish to know if such a type of hood is considered practical.

MR. ANDERSON: I would say that suction over the saw would be a fine thing. We are using a suction type below the saw, taking the sawdust away that way, but a circular saw at high speed carries a great deal of dust and fine stuff over the saw and right in the person's face. A suction pipe that would take away the fine dust that a man is facing all the time would be a fine thing. I would like to adopt it myself.

MR. THOMAS: It would be impractical to try and draw your dust over the top of the saw. You would have to have your pipe so high that the force with which the dust and shavings come around would be so strong.

CHAIRMAN TOLMAN: It is quite clear from the discussion here that men who are expert in the operation of saws and have spent a great part of their working lives at that are thoroughly agreed that the prime requisite for safety is to maintain the saws in proper condition for their work; and probably no other detail of those things we have been discussing is so important in itself as that of having the saw in proper condition. I also understand that the codes for woodworking machinery do not cover this point, at least all of them do not.

One purpose of this discussion is to provide for those bodies who are preparing woodworking codes, information on which to base the codes, and I am suggesting the following resolution subject to modification as you gentlemen see fit:

#### RESOLUTION

**"RESOLVED,** That it is the opinion of this Section that the most important requirement for safety in the operation of circular saws is the condition of the saw, and it is recommended that the safety code on woodworking machinery shall demand that, in addition to safeguarding, saws be kept in proper condition for the work.

"It is further our opinion that such a requirement should be rigidly enforced as it will impose no hardship but, on the contrary, will mean a substantial profit through increase in production."

MR. ANDERSON: I move this resolution be adopted.

(The motion was seconded by Mr. Lovett and carried.)

MR. BURROUGH (Maryland Casualty Company): I notice that you skipped No. 18, "How would you guard a bolter saw?", and No. 20, "Can equalizing saws be guarded successfully?"

MR. PAINE: On No. 20 we have a collection of pictures showing definite guards covering each of the saws on the equalizer, and where the equalizers are made up of three, four and five saws, definite individual hoods have been installed, and the user tells us that it has been effective.

MR. SANFORD: was that question discussed in the Massachusetts Code?

MR. SANFORD: The code did not cover that question. The code was limited to such machines as were in common use in the state.

MR. LOVETT: From what I have seen, I think that equalizing saws can be guarded with a frame over the top of the machine.

MR. PAINE: No. 21. How should a swing saw be guarded? (a) What is the best method of fastening counterweight to the swing bar? (b) Should a safety chain always be used to limit the swing of the saw?

MR. SANFORD: Some of the General Electric factories have saws that do not use a safety chain. They use a heavy board link at both ends fastened back again to the post or side of the building, wherever it is convenient with regard to the location of the saw.

There is also another guard for a swing saw that we put on our saws which isn't mentioned here. That is a latch which, after the saw is pulled out to its ordinary length and is let go, will catch. I have seen swing saws that would rebound clear across the table. We have all of our saws fitted with latches.

We have two or three different designs depending on the location of the saw, whether it is against the wall or in the middle of the floor, which in each case will catch on the back travel of the saw. I think there ought to be something in there that would call for a latch to catch the swing saw at the back travel, and I will send in to Mr. Williams some drawings of one of our other guards, also photographs showing the construction of that latch.

MR. W. D. KEEFER (National Safety Council): When you release that latch, do you do it as a separate operation by hand?

MR. SANFORD: The handle of the latch is on top of the other handle and you simply, instead of getting hold of one handle, take hold of both of them and let loose.

MR. CONNER: I have in mind a condition of swing saw in which the saw is counterweighted, that is just the frame. It is just heavy enough to swing back slowly. It doesn't come back with a rush. As soon as you release it, it drops slowly back into its forward position.

MR. PAINE: In behalf of the Committee that is trying to do some work on this code, I want to extend to everybody our thanks, and if you have any suggestions that you think would be helpful to us, especially con-



structive criticism, we welcome them. In order that this code may be expressive not of any individual's pet schemes but may be a public code representing the users and the manufacturers.

ADJOURNMENT.

#### THURSDAY AFTERNOON SESSION

THE meeting was called to order at 3:00 p. m., Mr. C. P. Tolman, the Chairman, presiding.

CHAIRMAN TOLMAN: Our first paper is "Practical Methods of Teaching Safety to Engineering Students," by Mr. R. McA. Keown.

#### PRACTICAL METHODS OF TEACHING SAFETY TO ENGINEERING STUDENTS

ROBERT MCA. KEOWN. ENGINEER, INDUSTRIAL COMMISSION OF WISCONSIN.  
MADISON, WIS.

I do not believe that a complete course in safety engineering leading to a degree is necessary or desirable. Universities and technical schools are not all entirely "sold" to the necessity for even a small amount of safety instruction, and it appears that the demand for it can be best met, not by a specialized course in safety, but by giving whatever instruction is given to a larger group of students than would enter a special four year course.

One of the first things that should receive attention when an institution takes up safety instruction is to make the physical plant as mechanically safe as good practice may require. It does not set a good example for the students, to require them to work in shops and laboratories where numerous accident hazards exist, and then after graduation when they go into industry to have them find that such conditions are considered almost criminal.

#### GENERAL LECTURES

Safety instruction can, it seems to me, be carried out along several lines, each of which is necessary to give the student a fairly broad view of the subject. Many institutions have "General Engineering Lectures" that are given for the purpose of enlightening the students along engineering and other lines. These lectures are usually given by some one who has made a marked success along his particular line, and who is invited in to address the students. In such a series of lectures, four or five distributed throughout the year might be devoted to safety. These lectures should outline the enormous waste through disablement and death occurring in the industries, on the streets, and in the homes in this country, give a brief history of the safety movement and the benefits derived as a result of good organized safety work, emphasizing the fact that accident prevention is good business. These lectures should

awaken the interest of both students and faculty and drive home to them the necessity for the conservation of human life.

This brief but comprehensive series of lectures should get members of the instructional force to thinking along these lines, and no doubt ideas will occur to them as to how they can present the subject in their individual courses. A few suggestions are here given that may be of some assistance.

#### FRESHMEN DRAWING

Many institutions have gotten away from the "exercise" method of teaching drawing, by which I mean the making of figures and diagrams that teach technique only, and have substituted material, such that when a student completes a plate he has something for which he can see some use. In the early part of his course he becomes familiar with the use of instruments and the theory of projection, the problems must necessarily be simple and may be that of drawing views of some simple machine part other than those given.

As material for these problems, in addition to using levers, small pulleys, engine, lathe and other machine parts, there might be added simple guards and safety devices such as those for gears, safety lathe dogs, headless set screws, safety couplings, and cylindrical heads for jointers.

In some institutions the student during the latter part of his mechanical drawing course makes free hand sketches of various machine parts from the machine itself, measuring the part and obtaining the necessary dimensions so that he may make a complete working drawing. If complete guards such as those for jointers, saws, belt shifter locking devices, complete screen guards for belts and pulleys, and some types of tripping devices for power presses are available, the student can make use of these, and obtain the same practice in drawing as he can by sketching his parts from an engine or lathe, and at the same time be learning the necessity for machine guards.

#### SHOP WORK

Since the shop is a department in which power machinery is used, the student should be given thorough instruction in the accident hazards in connection with its use.

Most woodworking departments are equipped with jointers and circular saws, but there are many without efficient guards. In Wisconsin more accidents are caused by the circular saw than any other tool in the woodworking industry, and from the way in which many of the accidents occur, it appears that the lack of the proper maintenance of the saw is the cause of many injuries, so that particular attention should be given to its guarding and maintenance.

In the course in pattern making the students can get practice by making patterns for the hazardous machine parts that are not guarded at the factory. Their pattern work can be facilitated by having drawings from which they are to work made in machine design courses, which will be spoken of later.

The hazards of the foundry should be carefully pointed out to the

student. These in the school shops are not very great, unless there is a cupola, and then of course, proper instruction should be given in the safe handling of molten metal. As part of his work, he can make castings of the parts for which he made patterns.

The machine shop affords a number of hazards as well as good practice in eliminating them. Those in charge of this department should familiarize themselves with what are considered standard guards for the hazardous conditions in such shops, and then the students for their general shop problems, after they have had practice with machine operation and bench work, can make up these guards. This is of more interest to the student than that of exercises only, as he can see some use for his product, when he has it completed.

Particular attention should be given to the proper use of grinding wheels, care of hand tools, and eye protection.

For the kind of shop instruction that is given at the University of Illinois<sup>1</sup>, where the shop work is organized along the lines of a modern industrial plant, making a standard product, the safety department is one of the seven divisions into which the administrative or executive department is organized, and as each student does some work in this division, those taking shop laboratory get systematic instruction in accident prevention, using methods that prevail in a well organized industrial plant. This, it seems to me, is an ideal method.

The shop instruction would not be complete without bulletin boards in each department, or near the main entrance, where the weekly bulletins of the National Safety Council can be displayed, and changed at frequent intervals.

#### MECHANICAL, HYDRAULIC, AND ELECTRICAL LABORATORIES

After the student has completed his first two years of work, and has received the instruction in safety that can be given in the work of those years, he should by this time be able to determine and be on the alert for hazardous conditions, himself. There are many hazards in connection with the machines in these laboratories, and from the nature of the work performed some of them are rather difficult to eliminate. All of those that can be guarded should be taken care of, and for the others the instructors should emphasize the necessity for special care, be on the lookout for unsafe practices, and call attention to them when observed.

In connection with this work, one of the problems of the course might well be a report on the unsafe conditions in the laboratory and the central power plant, together with suggestions for their elimination.

#### STRUCTURAL ENGINEERING

The fundamental principles of safety as applied to structures is covered in the hand-book issued by the National Safety Council, and will not be further discussed here except to suggest that students in this department

<sup>1</sup> "Safety Instruction at the University of Illinois"—Paper by Professor B. W. Benedict before Engineering Section, National Safety Council, abstracted in National Safety News, May 24, 1920.

might well be given the problem of making a safety survey of the University Buildings.

#### MACHINE DESIGN

It is in this department that the necessity for proper guarding of machinery can be taught.

At the University of Wisconsin this feature of machine design has had some attention for a good many years. Lecture notes prepared in 1905 for junior students by Professor J. G. D. Mack and other members of the instructional staff, treated "safety of operation" as one of the points to be considered in the design of a machine.

In the drafting room simple problems in safety devices can be given, similar to those given in mechanical drawing, except in the case of machine design the students can design them, instead of making drawings from existing parts.

In one course this was carried out one semester in the University of Wisconsin, by having the students go to the shops, take measurements and make sketches of gear guards, and then lay them out and actually make them up out of "press board", then fit them to the machines to judge of the results. This was interesting work for them, and since the dimensions they took were used to lay out the part, they found the necessity for obtaining them completely and accurately. This problem might have been carried out further by having the student, after he had verified all of his dimensions, make a working drawing from which a pattern could have been made in the shops, and the guard made up. Other similar problems of this nature can be worked out.

When it comes to guards for such machines as power presses, where experience is so necessary for the solution of the problem, the student will probably not make much progress in the design of safe dies, and as most school shops are not equipped with these machines, it is necessary in order to get first hand information, to visit industrial plants. Half day shop visits have been a feature of the courses in machine design in the University of Wisconsin for a good many years. The sophomores who take mechanism are taken to plants where they can see automatic machines, and observe the way in which cams and linkages are used to obtain required results. Such things as hand tripping devices and automatic feeds for power presses are pointed out to them, the necessity for eye protection in spot welding operations, etc. These brief plant inspections give the student a new interest in his work, for by them he can see the practical application of his theory.

In connection with the class and drafting room work in machine design at Wisconsin also the department gives a laboratory course of one credit throughout the junior year, which is required of all mechanical students.

This laboratory course is run parallel to the class and drafting room work and the first part is devoted to the testing of simple machine elements, and the latter part to that of testing simple complete machines.

The purpose of the course is to give the student a better idea of the strength of machine elements by actually testing them through to destruction. Thus when studying the design and holding power of screw

threads in the class room, the corresponding laboratory experiment would be that of screwing a bolt into a nut one, two, and three threads and pulling it out in the testing machine; and while on the subject of belting, making destruction tests on various kinds of belting and fasteners. Crane hooks are taken up in the same manner.

In this way the student learns to judge of the safety of a part in a way that he could not do by simply knowing that the average ultimate strength is so many pounds per square inch.

In those institutions where such work is given in the materials testing laboratory similar experiments might be given there.

Safety surveys of the machine hazards in the shops and laboratories might also be undertaken on one or more laboratory periods of this course; such a period being at a time when testing machines are not available or for any other reason it is desirable to change the schedule.

#### ANNUAL INSPECTION TRIPS

Many institutions require annual inspection trips of their Junior or Senior students. A great deal of information on the prevention of accidents can be gained if the instructors in charge will point out these as well as other engineering features. In plants where there is a safety engineering department, arrangements might be made to have the engineer in addition to other guides accompany the students, and perhaps give them a brief outline of the accident prevention work that is being carried on.

#### BRIEF COURSE IN ACCIDENT PREVENTION

In addition to the safety instruction given by the various departments, which must of necessity be very limited, it seems to me that a two credit course for one semester in Accidents and Their Prevention could be very profitably given. Such a course could be offered as an elective, open to Juniors and Seniors, and given by a professor who is particularly interested in the subject. Outside experts might be invited in to address the class on certain phases of the work. Each student should prepare at least one report on some particular phase of the subject and present it at a meeting of the class and have it discussed.

I predict that such a course given in an interesting way would soon become one of the most popular courses of the college.

#### STUDENT SAFETY ORGANIZATION

An organization of this kind conducted by the students themselves would do much to arouse their interest in accident prevention work. The University of Illinois has already made progress along this line in their "Life and Limb Club." Such an organization might be entirely local in its nature, or perhaps affiliated with this section of the National Safety Council.

#### FACULTY INTEREST IN SAFETY

Unless the members of the instructional staff can be interested in teaching accident prevention in their various departments, there cannot be much co-ordinated work done. It will be like accident prevention in the

factories where the management does not interest itself in the problem. It is hoped that the four or five general lectures already mentioned will sufficiently interest the faculty as well as the students in such a way that they will see and grasp the opportunity for performing a lasting service to their fellow men.

CHAIRMAN TOLMAN: This paper that Mr. Keown has just given us is of very great professional importance. The various technical schools depend upon the alumni for guidance relating to new courses. They recognize that the man in practical work can best tell them of a new need in technical education. We have had several men speak to us on this subject, and I think Mr. Keown has given us a paper that shows clearly the possibility of introducing safety education of a practical sort without taking additional time in the school course. That is the one great need in getting safety education into the technical schools. The programs, as you know, from experience, are well filled.

I am going to suggest that when you get this paper with your proceedings of this Congress, you individually take the trouble to transmit it to the Dean of the school that you came from or to the particular member of the faculty where it will do the most good, and in transmitting it write a letter strong enough to make sure that he will at least read it through. Then after a few weeks follow it up by writing again and asking his opinion about it, getting him in touch with the Chicago office. You will, in that way, be adding a great deal to the promotion of safety education.

MR. BONSIB (Tanners' Council of the U. S. A.): The speaker, it seems to me, should have mentioned the use of seminars. Most engineering schools are crowded. At Columbia they are pretty well crowded but you can usually arrange a seminar, say, once a month in which the engineering students would take a very active interest. I would like to suggest that in outlining courses, if the courses are too crowded, a seminar in safety be organized.

CHAIRMAN TOLMAN: If I may answer that for Mr. Keown, that is, of course, a possibility for getting the general instruction, but what appealed to me in Mr. Keown's paper was that the men are getting the actual practical experience with their hands and their heads combined and getting that without adding an hour to the time. The Rensselaer Institute for a long time has been giving technical instruction in safety and has incorporated in its business administration course the principle of safety as reacting upon labor turn-over and other matters of that sort vitally important in industry today.

We will take up the next paper which is by Mr. D. H. Colcord of Detroit, Michigan, and it takes up a very important branch of accident prevention. In this Section particularly we don't have to shy at the word "psychology", and the principles of psychology are being used by us right along. As is true of anything which has been reduced to a scientific basis, better results can be obtained by recognizing the definite principles which have been established and working from them than can be obtained if the principles are only realized in a hazy sort of way and we are going by rule of thumb instead of science.

Mr. Colcord, I think, has a real message for us, and I am pleased to introduce him. (Applause.)

### SOME PSYCHOLOGICAL ASPECTS OF ACCIDENT PREVENTION

D. H. COLCORD, DETROIT, MICH.

Most men jump at the sight of a snake, seek companionship, desire reward, and fear punishment. In other words there are certain modes of human conduct which are common to all. Man must recognize these laws—for such they are—and conduct himself accordingly, but it isn't necessary in the ordinary walks of life for him to analyze them, to classify them, and build them into a philosophical whole regardless of their particular usefulness to him. He uses common sense and succeeds or fails in direct ratio to the extent that his *sense* is common.

When so-called common sense becomes inadequate to deal with situations complex, analysis and classification of known facts creates *un-common* sense.

If when it first became necessary to codify common sense, the author had called that first book *The Science of Behavior*, or the *Science of Un-Common Sense*, the modern term, *Psychology*, for the same group of classified knowledge, would not have achieved its present disrepute outside of the classroom.

In the last few years *Psychology* has been applied and misapplied to almost every phase of industrial and business activity. With a little text-book knowledge and a few mysterious terms of ten syllables, efficiency experts have hypnotised otherwise sound-headed business men into putting these so-called experts on the payroll—business men who knew more psychology, under another name, than they will ever know. For example, I think that perhaps the most interesting phase of this misuse of the term psychology has come with the advent of the ultra-modern character-analysis. He or she sits mysteriously in the shadows of the employment office interviewing, like a gypsy fortuneteller, a hundred applicants a day. In ten minutes one can learn that because his hair is blond and his ears are big he is a spendthrift and is fickle. This knowledge is passed to the employment man who, if the system is working, gives you a job where you will have lots of spending money and a male stenographer.

That's why we all groan every time a new book appears on the *Psychology of Winding Coils* or the *Psychology of Digestion*. It's a splendid horse that has been ridden to death. That's why most of us say "bunk" every time the term is used. However, its very popularity demonstrates that it must contain something potent and something powerful for business and industry, and especially in that phase of industrial development which seeks to prevent accidents and conserve human life. If there is anything in the science of human behavior—which our academic world has discovered—which will in our hands assist in saving

human life, we ought to know it. And I think there is a tremendous scientific effort which if applied in safety engineering would do as much for us as it has done for our educational system, for the science and art of medicine and surgery, for advertising and for salesmanship.

It might be interesting for you to review in a superficial way some of the instances where psychology performs a decided function in other departments in your own plant that are analogous to your own problems.

Several years ago the international correspondence school was spending thousands of dollars on an advertising campaign that was not producing results. A conference was called to find the "bugs" in their copy appeal. Their illustrations portrayed the idea of failure—a broken down old man or woman, an ill-furnished home—every element taught this lesson: "If you don't improve your present position this is what you are coming to." It was a negative appeal—the appeal to the instinct of fear by playing up failure. Some way this appeal did not get over with the public. Here was a problem in practical psychology: "Is an appeal directed toward the desire for reward more powerful than one directed to the desire for success?" They changed; the experiment proved successful, as you know. Imagine Siddall, editor of the American Magazine making his excellent publication a chronology of failures—as does the daily press—would it succeed? This is a problem in the psychology of appeal. The National Safety Council are using fear copy, so-called, and very effectively; but an analysis of reactions, a survey by experiment might prove that the constructive illustration is more powerful. Don't you see how this fundamental issue becomes interesting and applies in every phase of your work? And it is based on psychological laws—laws of common reaction and behavior?

Last week I had the pleasure of looking at some wonderful oil paintings at the studios of the Charles Daniel Frey Company of Chicago. The paintings were to be used for advertising illustrations and each one was subtly built upon an idea, the idea selected to appeal to a dominant instinct or emotion in human nature. It was wonderful to observe the cold application of the laws of psychology to commercial art. One picture especially interested me. It was dominated by two characters, an old gray-haired gentleman and his wife. They were at the twilight of life, sitting peacefully before the fireplace hand in hand, lost in happy reminiscence. The whole picture conveyed the impression of a well-provided-for old age. It gave me a shock when I thought of my savings account. Was I making a life provision? The emotion is common to us all. The ad. was to be used by a metropolitan bank.

Safety men must understand the mental machinery of the men they are trying to reach. You have to get the employee to save *himself* and how are you going to "sell him on the idea" without using the most effective tool of modern salesmanship—practical psychology. You have to get every employee's name on the Dotted Line and it's a harder selling proposition than selling commodities. You are selling a staple not a specialty. There is no price appeal. You can't let them return the



goods. You must take a prospect uninterested and often prejudiced with carelessness and build an idea up in his mind and so influence and direct his thought and its expression in action, that he will do as you say. It's a selling proposition from the start, and how are you going to do it unless you know the structure of that mind which you are trying to influence?

For me to attempt to discuss in twenty minutes the scope of safety psychology reminds me of an incident that occurred in college. When I first began to learn a little something about literature, I attempted to display my knowledge in an erudite group of young professors by asking what they thought of "Les Miserables" which I had just read. Like a flash one of the them came back with "What do I think of the Universe." I was squelched for all time.

The possibilities for developing a practical psychology of safety within the National Safety Council are unlimited. Such a psychology should come from all of us as we find its application in safety engineering. It presupposes a knowledge of the fundamental laws of psychology and a resourcefulness in applying those laws to our own particular problems.

#### PROBLEMS IN INDUSTRIAL PSYCHOLOGY

Let me suggest some of the problems which occur to me:

1. When is it necessary to change a man's job in a factory when he has so mastered the operations that he ceases to attend to them and becomes careless?
2. At what period in the experience of a green employee is he unconsciously the most careless?
3. Does the stimulation of interest in a task increase or diminish the danger of accident?
4. When is carelessness due to poor eyesight and when due to poor attention?
5. Is it practical to test motor control in dangerous employments?
6. Is the danger incumbent with fatigue due to exhaustion or to mental incapacity and co-ordinated nervous control?

To illustrate the possibilities of such an activity on the part of the National Safety Council, I might analyze two of the problems in more detail. However, this is only a step forward and I hope that this organization will discover a method to carry forward this work in an exhaustive manner.

#### THE SCIENTIFIC BASIS OF CARELESSNESS

When a man deliberately steps into the street directly in front of a moving automobile and is injured, bystanders assign carelessness as the cause of the accident, whereas the real basis for his apparent lack of judgment may be buried deep in his nervous system. Thousands of accidents of a similar nature which occur every year and appear to be preventable are in reality caused by a physiological condition over which the victim has no control. A nervous reflex located in the muscle often

is more powerful in an emergency than man's higher brain centers, and is at all times a treacherous asset.

To carelessness is assigned the majority of industrial accidents, which total alarming figures, notwithstanding the advance in the science and art of safety engineering. When is a preventable accident due to carelessness, and furthermore, when is a man actually careless? With analysis it will be found that the instances are rare when an employee who has been injured or killed has failed to "care" for his safety—statistics to the contrary notwithstanding.

Briefly stated, in a careless moment the attention becomes fixed and the judgment suspended because all of the controlled motor activity of the nervous system is held in abeyance during a period while a set chain of habits is running its course. The period may be but an instant of time or it may be several minutes; in any case, of sufficient length for a sleeve to be caught or a punch-press to fasten the hand. The sensory nerves are functioning, messages of warning are flashing to the brain-centers; but reaction is delayed.

Did you ever start to change your collar before dinner and find that you had, from force of habit, removed several other articles of apparel before your attention was arrested? Have you ever gone to the bathroom for a drink of water to find yourself a moment later with a razor in your hand? You can find any number of instances from these suggestions wherein daily you perform some act deliberately and find yourself in the midst of a second or third act that has by habit accompanied the first. A prominent industrial surgeon told me that occasionally men burned themselves with apparent deliberation, the movement that produced the injury being a unit in a habit-series. A man operating the levers of a crane, pouring a heat, oiling a lathe in motion, driving an automobile, or crossing a crowded thoroughfare, may at a dangerous moment continue to act as accustomed by habit, thus occupying the nervous machinery with habit-chains which prevent conscious control. The more highly-skilled a workman becomes the more liable he is to such a lapse of attention accompanied by unconscious activity.

A correct analysis of the neurotic state of the injured at the time of the action would charge the responsibility to *skill* rather than to *carelessness*. The man has relegated to the lower brain centers control of the thousands of acts that function in series. The automatic connection that is made between separate acts in serial action sets in; although valuable as skill, it may prove to be his undoing in an emergency. To perform one act touches off the series. Animals are not careless—they are always at attention, being unencumbered with automatic complex muscular co-ordinations.

What is there about the function of our nervous system that creates the serial action or chains of habit? Curiously the organ that furnishes the link in the chain is located in the muscles. It is a man's sixth sense. The movement of a muscle stimulates nerve end organs located beneath muscular tissue. The end-organ here transmits the stimulus to the

sensory nerves. The nerves carry it to a nerve center, which redirects the message, transmitted over the motor nerves to the muscle and a second act results. The same process may act and react indefinitely until the action is performed. For instance, one sees that a steel cylinder has been cut to the mark on a milling machine, an arm moves to stop the carriage, the movement of the arm muscle stimulates the muscular sense which "touches off" a leg movement to kick open a switch to stop the motor, the kick sets up a nervous transmission that moves the arms to release the piece of steel, etc. This repeated a hundred times becomes automatic, habitual, unconscious—the sixth or muscular sense furnishing the connecting links. It is then easy to conceive of a number of situations where men have been injured due to an extra uncontrollable movement in a habit series.

One solution for the problem of "Injury Due to Carelessness" would be to change an employee's environment in the shop occasionally. To allow a man to work too long at one machine with one series of actions jeopardizes his safety. He becomes a slave to habitual co-ordination. Safety-first signs must be changed frequently in design and effectiveness. Their particular location should not be constant. To teach safety is to make a man a better animal—to break up a tendency to nervous plasticity and to make habits more flexible.

#### THE CRUCIAL WEEK FOR THE GREEN EMPLOYEE

Men often get discouraged and quit the first month on a new job and do not analyze the cause of their failure. This angle aims to discuss one universal reason for discouragement and failure in commercial and industrial life. A green man often labels himself as "Incompetent" because he doesn't understand the nervous readjustment that accompanies any change of occupation, nor does he foresee the crucial moments in this readjustment.

Every man in every occupation makes mistakes at the start. This is nothing to his discredit, providing he has profited by them and rearranges his mode of conduct so as to prevent the same mistake twice. The man higher up always extends the privilege of making one mistake; but woe to the man who continues to repeat it. Repeated blundering soon catalogues an employee as incompetent and he is fired or is relegated to some niche of mediocre service where his mistakes are not costly.

However, every man has had a week, we'll say the third, when everything goes dead wrong. If they all had backbone enough to "stick" in spite of it, this discussion would miss fire; but thousands quit, only to swell our vast American army of floaters, lowering the standard of efficiency in every occupation. What is there about the third week that is unquestionably critical?

The routine of new work necessitates the formation of new habits. The process of habit formation is essentially physiological as any other function of our material bodies. It has its basis in the most highly

organized mechanism of man, the nervous system. The sense organs, coming in contact with the world about us, receive impressions. These impressions are transmitted to nerve centers in the brain or spinal cord, and action results. If the message transferred is dependent on the brain for interpretation, the process is conscious; if the process is reflex, a lower brain center, perhaps the spinal cord, handles it with no thought on our part. To form a habit is to transfer the circuit to a lower brain center and relieve the higher mental faculties for new work. The transfer takes place after the same pathway has been used so often that a stimulus meets no resistance when it excites the nerve ending.

Nervous tissue is very plastic and readily yields to repeated stimulation. But from the time we start to form a habit until it is absolutely part and parcel of our body, there are dangerous pitfalls for the individual. The most critical time is when we must judge whether or not we can trust the lower nerve centers to carry out our work. Too much new stimulus forces us to crowd unripe habits into the subordinate centers of control. What happens? They function inefficiently, we make mistakes, call these new habits back to consciousness, confusion results, and we get discouraged.

Learning to operate a typewriter, an adding machine, a lathe, a crane, or anything else, means not only one readjustment, but thousands; hence the significance of the problem. We must not try to let our new habits do the work before they are grown-up. If an employee can cross this plateau of uncertainty in forming new habits, the battle is half won. If an employer can understand the stress and strain of this period for the employee, he will often develop a valuable man instead of losing his temper and firing him.

If a learner, strive to attend to the routine until the habit is thoroughly ripe; if an employer, take the "third week" into account and help the green man.

CHAIRMAN TOLMAN: I hope next year will see the organization of a section on psychology in industry.

#### DISCUSSION

MR. FRANK E. MORRIS (Syracuse, N. Y.): I think Mr. Colcord has said that cases are rare where the employee has failed to care for his safety. I want to take exception to that because (I don't know very much about psychology. I will admit) I find in my experience that the employees have failed to care for their safety. A great many of them fail to do so.

I want to cite an incident in my experience and then find out why it happened the way it did. A man was pushing a block over a planer; his boss was standing about four feet away from him and saw that he was going to trim his fingers off. After the accident, I asked the foreman where he was at the time and I was surprised to learn that he was in reaching distance of this man. I said, "Did you see the accident?" He said, "Yes, I saw the man shoving his fingers over on to the planer." I said, "Why didn't you stop him?" He said, "I couldn't."

"Why didn't you say something?"

"I couldn't. I tried to holler at him and I couldn't."

"Why didn't you grab him?"

"I was frozen to the spot."

How much does fear paralyze our muscles in a case of that kind and how much of it is due to the action of these nervous reflexes that you have been talking about? It seems to me that a lot of these accidents that are, as you say, Mr. Colcord, due to skill and not to carelessness ought to be eliminated in the training. The man was careless when he was learning to be skilful in that he didn't learn to take care along with his skill. How much does fear have to do with paralyzing our actions in cases of that kind and how much of it is due to this series of actions that must take place through these nerve ganglia or nerve ends of the muscles?

MR. COLCORD: When I say that all employees care about accidents, I admit that I was putting it a little strong.

I have started out every time not from a textbook but from observation in the factory. We had a side press in our factory. There was a lever on one side that the press was operated with and a man got his hand caught in there. We had a side lever put on the other side and it was necessary to operate it with both hands. A week after that he had the left hand of the lever tied down. A couple of weeks before a man had had his hand taken off. Maybe it was due to ignorance.

I won't attempt to answer how much paralysis is due to fear or chain of habits. I think there are times when a man is so scared that he can't control himself.

CHAIRMAN TOLMAN: Isn't the principle involved there the same one that is involved when a person leaps off of a high place, or when learning to drive an automobile the thought crosses his mind that he may run into that telegraph pole if he is not careful and he forthwith steers exactly straight towards it? Isn't it possibly a sensation in the mind so intense as to cause a fatigue which renders the consciousness less able to overcome the habit train? I have in mind the possibility of something analogous to that that we have in the eye whereby staring intently at a bright light or object fixedly for a moment and then turning to a dark area on the wall and looking at that causes us to see that which was a bright object in outline as a dark object relatively on the wall, because in looking at the light intently we have fatigued a certain area of the retina and when the whole retina is uniformly stimulated, that area which has been fatigued does not respond as vigorously as the rest and we get relatively a dark area.

MR. COLCORD: Very often fear is produced by arousing instincts which touch off a motor activity.

MR. MORRIS: I am intensely interested in this proposition because I think that it is very fundamental. We go at this problem of preventing accidents and we go out in the shop and talk safety first, but do we know what causes the accidents? I really hope that some time I will get hit by an automobile; I have got it all figured out just what I am going to

do if I get caught out in the street with an automobile bearing down on me when I haven't got a chance to jump away. I want to try out this man's theory. I think it is sound. I think it is good. I think I am going to jump up and step on the bumper and then on the hood. (Laughter.)

MR. BONSB: I have been very much interested in psychology as regards accident prevention. Five or six years ago I taught psychology, and they said I was nothing but an impractical college fool. I have learned that in order to stop accidents you have to know the causes. That is a fundamental basis among safety engineers. We have always heard the word "carelessness." I don't think carelessness exists in the cause of accidents, but in the place of carelessness I do believe you should consider the factors of thoughtlessness, rashness, inattention, and ignorance. Under those heads you can class most of the accidents and you are putting them under the proper classification and it will be much easier for you to eliminate the causes instead of simply calmly waving the hand and saying, "That man is careless." Why not find out whether he is thoughtless. If he is thoughtless, then try to bring about means to make him more thoughtful. If he is naturally rash, then there is practically nothing you can do, and the best thing is to get rid of that man. If it is a case of inattention, then you have to bring about means of increasing his interest so that he will pay attention.

Some of the impulses regarding accidents were very vividly brought to my attention by seeing a man killed. He was passing a building in the course of construction. Just as he was passing they were raising a bunch of lumber and something came loose and the lumber fell. The man above yelled, "look out!" That man immediately stopped to see why he should look out. The result was that he was killed. That was a little psychology. If the man above had yelled out, "Look out, there is something falling," the reason would have been given and he wouldn't have stopped to see why he should look out. That is a sample of going at the thing psychologically.

I would like to ask Mr. Colcord whether he considers the appeal to the man the acquisitive instinct or the instinct of preservation, whether by being safe they are going to continue to live on earth or whether they are going to gain something by being safe, also whether the acquisitive instinct is greater than the creative instinct of man. There is something that involves a principle of which you could make great use if you could find out which is the most powerful. If you can put those instincts to work you can get much better results. I might illustrate that by the use of bulletins. One of the fundamental instincts in man, I think, is the ability to recognize the unusual. We exist here today by virtue of the fact that our forefathers recognized the unusual. Therefore, anything unusual we notice, and that principle could be made use of by changing the types of bulletins and the position of bulletins.

Another psychological principle in bulletins is the fact that the human mind hates to start a thing that it doesn't finish. The continued story is based on that principle; the serial in the movies is based upon that principle, and anything that a man can't finish he doesn't start. When he sees a bulletin board filled with seven or eight bulletins, the man says, "Hell,

I haven't got time to read all that!" In trying to make bulletins effective I have tried to apply those principles of psychology. I got the idea from studying psychology and I wanted to try it out, and it works.

The reason I know it works is this: When we had a bunch of bulletins on our boards, in an offhand way I would go up to one of our men and ask him something that would necessitate his having read the bulletin to be able to answer it. He would look at me in a funny manner. Then I took away all the bulletins and put up one. I went up to another man and he had seen it. In simply passing by the board he had grasped the message. There wasn't too much effort entailed in his reading it. The human mind can't grasp more than one object at a time. Maybe there are some supernatural beings that have a greater grasp, but the average human being can only get one idea at a time. These are only illustrative principles showing the practicability of psychology.

MR. BURKE (Toronto, Ont., Canada): I think that this Section is one of the most important of the Council. The first thing we would try to ascertain after an accident happened would be what caused it. There was a reference made in Mr. Colcord's paper to a comparison. I think, between men and animals. Why is it that the instinct of man is not as acute as it is in animals? You know, as a matter of fact, an animal will safeguard itself against accidents. Take the fox as an illustration. You hear the term "foxing" used frequently. You undertake to hunt the fox and you have quite a time finding him and catching him. The animal itself seems to have an instinct of safeguarding itself.

#### ELIMINATE THE WORD "CARELESSNESS"

I think one thing we ought to do is to drop that word "carelessness". I don't believe there is a man who is sane that will permit himself to be injured. I believe that if you investigate the cause of every accident, you will find something remote was the cause—remote from the man's immediate work. When an accident happens we try, if possible, to ascertain where that employee's mind was at the time he was in the accident. The employee comes to work in the morning; the employer or safety engineer doesn't interrogate him and ask him if he had a full night's rest. He doesn't ascertain whether he had a quarrel with his wife or members of his family in the morning. He doesn't find out whether he is troubled over trying to pay a mortgage or a doctor bill or something of that kind. If there is a clock on the wall and it strikes, and three minutes after it strikes you ask the employees or the office staff what time it is, they can't tell you without looking at the clock because their only interest is in, say, five o'clock or whatever time they quit. Those things are put on us, we become used to them, and these accidents overtake employees in just that way. If we are going to eliminate accidents we have got to eliminate the word "carelessness" and ascertain where the man's mind was when the accident occurred.

I believe this is one of the most important features of this paper. There is no use of our becoming a judicial tribunal and condemning the man and saying "This is carelessness."

MR. BONSB: The reference to the state of mind is very important. One of the worst accidents that I had occasion to investigate I found was due to a quarrel the man had with his wife that morning. He was so worried as to how he was going to square himself with his wife that he had his mind completely off the job and he was injured. Based on that principle, I think the safety engineers should go after the wives. (Laughter.) It is serious, Gentlemen, it isn't funny at all. If you can show the women the importance of sending their husbands to work with a smile so the men can go and earn the bread and cheese or bread and butter, or whatever they eat, with a clear mind, you are going to eliminate accidents. I know from experience. Have monthly meetings for the wives and daughters and sweethearts of the men. Get them together and explain to them the influence which they have and what they can do to keep the man on the job. That is applied psychology. Women as a rule have a one-track mind. If you get them running on safety they will put all their energies in that one direction. I am really serious about this. Go at this earnestly and find out how the men under you or the men with whom you are working are living. It will go a long way toward eliminating accidents.

MR. L. A. DEBLOIS (E. I. du Pont de Nemours Co., Wilmington, Del.): Some years ago I had occasion to make tests—some thousands of them—on the quickness of response to physical stimuli on a number of individuals—about ten or twelve. What we did was to measure the exceedingly small time element that occurred between the ringing of a single-stroke bell and the pressing of a telegraph key by the person under the test. They were told, of course, to press as soon as possible after the ringing of the bell, and the bell was not rung at any certain interval. It was a surprise test in every sense. The records were rather uniform.

One morning one of the men who was ordinarily rather steady in his record and had made a very quick response, showed a surprising record. I think we made twenty readings. They were the most erratic readings of any that I have ever seen. They were up and down, some of them exceedingly slow and some of them exceedingly quick. I asked him, when he got through with the test, what happened before he came. He said to me, "My boss gave me a hell of a calling down." He came in after lunch and we took the test again before I asked any questions, and he showed perfectly normal reaction. I said, when the test was over, "How are things going now?" He said, "Oh, well, I had another talk with him and I found out that he didn't mean exactly what he said. It's all fixed up now and I feel fine." That same quickness of response or slowness of response or erratic response is what, in a great number of cases, is responsible for accidents, I am sure.

MR. WILLIS MACLACHLAN (Consulting Engineer, Toronto, Canada): I think that the Engineering Section is to be congratulated upon having a subject that is not along the physical line discussed. I think our engineering associations have been too long dealing with the physical and not with the human or the psychological response. This matter of carelessness, of blaming it on the man, I think, has been ridden to death. I



think that a great number of cases are due to man failure, but who is the man that failed? Was it the man who was hurt that failed? I think that possibly we may, after hearing the paper and learning something of the psychology of habit, know that for some reason we are indifferent in getting our designing engineers to change their old ideas and bring them up to date. The engineer not specializing in accident prevention should be gone after to bring his designs more up to date.

CHAIRMAN TOLMAN: We will take up the next paper. I am sure we are all in accord with what Mr. MacLachlan has said. I will say that we have started a most profitable line of work in having begun consideration of the psychological aspect of accident prevention. Mr. Kershaw is going to follow this up with an address on "How to Check Plans and Specifications for New Buildings and Equipment".

## HOW TO CHECK PLANS AND SPECIFICATIONS FOR NEW BUILDINGS AND EQUIPMENT

S. H. KERSHAW, SAFETY ENGINEERING DIVISION, HERCULES POWDER COMPANY, WILMINGTON, DEL.

When the safety engineer takes a few minutes off to float around in the higher refinements of his profession, one of the things he is almost certain to run into is that weather beaten question of whether or not it is engineering revision, mechanical protection, or educational work that will net the best returns in human life and limb rescued from the hazards of industry. If he should by chance so concentrate his thoughts on it as to stretch it beyond its elastic limit, the chances are it will break and open up to him a new vision in which he will see pictured a designing engineer pondering over the plans of new buildings and equipment, and holding within his power the creation of the most dangerous conditions that could exist in the industrial world today. Upon his return to earth, however, it is certain that he will realize that designing engineers are as a rule genuine human beings with red blood in their veins and are not the kind who would intentionally expose their fellow men to accidental injury or death. For the most part they voluntarily apply all the safety principles of which they have knowledge. This is undoubtedly true, yet the complexity of modern industrial engineering and operating details is so enormous that one man cannot possibly specialize in all of the things that must be considered in laying out up-to-date plants, and so the designing engineer is apt to unthinkingly create with his pencil unsafe conditions possessing the most serious possibilities. It is a condition that cannot be avoided and it accounts for the fact that the progressive engineering departments of industrial concerns arrange their work so that they function as groups of specialists in the more important engineering sciences working in such harmony and so checking up each others work that the products of their combined efforts will be safe and efficient plants capable of producing

articles useful to civilization and of returning dividends to those whose financial support makes possible their construction.

In the modern industrial engineering department the safety engineer has one of his most important duties to perform. Working in close harmony with all the other engineering specialists of the department it devolves upon him to bring to light and have corrected the unsafe conditions that may appear in plans and specifications because of the fact that the other creative minds that have been working on them have not been able to comprehend all of the things that might happen when the plans materialize. There is nothing that could call into action his utmost thinking capacity and imaginative power more than this branch of his work, and there is nothing that he can do that is more important. If he has a broad knowledge of engineering subjects, can recall conditions surrounding many of the accidents he has seen or heard about, has studied the prevention of accidents from all angles, is able to read blue prints, is familiar with state and federal safety requirements, and knows a great deal about the operations that are carried on by his company, this plus a liberal experience in the other branches of safety work should fit him for the work of checking plans and specifications.

Paralleling the checking of plans and specifications with the work of inspecting a plant in operation it is obvious that the most logical method of procedure is to start where the raw materials enter, follow the process through and wind up where the finished products leave for their onward journey beyond the plant boundary. In no case, however, is it advisable to start without a knowledge of the operations as they are planned or actually in effect. There are sometimes cases in which there exists an uncertainty as to the exact operating practices that will ultimately be followed when the buildings and equipment are provided, and these will require special treatment but for the most part the safety engineer can obtain a knowledge of conditions as they will exist and he can then trace them out through his study of plans and specifications. If he is about to study the blue prints of a chemical plant building, power house, or like structure, he will find invaluable the use of colored inks or pencils for use in marking the pipe lines, electric circuits, and the like, in order to follow them more clearly from their sources of origin to their destinations. It is however, of utmost importance that he start his work at the time the design work originates, following each drawing as it progresses so that the necessary safety alterations and additions may be introduced as the drawings materialize. Unless this is done the chances are that he will find it impracticable to ask for changes in the fundamental arrangement of things when the tracings are ready for blue printing. This is particularly true on rush work wherein a few hours delay in the preparation of the drawings may mean a few hours idleness of several hundred construction men in the field.

It is invariably true that a fellow can, when he understands a situation reasonably well, accomplish more by putting his own thoughts down on paper and letting the other fellow pick them to pieces than he can by consulting the other fellow in advance. It is therefore an excellent plan

for the safety engineer to put his own thoughts concerning plans and specifications in writing when he feels he understands them reasonably well and then confer with the other engineering specialists or designing engineer. This should be done with an open mind for he would be foolish to attempt to uphold a point which originated in his mind when the other fellow has explained very clearly that he used the wrong reasoning in determining what should be done.

At this point one meets with a principle that means more than anything else in this branch of safety engineering. While the safety engineer is primarily striving to secure a specific result in doing this work, namely to see that the plans and specifications embody all the necessary safety features, yet he has a most excellent opportunity to "kill two birds with one stone," and perhaps the "other" bird is the more desirable one. Referring again to plant safety inspections, one would be unwise if he failed to recognize the fact that a safety inspection may produce a very desirable educational influence among the plant men or it may cause them to become momentarily antagonistic to all safety work according to the manner in which the inspector does his work. One of the greatest mistakes that is often made is that of overlooking the pride of authority possessed by most foremen and department heads. Let an inspector enter a department in a plant and go about his work without first consulting the man at the head of that department or in charge of a particular part of it, and he may forever find himself "in wrong" with that man and without his co-operation it would be next to impossible to exert the desired influence upon the men under him as he would in all probability become an obstructionist. This same thing applies to a drafting room or an entire engineering department only in a higher degree. The relation of the designing engineer or chief draftsman to the draftsmen who make the drawings, and the estimators who may estimate costs and prepare specifications, is usually such that it does not behoove the safety engineer to attempt to apply his work by direct contact with those who carry out their instructions. He will find that it pays to leave it to the man in charge to do the instructing unless he makes a special request for an outsider to supplement what he has already done, or is planning to do in the future.

The foregoing is somewhat of a generalization of the subject but it is not well to discuss the details of such a work without first saying something concerning the manner of approach.

When the safety engineer feels that he has established the proper relationship between himself and the various members of the engineering department, and is about to review plans and specifications he finds it necessary to summarize in his own mind the things to look for. Such a summary of course varies with the kinds of buildings and equipment that are being planned, but there are certain fundamentals that apply to all and the following list of hazards to look for should prove valuable as a partial check list:

1. *Insufficient Clearance*

- a. Between machinery parts where operators body or limbs might be squeezed.
- b. Between moving parts of machinery and stationary objects near-by.
- c. Between moving parts of machinery and the protective guards around them.
- d. Between railroad cars running on parallel tracks.
- e. Between railroad cars and stationary objects near-by.
- f. Between working floors and platforms and apparatus machinery, and structural parts of buildings above them.
- g. Between hazardous electrical equipment and grounded metal objects near-by.
- h. Between moving platforms, cars, or machines on which men may stand, and stationary objects near-by.
- i. Between trucking runways or passageways and positions in which operators perform their tasks.

2. *Overloads*

- a. On floors and platforms
- b. On roofs
- c. On structural supports for machinery and apparatus
- d. On beams used for hoisting purposes
- e. On hoist cables, chains and ropes
- f. On hoisting drums and pulleys, and their fastenings

3. *Weakening of stressed apparatus and structures through exposure to external injury*

- a. Due to absence of drip troughs or pans under apparatus and pipe lines in which corrosive chemicals are handled
- b. Due to unnecessary exposure to corrosive fumes and vapors
- c. Due to apparatus involving explosion hazards being placed too close to important structural supports

4. *Falls of persons and materials*

- a. Because stairways are not built at proper angle or treads and risers not well proportioned
- b. Because of failure to provide railings at edges of floors or platforms
- c. Because of failure to protect against floors and steps becoming slippery
- d. Because toeboards may not have been provided for at open edges of overhead floors and platforms
- e. Because of failure to provide permanent ladders and platforms to give access to out of the way places where men will be required to work, thus necessitating the use of portable ladders and scaffolds
- f. Because of failure to allow proper factor of safety in computing strength of structural supports, hoist cables, and the like
- g. Because of failure to provide overhoist cut-outs (mechanical or electrical) on cranes, hoists, elevators, and the like

5. *Obstructions*

- a. Which form stumbling hazards on floors, platforms, and foot-paths
- b. Which project into passageways at a height which would cause injury to any one running into them
- c. Which obscure vision of persons, and vehicles at corners and like places

6. *Slides of materials in hoppers and bins*

- a. Failure to provide means for working down materials from positions outside the hoppers and bins
- b. Faulty design of sloping side walls so that materials will not flow properly

7. *Insufficient Illumination*

- a. At individual machines and apparatus
- b. In frequently used passageways and at stairways
- c. Where materials are regularly handled
- d. At pressure gauges, and other similar measuring instruments requiring constant watching for safety
- e. Generally throughout buildings and yard areas
- f. Where persons are required to step on and off vehicles

8. *Excessive Speeds*

- a. Of pulleys and flywheels
- b. Of grinding wheels
- c. Of power transmission belts and ropes
- d. Of passenger and freight elevators
- e. Of traveling cranes
- f. Of industrial plant railroad locomotives

9. *Excessive Pressures*

- a. In boilers
- b. In hot water heaters
- c. In air receivers
- d. In all kinds of chemical apparatus as for instance stills, blow cases and auto claves.
- e. In steam and air lines and traps

Note: Pipe connections are not infrequently arranged so that high pressure originating at one point may by accident communicate to apparatus not designed for high pressure.

10. *Gas and Dust Explosions*

- a. In tanks and portable containers for volatile liquids
- b. In special chemical apparatus wherein sudden violent reactions may occur
- c. In buildings where coal and grain dust and dusts from other similar materials may accumulate
- d. Within apparatus where dusts originate or are handled
- e. In oil switch and circuit breaker cases

11. *Panic hazards and traps*

- a. Through failure to provide good egress facilities in assembly

rooms or in work room where flash fires, explosions, or serious steam, fume, and gas leaks may occur

- b. Failure to leave passageways to exits free from permanent obstructions
12. *Exposure to gases, dust and fume laden air, and to industrial poisons*
  - a. Through poor arrangement of windows and ventilators
  - b. Failure to provide fume, gas, or dust exhaust systems or to provide adequate ones
  - c. Through failure to equip apparatus with adequate vents terminating outside the workroom
  - d. Through arrangement of machinery and apparatus requiring too much handling of materials in the open
  - e. Through design of equipment requiring operators to handle poisonous substances with their hands unnecessarily
13. *Improper arrangement of mechanical and electrical controls*
  - a. Operators unable to reach machine control levers from operating positions
  - b. Absence of latches-on belt shifters to prevent belts creeping to tight pulleys
  - c. Absence of locking arrangements with which to lock controls while working around machinery or apparatus
  - d. Location of hoist controls where operator does not have clear view of the load or signal men
  - e. Absence of warning gongs, lights, or whistles where remote controls are used for hazardous machinery
  - f. Absence of interlocks on elevators
14. *Improper control of chemicals due to:*
  - a. Valves and cocks not indicating whether open or closed
  - b. Pipe lines arranged so they cannot be easily traced
  - c. Pipe lines not being painted distinctive colors
  - d. Inadequate supply of indicators such as thermometers, pressure gauges, and sight glasses
  - e. Important control valves being placed beyond reach of operator, or so widely separated that he must lose valuable time reaching them in an emergency
  - f. Insufficient number of valves where a single valve giving way would give rise to a hazardous condition
  - g. Lack of provision of safety cut-offs (Pipe joints that may be easily disconnected) at points where the accidental introduction of a chemical would cause a violent reaction
15. *Unguarded Machinery such as:*
  - a. Power transmission belts, ropes, and chains
  - b. Pulleys, sheaves, and flywheels
  - c. Revolving shafting
  - d. Projections on revolving or reciprocating machinery
  - e. Reciprocating or revolving parts of machinery that come together close enough to crush or tear parts of body

- f. Cutting edges
  - g. Parts from which molten particles, sparks, or hard particles may fly
  - h. Large reciprocating parts of machinery
16. *Exposure to catastrophe hazards*
- a. Through failure to segregate buildings and equipment possessing serious explosion or flash fire possibilities
  - b. Through failure properly to protect one building from another where serious explosion or flash fire possibilities exist
  - c. Through failure to arrange extra hazardous buildings and equipment so that only small numbers of employees are exposed at each point of hazard

The foregoing is not a complete list of all the things that must be considered by the safety engineer in checking plans and specifications, but it will serve to give a fairly comprehensive idea as to the field there is to be covered. It is practically unlimited and requires not only a specific knowledge of the more important engineering sciences, but also a knowledge of the sources from which to secure information relative to safety matters as such information is needed. There are of course the various standard engineering handbooks and a few good reference books devoted to safety exclusively. The valuable services rendered by such organizations as our National Safety Council, The Safety Institute of America, and the National Fire Protection Association are frequently overlooked. These organizations maintain excellent libraries and the sources of information made possible by large lists of members are practically unlimited. The minutes of the Annual Safety Congress are full of valuable data and suggestions for the safety engineer, and he is unwise if he does not use them for reference purposes. In addition there are the insurance companies that have accumulated valuable data, the various departments of our Federal Government—as for instance the United States Bureau of Standards, which has made thorough detailed studies of certain safety matters, and the state departments of labor and industry, all of which are liberal with the safety data they have accumulated. Then also there are the Underwriters' Laboratories Inc., who make it an important part of their service to pass judgment on the various safety appliances offered for sale so that those who are about to install such appliances may be sure that they are equipping their plants in a way that would meet with the approval of their insurance carriers and at the same time provide for the maximum of safety.

The development of engineering standards is an invaluable aid to the safety engineer in his work, and he should consider it an important duty to take on the responsibility of developing safety standards for his company. To do this, it is necessary for him to work in close contact with the other engineering and operating specialists and in so doing he takes advantage of a splendid opportunity to get his safety ideas across to those who can apply them in their daily work. This has an additional advantage for if the standards are applied voluntarily to original draw-

ings and specifications it makes unnecessary duplication of work when they are checked for safety features.

Not much has been said in the foregoing paragraphs which would relate exclusively to the checking of specifications because that and the process of checking drawings are so interlocked and are so nearly alike that what is said of one nearly always applies to the other. It is not amiss, however, to say that the safety engineer should establish just as close a relationship between himself and the purchasing agent as he should with the designing engineer for the purchasing agent is often granted such wide limits to work in that unfamiliarity with the best practices from a safety standpoint, or a slight oversight on his part might easily result in the purchase of materials or equipment that would present serious dangers. In this connection however, there is an important thing to be remembered, namely, that manufacturers of machinery and finished materials have not all acquired or applied the spirit of safety and some that have, have not yet had sufficient experience in that work to do it the way it should be done. In such cases it is up to the safety engineer to determine whether or not it is advisable to insist upon a machine, for instance, being fully guarded by the manufacturer, or whether a certain amount of the work should be handled by his company under his direction. Very often the latter arrangement is better from a practical standpoint even though it is somewhat contrary to the good principle of trying whenever possible to convince the manufacturers that there is a real market for safe machinery and materials.

In all of this it is of the utmost importance that the safety engineer have a thorough knowledge of the monetary side of his work. Not only is it important that he protect his company from the embarrassment that is certain to result from failure to comply with state and federal safety requirements but he must also take into account the savings that may be affected through meeting the requirements of the insurance carriers if his company does not carry their own insurance. No one can dispute the fact that safety in all its many forms is a paying proposition. The fellow who fails to take advantage of every opportunity to make what he knows a positive saving for his company, is falling down on the job. Like many doctors two safety engineers may have ideas concerning a specific subject that would remain entirely different even if put into a furnace and melted together, only one would probably be drawn off as slag. However this may be, when one does not believe that certain insurance company requirements will measure up to the one hundred per cent mark in results, but can do no harm, he should remember that if by putting the requirement into effect he can secure a twenty dollar reduction in the annual premium paid by his company, an expenditure of one hundred dollars to do it is a pretty sound investment.

In conclusion it is not amiss to say that the fellow who is reading a set of plans or specifications, pictures in his mind just what the conditions will be when they materialize, and then proceeds to treat those



conditions as if he were actually making a 100 per cent safety inspection of the buildings and equipment, by applying every ounce of his safety knowledge and experience, will not go far wrong in his efforts to secure the desired results.

CHAIRMAN TOLMAN: Before having discussion on this paper, I would like to ask if the Nominating Committee is ready to report.

REPORT OF NOMINATING COMMITTEE

MR. H. E. SOMES: We recommend the following:

Chairman, L. A. DeBlois

Vice Chairman, B. F. Tillson

Secretary, S. J. Williams

Assistant Secretary, F. M. Rosseland

Executive Committee, terms ending 1921:

H. W. Forster

G. T. Fonda

H. A. Schultz

Terms ending 1922:

F. P. Sinn

D. S. Beyer

E. B. Tolsted

Terms ending 1923:

C. R. Alling

G. E. Sanford

J. I. Barnash

(The nominees were thereupon unanimously elected.)

MR. SOMES: We also recommend that a Nominating Committee be appointed at the first meeting in January, 1921, and that they work up recommendations as to the officers of the Executive Committee for the year 1922.

(This recommendation was adopted.)

Mr. DeBlois took the Chair.

CHAIRMAN DEBLOIS: I have one ideal in mind and that is to make this an engineering section of engineers. In other words, I don't want to have it the engineering section of the officers but the engineering section of the great body of safety engineers who are members of the National Safety Council, to be run by them and for their benefit.

I am sure that that same feeling will be shared by the remainder of your Executive Committee.

I think unless there is other formal business to come up, we had better take up at once the discussion of Mr. Kershaw's very interesting paper. I know we are all interested in the functions of the safety engineer in relation to the design room, the drafting room and general construction design.

DISCUSSION

MR. TOLSTED: Mr. Kershaw's paper covered the subject so well that it is hard to add anything. There is one thing that I wonder whether the

engineers of this organization understand. That is the work of Underwriters' Laboratories. Underwriters' Laboratories do not examine devices that are for sale upon the request of any one, only upon the request of the manufacturer of those devices. That is a thing that frequently is not understood. The manufacturer of the device must submit his device to the laboratory and then, unfortunately, perhaps wait two or three or six months until the Laboratories have made a complete series of tests and examinations of the device before approval can be given.

Every one of you men who is likely to do the kind of work outlined in Mr. Kershaw's paper ought to have a list of the devices approved by Underwriters' Laboratories so when you really have the opportunity of purchasing one of those devices you will do so.

MR. KERSHAW: I would like to add that there is one thing that we are developing now in our company that I think is going to be very useful to us in checking plans and specifications. We are putting all of our personal injury records on tabulating machine cards. We are classifying every accident that is caused by a piece of equipment in our plant according to that piece of equipment. When it comes to reviewing plans or specifications of a certain kind of equipment, all I have to do is to run those cards through the tabulating machine and I can find out what our experience has been in hours lost and cost and so forth with that particular kind of equipment. I think it is going to be very valuable information.

MR. BURKE: I was very much interested in the paper read by Mr. Kershaw, but I have been wondering about the practicability of carrying out the various details recommended in the paper. We all know that the safety engineers and executive officers are changing about constantly. Next week you find an industry entirely changed and different from what it is this week.

MR. KERSHAW: In our company, the position of safety engineer is advisory. When he works with the designing engineer on plans or with the power engineer, or whatever engineer it may be, he makes his recommendations to them. He always puts them in writing, except, of course, the very little things that the designing engineer should have taken care of anyway. As long as he puts his recommendations in writing, the safety engineer is relieved of a certain amount of responsibility. No safety engineer that I know of today can absolutely force the company to do what he wants them to do, because he is usually employed by them and they say to him that they don't need his services any longer if he is going to become officious.

MR. MACLACHLAN: I might tell of a plan that has worked out very well in interesting the designing department, that is the creating of a committee on certain phases of the work, representatives of which are from the designing department, the operating department and the construction department. In that way, with the representatives of the accident prevention department sitting in, you will have the men convince themselves of the desirability of certain changes of design. We most thoroughly believe that the safety engineer, so-called, should confine his activity to that of advising and not get into the executive end of the work.

CHAIRMAN DEBLOIS: In the Du Pont Company it has been our effort, in handling the construction and designing work for safety, eventually to get to the stage where the safety engineer is called in as a consultant only for rather unusual or new conditions of design. It formerly required the presence of one or two men either in the drafting room or in the offices of the design engineers practically all of the time in order to check details of drawings, guards, railings, track, placement and so forth. Today, only part of one man's time is required, although there are literally hundreds of designs going through, for the simple reason that we have got our design engineers up to the point where they are really qualified safety engineers. They only call on us for matters somewhat out of the ordinary. We have given up trying to put on all drawing details of guards and railings. We have our standards and it is not difficult to make a note on the drawing. In a complicated building arrangement, for instance, you cannot show all guards or other safety devices. If necessary—take an engine room, for instance, where railing sockets should be placed before the concrete is poured—a special drawing is gotten out early in the game so it can go to the field practically simultaneously with the foundation drawing.

I think our idea is to educate others. Our field of education lies not only in the operating plants but it lies very distinctly with the designing engineers of our large companies and the draftsmen. There is no reason why the interest of those men cannot be developed and kept up.

There is one point that I would make, however. That is that it is not fair to expect real interest from the design men and draftsmen unless you tell them something about the accident hazard, the occurrence of accidents, the nature of accidents that occur. It is far too easy to assume that those men have an interest that isn't visualized in accidents. We have got to visualize that interest for them. Then and then only will we make our real safety engineers.

ADJOURNMENT.

# Grain Dust Explosion Hazards

DAVID J. PRICE

Engineer in Charge, Grain Dust Explosion Investigations, Bureau of Chemistry, U. S. Department of Agriculture, Washington, D. C.

## RECENT LOSSES

During a period of nine months at least six disastrous explosions occurred in industrial plants in the United States and Canada. These explosions resulted in the loss of eighty lives and several million dollars worth of foodstuffs and property. In some instances the explosions have taken place in certain industries where the dust produced during the operating processes had not been previously regarded as dangerous. In other cases a thorough investigation of each explosion developed new causes of dust explosions that had not heretofore been determined.

## INDUSTRIES AFFECTED

At the time of the origin of the dust explosion work now being carried on by the Bureau of Chemistry, U. S. Department of Agriculture, the study was confined entirely to explosions during the handling or milling of grain. The project was a development of the coal dust explosion work of the Bureau of Mines and was started, in that Bureau, largely as a result of the very great interest manifested by the milling industry. Naturally attention was directed to the investigation of explosions in grain elevators, flour mills, cereal plants, feed-grinding plants and similar lines of milling.

It became apparent, however, in the very early stages of the work that explosions were occurring in other types of industrial plants, causing large losses of life and extensive damage to our food supply. Explosions of this nature have taken place in starch factories, sugar refineries, cocoa and chocolate plants, spice works, wood-working establishments, paper mills and shoe factories. Reports have been received of explosions in other similar types of industries. A recent explosion of "aluminum dust" occurred in this State and attracted considerable attention.

From the results already obtained in this work it must be concluded that these dust explosions can occur in any industrial plant where explosive dusts are created during the manufacturing processes. It is, therefore essential that precautionary measures be adopted for their control and prevention.

is no reflection on any particular industry, and merely is advanced to indicate the very great importance of acquiring further knowledge regarding the circumstances under which these plant dust explosions originate and the methods that can be followed for their prevention.

#### DUST REMOVAL

When we talk of "dust explosion" in mills and factories we appear to many to be discussing a "mysterious" subject. It is no longer debatable as to whether dust will explode, scientific research has settled that part of the problem. There may have been some reason for the practical coal miner, who had spent his entire life in the mine, to question the possibility of coal dust exploding, especially in those mines where the highly flammable methane gas had previously been detected. It was probably not a case of doubting the explosion hazard, as much as the actual agent contributing to the explosion. But the Bureau of Mines has demonstrated to the satisfaction of the mining industry the dangers of "coal dust" explosions in the tests in the experimental mine near Pittsburgh. In the industrial plant however the "gas theory" cannot be so forcibly advanced and brings the dust into more prominence. Since it is a physical impossibility to have an explosion without some explosive agent being present, a dust explosion cannot take place unless the dust is present, and in sufficient quantities to "spread" or propagate flame. This makes very evident the necessity for the adoption of effective dust control and removal methods.

In many of the industries, this is an essential requisite, especially if the product is commercially valuable. This would apply to flour, sugar, starch, cocoa, and similar products where the price per pound justifies the collection of the material. This gives return for the installation and equipment required and also prevents the dust from escaping and spreading throughout the plant.

A situation exists at the present time however, in the terminal grain elevators by which it is not permissible to collect the dust by suction between the point where the grain is received and the point of weight. This regulation is based on the apparent loss in weight in grain by dust removal which produces complications between shipper and receiver. The enforcement of a regulation of this nature in the terminal elevators prevents any effective system for dust removal from being installed before the grain is weighed.

As a result of this requirement the dust escapes from the mechanical equipment and settles on inaccessible parts such as beams, girders, overhead machinery, and similar points. This presents a very dangerous condition unless the dust can be effectively removed by other methods. A slight concussion forces the dust into suspension and this assists in the spreading of flame from the original ignition.

Conceding the merits of the contention and granting that there may be a slight loss in weight, from the safety point of view it would appear that the matter could be adjusted. This would probably require sufficient experimental work for the design of special equipment giving the best

results in the removal of the lighter dust which tests have shown to be the more flammable.

Aspiration systems in grain elevators for dust removal have given at least two main returns for their installation that are of interest to engineers engaged in safety work. (1) Reduction in explosion and fire hazard. (2) Improvement in working conditions. In addition the reductions in the fire hazard is recognized by the insurance companies with corresponding reductions in rate.

This particular problem is of vital importance to dust control and explosion prevention in our large grain elevators, where recent disastrous explosions have occurred. Can we expect to prevent dust explosions, unless we remove the dust. Is it not possible to adjust the matter at issue, so the dust can be collected at every point where grain is either thrown or handled?

#### EXHAUST FANS AND DUST COLLECTING SYSTEMS

In many industries exhaust fans are installed in connection with the removal of fine dust from buffing or polishing wheels, grinding rolls, and similar equipment. In these installations as a rule the fine dust is drawn from the source of production, through pipe trunking, into the exhaust fan, and then blown into the collecting device. In a number of recent disastrous dust explosions the origin has been associated with the exhaust fan.

In an explosion of chocolate dust in a New England factory six lives were lost and \$1,000,000 property damage done, by the explosion which originated in the exhaust fan. An explosion occurred in a Western flour mill and one of the causes assigned was sparks produced by the exhaust fan slipping on the shaft. A very disastrous explosion of aluminum dust causing the death of six girls was attributed to metallic sparks produced by a piece of wire striking the blades of the fan and igniting the dust in suspension.

When the dust passes through the exhaust fan a flammable mixture is usually formed which explodes if the ignition source is present. Ignition may be caused by sparks from foreign materials striking the fan blades, or from the blades becoming loose. What can be done to remove this apparently newly-developed hazard? Can the position of the fan be changed from a location between the source of dust production and collection, to a position beyond the collector? In other words can we draw through rather than blow into the collector?

In connection with developing methods of dust explosion prevention as a result of an explosion in this State, the Industrial Commission of Wisconsin designed a system of primary and secondary air currents for dust removal.

The results of the investigation of the explosion and a description of the proposed installation appear in a recent issue of *Chemical and Metallurgical Engineering*. The proposed new system is based on the fact that aluminum and iron dusts, mixed and finely divided are highly explosive under favorable conditions.

1. The new system proposes to furnish a positive inlet for all air exhausted from the building, this to be provided for by an efficient ventilation system.

2. No exhaust ducts to be used (Induced on secondary currents of air required).

3. No exhausts used or no machine (through which air currents containing explosive mixtures are carried) in which moving parts are made of materials which could generate sparks.

4. By the elimination of exhauster and exhaust ducts this system largely eliminates the contributing conditions to the explosion hazards.

The Industrial Commission reports that tests and research work demonstrating the feasibility and practicability of the proposed system have already been made.

#### ELECTRICAL CAUSES

The investigation of recent disastrous grain dust explosions has directed attention to the electrical equipment and its relation to the cause of these occurrences. In this relation the incandescent electric lamp has appeared prominently. Explosions have been caused in some of the large industrial plants when the lamp bulbs were broken in dust clouds. This has been particularly true when extension cords have been lowered into dusty bins or introduced into elevator legs and similar operating equipment. Tests conducted in co-operation with the lamp manufacturing companies have shown that explosion of these dusts can be readily produced when the lamp bulbs are broken in dust clouds. This is true irrespective of the type of lamp.

In addition to the explosion hazard, it developed that numerous fires appeared to originate especially in grain elevators, from the dust settling on the globe and reaching the point of ignition. This "dust aflame" in falling to the floor or onto combustible material would cause a fire of "mysterious origin." The experimental work recently carried on indicates that fires can be produced when light fluffy dust such as would be created in the handling and elevating of grain, settles on the electric lamp globes. An effort is now being made by the engineers of the lamp companies to design equipment that will afford an additional factor of safety. In many of the cases referred to practices were followed in the plant that should be eliminated. It is extremely dangerous to permit an employee to lower an electric lamp of this type into a dusty bin. The lamp should be protected with approved vapor-proof equipment and well guarded. Attention must be given to this source of dust ignition in the industrial plants, and only safe practices followed. In a very recent case one of the officials of a large Eastern grain company introduced an extension lamp into an elevator leg and caused an explosion which endangered a number of lives and a large supply of grain in storage.

#### STATIC ELECTRICITY

The control of static electricity has been very strongly recommended by the Bureau in the conduct of this investigational work. Static elec-

tricity appeared as a very prominent cause of the large number of dust explosions in grain threshing machines in the Pacific Northwest. In that territory during the threshing season of 1914 and 1915 upwards of 600 explosions and fires occurred. Later, extensive losses resulting from cotton gin fires in the South were attributed largely to the same source. In a number of industrial plant explosions and fires, static electricity produced by the mechanical equipment or operating processes has been the cause of the original dust ignition.

Provision should be made in industrial plants for the control of static electricity. Effective results have already been obtained by proper grounding methods. Electrical engineers engaged in plant operation should give this particular cause their consideration in order that effective preventive installation can be developed.

#### CONSTRUCTION AND DUST EXPLOSIONS

At least three of our recent disastrous dust explosions have occurred in modern so-called "fire-proof" plants. It has been well demonstrated, (in a costly manner) that plants which cannot burn up, can "blow up." The slogan "fire-proof plants are not explosion proof" has been used many times in recent months. If the plant is not well maintained, and "good housekeeping" practiced, which means effective dust removal, a plant constructed of fire-resistive materials permits the explosion to assume large proportions. High pressures, that cannot escape are built up with the effect that concrete reinforcements are shattered and the explosion is accompanied by great violence. The assurance that plants so constructed are fire proof should not afford a false sense of security as far as dust explosions are concerned. The dust hazard must be recognized, and provision made for its effective removal.

In the construction of new industrial plants where explosive dusts are created, engineers should give consideration to dust explosion prevention. The extent of a recent disastrous grain dust explosion was closely associated with certain features of construction that permitted large quantities of dust to accumulate. The construction should be of such a type that dust cannot collect or settle in certain parts of the plant and thereby increase the explosion hazard.

#### VALUE OF EDUCATIONAL WORK

The lack of knowledge concerning dust explosions has been largely responsible for these disasters in our large manufacturing plants. The value of educational work was well illustrated in the special emergency dust explosion prevention campaign conducted by the U. S. Department of Agriculture during the war period, and also in the work of the U. S. Grain Corporation to protect government wheat and flour stocks in storage from explosion and fire. During this campaign an effort was made to acquaint both the workmen and the officials in the plants with dust explosion dangers. It is interesting at least to note that from October 1917 to May 1919—a period of 19 months—not a single disastrous dust explosion occurred in a flour mill, cereal plant, or grain elevator where



the workmen had been asked to co-operate in the prevention work. In the 20 months preceding the period referred to, five explosions in the United States and Canada killed 36 people and destroyed \$6,000,000 worth of property and foodstuffs.

This educational work was well received and supported in every section of the country. The success of the campaign was made possible by the splendid co-operation given by the milling and grain industry, together with the fire prevention agencies and commissions established to conserve on food supply. As a result of this effort the United States Grain Corporation suffered no extensive explosion and fire losses during the entire period of its existence. The importance of the saving thus effected is well indicated, when we consider that practically at all times the value of the stocks in storage was \$100,000,000 and at certain times approximated \$500,000,000.

#### ADDITIONAL RESEARCH ESSENTIAL

During the period of the special educational campaign, the research investigations were temporarily discontinued to permit the men engaged in the work to present the dust explosion hazards to the workmen in the plants. This was necessary in order fully to acquaint the employees with the simple causes of and conditions under which the explosion could originate. A large number of essential lines of research work relating principally to causes developed in connection with the operating mechanical equipment remain to be taken up. In addition the practical efficiency of preventive devices designed by the engineers must be determined on a plant scale. Those research problems can be briefly summarized as follows:

1. Application on commercial scale of "introduction of inert gases (preferably from boiler flues) into dusty atmospheres for the purpose of preventing flame propagation, in milling and grinding equipment." This will require the installation of "inert gas units" on a practical basis in industrial plants where explosive dusts are created.
2. Development of effective methods for the control and elimination of static electricity generated by the operation of mechanical equipment. Disastrous dust explosions are occurring from this cause, and this particular phase of the work is very important.
3. Relation of electrical equipment of all types to dust explosion and fire frequency, and development of safety installations and equipment to reduce relative dangers.
4. Development of aspirating systems for dust removal in grain elevators with specified limitations and preparation of code covering use of same. This code to include types and sizes of mechanical equipment, points of suction, and methods for effective dust removal in grain-handling plants.
5. Determination of efficiency of dust collecting systems and their relation to explosion and flame propagation, with special attention to "exhaust fans." In recent investigations the extent of the explosion was very closely associated with the dust collecting arrangement.

6. Development of efficient methods for installation of various types of grinding equipment handling by-products containing explosive dusts. This line of work to include tests to determine the efficiency of equipment now designed to prevent flame propagation and provide release of pressure.
7. Development of methods for determination of dust in suspension with special reference to health and safety of employees.
8. Determination of flammability of various dusts as related to the percentage necessary per cubic foot for explosion.
9. Various methods of ignition and conditions under which dust can be ignited.
10. Relation of moisture, ash and volatile content to the explosibility of the dust.

These are the more important lines of research work that demand early attention in dust explosion prevention, and are included among a number of others in the projected programs of the Bureau. The appropriation for the Department of Agriculture for the current fiscal year does not include funds for the proper extension of the dust explosion work. In fact the entire field organization, which included competent engineers, trained in dust explosion prevention has been entirely disbanded and the work that can be done by the Bureau of Chemistry will be necessarily limited to a very small laboratory scale. The research lines referred to, as well as many others equally important cannot be taken up until the appropriations recommended by the Secretary of Agriculture are made available, and the work properly developed.

#### IMPORTANCE TO INDUSTRY

As our industrial plants increase in size, capacity, and production, the dust explosion hazard increases on the same scale. The more dust created the greater the possibility of a disastrous explosion. The utilization of by-products that heretofore were discarded in the industries, has led to additional dust creation, especially if grinding operations are a part of the process. The importance of dust explosion prevention has been well emphasized by extensive losses in recent explosions. Is the work of sufficient value to the industries of the country to have provision made for its proper development? Before we can expect to prevent these losses of life, foodstuffs, and property, we must acquire more knowledge concerning the causes of these dust explosions and methods for their control and prevention. The support and endorsement of the National Safety Council will be of value in determining the real importance of the work as it relates to the industries of the United States and Canada.

## Public Safety Section

September 28—October 1, 1920

---

**C. M. TALBERT, Chairman**

Director, Department of Streets and Sewers, St. Louis, Mo.

**J. H. HARVEY, Vice-Chairman**

The Bracken Company, Kansas City, Mo.

**CARL L. SMITH, Secretary**

Field Secretary, National Safety Council, Chicago

---

### TUESDAY MORNING SESSION

**T**HE meeting of the Public Safety Section was opened by Chairman Talbert, who called upon Mr. C. W. Price, General Manager of the National Safety Council, for a few introductory remarks.

Mr. C. W. PRICE: Until two years ago, the National Safety Council was almost wholly absorbed in industrial safety. Public safety was until then regarded as something entirely distinct from industrial safety. Public accidents are by far the most important. The greatest step which has been taken during the past year is the development of public safety in the opinion of our members. We are going to reach, through the child who is taught in the schools, the workman in a larger and more effective way than it is possible to do through any other medium. It is my idea that we cannot solve the industrial problem until we have really organized the whole community for safety.

### SECRETARY'S REPORT

SECRETARY SMITH: At the sessions of the Public Safety Section in Cleveland last year, certain plans were formulated for the activities of the section and a number of committees were appointed. The past year has been a most successful year in the development of public safety work because we have had fifteen committees giving their time and attention to the study of the various problems involved in the prevention of public accidents. I wish to say for these committees that some of them were appointed late, and they for this reason have not had sufficient time to do the work that was expected of them.

Since our meeting in Cleveland last year, we have organized nine cities in public safety work: Wilmington, where some exceptionally good work has been done, Buffalo, Syracuse, New York City, Chicago, St. Paul, Minneapolis, Grand Rapids, and Milwaukee, the city that is your host this week.

Can there be any more convincing proof of the interest of a community in public safety than the demonstration which the people of Milwaukee are giving you this week? Six or seven months ago the city of Milwaukee knew little of public safety.

Louisville, Kentucky, is now getting ready to form a public safety organization and is looking for a competent man to take charge of the work. That is the first step to be taken. I am informed that Detroit has recently employed a secretary for the Local Safety Council, and Captain Jack Robbins, of the Border Cities Local Council (Windsor, Ontario) has been invited to take the position.

Besides the organization work which has been done in these cities through the Public Safety Section of the Council, we have had an opportunity to take an active part in several no-accident week campaigns. Probably the most successful of these was the special campaign conducted by the Lehigh Valley Division of the National Safety Council at Bethlehem, Pennsylvania. A complete account of this successful safety drive was published in the NATIONAL SAFETY NEWS, June 14, 1920.

Cities which have been visited during the year in the interest of public safety and which will probably be ready to organize a local council with public safety activities next year are Boston, Philadelphia, Cincinnati, Columbus, Dayton, Toledo, and Akron.

Every one who has ever conducted a safety campaign has shown a desire to reach the man who has an automobile. Here in Milwaukee, we have tried to reach the automobile driver in several ways. We have used the Boy Scouts to distribute stickers to be placed on the machines. In St. Louis, a general circular illustrated with a picture of a reckless automobile driver was sent to all owners of cars. We have made an effort to interest the motorist in this campaign because we realize that if we are going to stop accidents on the streets we must reach the man who drives a car. In Milwaukee we have organized a Safe Drivers' Club. The membership fee is one dollar. A form letter was sent to every automobile driver and attached to it was a membership card upon which was typed his name and license number. On the back of the membership card we printed a statement concerning the purpose of the club and the objects for which the money received in the form of membership dues would be spent. We also enclosed with the letter a sticker for his car and an application blank which we asked him to sign. We told him in the letter that if he was not interested in this movement, if he did not care to belong to the club, and if he did not care to protect the children on the streets, we did not want his money.

The results were beyond expectations. In five days, five thousand motorists joined the club. It cost us \$2,500 to solicit all of the car owners, but we shall get many more than the five thousand persons who

have already joined and we have succeeded in enlisting their co-operation in the no-accident week campaign. The remarkable results of this undertaking has demonstrated to me that the average automobile driver is willing to do something to help reduce the enormous number of automobile accidents.

CHAIRMAN TALBERT: The success of the Safe Drivers' Club has been one of the gratifying results of the campaign in Milwaukee. We shall now hear from Dr. Crum, Assistant Statistician of the Prudential Insurance Company of America, who has evolved a system of statistical reports.

### REPORT OF COMMITTEE ON STATISTICS

FREDERICK S. CRUM, ASSISTANT STATISTICIAN, PRUDENTIAL INSURANCE COMPANY OF AMERICA, NEWARK, N. J.

Last year as chairman of the Committee on Statistics I presented a brief résumé of public accidents in the United States and attempted a rough estimate of their cost. This year the committee has had a two-fold task—to continue the collection, compilation, and analysis of public accident statistics and, perhaps even more important than that, to draft blank forms for the proper reporting and recording of public accidents.

The first function of the committee has devolved upon me, and special emphasis this past year has been given to the collection of vehicular or traffic accident data. These have been gathered from thirty-six representative cities of the United States from the registration area, from life insurance experience, etc.

Practically all of these data have been turned over promptly to the National Safety Council and I understand are to be used in a nationwide campaign against what are now become nothing less than extravagantly wasteful, not to say criminal, conditions. Today well over 10,000 fatalities are caused by the automobile in the United States. It alone of all vehicles, except the aeroplane, continues to be an increasing menace to human life. During the last seven years, there has been an average of 1,000 victims added each year to the preceding year's record. In 1912 there were about 2,000 automobile fatalities in the U. S. and in 1919 over 10,000. I cannot take the time to go into details, but I may say that in thirty-six cities combined the automobile fatality rate in 1915 was 80.0 per 1,000,000 of population and in 1919 it was 143.0, an increase of 79.0 per cent. In the same cities the fatality rate from all other vehicles in 1915 was 114.5 per 1,000,000 of population, but by 1919 this had fallen to 90.0 a decrease of 21.4 per cent.

#### HALF OF ALL ACCIDENTS ARE PUBLIC

Last year I suggested that about one-half of the fatalities from accidents in the United States were the result of public accidents. I now have confirmation of that belief in the personal accident claims paid by the Travelers' Insurance Company during a recent five year period. In that experience 51.0 per cent of the fatalities were due to public acci-

dents, 14.5 per cent to home accidents, and 34.5 per cent to occupational or industrial accidents. In the non-fatal injury claims 45.1 per cent were public, 17.2 per cent home, and 37.7 per cent industrial. These figures have been furnished through the courtesy of Mr. Everett S. Fallow, Actuary of the Accident Department of the Travelers Insurance Company.

In 1919 the Travelers paid \$450,742 in personal injury claims arising out of automobile accidents. About one-fifth of the total number of cases and one-third the amount of the damages paid were the result of collisions.

THE TRAVELERS INSURANCE COMPANY, ACCIDENT DEPARTMENT AUTO ACCIDENT EXPERIENCE

PERSONAL INJURIES, 1919

|                               | Number | Amount paid<br>in claims |
|-------------------------------|--------|--------------------------|
| Cranking .....                | 798    | \$ 65,737.46             |
| Foreign matter in eye.....    | 21     | 4,185.89                 |
| Jolting .....                 | 59     | 4,821.31                 |
| Entering or leaving .....     | 284    | 27,963.87                |
| Skidding or ditching .....    | 341    | 114,585.04               |
| Operating .....               | 78     | 4,962.34                 |
| Caretaking or Repairing ..... | 446    | 60,508.31                |
| Collisions .....              | 514    | 150,513.51               |
| Around Garage .....           | 94     | 7,070.59                 |
| Miscellaneous .....           | 52     | 10,392.92                |
| Total .....                   | 2,687  | \$450,741.74             |

As will be recalled, this committee was created July, 1919, and a few meetings were held prior to the Eighth National Safety Congress, held in Cleveland last year. We were able to make only a brief report last year, barely outlining what we felt was the first requirement in any intensive study of the extent, relative importance, causes, and possible remedies for the present lamentable situation in the United States in respect to public accidents. As the immediate result of our tentative report, which was supplemented by a paper on public accidents submitted by the chairman of this committee, it was requested that the committee be continued and the chairman was authorized to add to the membership of the committee and to proceed with a study of how best to secure adequate reports of public accidents. It was agreed also that the first step would be the preparation of blank report forms for this purpose.

REPORTS MUST GIVE DETAILS

During the past year the Chairman has called several meetings each of which has been attended by at least three members of the committee. We have studied the report blanks of several police departments, we have consulted some of the best reports of coroners, and we have kept

in mind always that none of the present available reports, police or other, gives sufficiently detailed information to meet the needs either of the National Safety Council or of any other organization or individual interested in the various phases of the public accident problem.

After very careful consideration of the task assigned us we have drawn up for submission to those most competent to criticise and to revise, if necessary, eight blank forms for the reporting of public accidents. These have already been sent to several individuals for review and criticism, and some very constructive suggestions have been received. We will be frank enough to say also that some of the criticism is rather destructive than constructive, mainly on the ground that these tentative forms contain too much detail and that there is no hope that the average policeman would have the ability or the patience to furnish the data called for on these blanks. Opposed to this view we have the worth-while testimony of Inspector May of the Cleveland Police Department, that just as detailed report blanks as those which we propose are now being satisfactorily filled out in that city. If the proof of the pudding is in the eating, we feel that this matter of detail has been settled by the results accomplished in Cleveland, for when put on their mettle we feel sure that no other police department would be willing to admit that what is possible in Cleveland cannot be duplicated by it.

As we see it there are at least two fundamental requisites in the reporting of public accidents; first, all such accidents should be reported in any given city adopting standard blank forms, and second, the reports should be full and complete enough so that the resulting statistics when classified, tabulated, and analyzed will yield worth-while results. Mr. A. Ryder, Superintendent of the Automobile Department of the National Workmen's Compensation Service Bureau, and one of the members of this committee who has worked hardest on these blank forms, puts the case in this admirable form:

"The drawing up of a table or tables to be used for the collection of these data depends altogether on the use to which such information is to be put. It is like designing a bridge. If the engineer determines that the bridge is only to carry a maximum load of one-ton, he goes ahead on that basis. An entirely different structure is built if it is to withstand a fifty-ton load." It is our belief that, whereas our original intention was to build a structure only for light loads, the National Safety Council would probably prefer the submission of a tabulation that would stand up under heavy loads. At any rate, whether the National Safety Council finally decides to accept the more detailed tabulation or not, it is our belief that the original survey as made by us should be a detailed survey prepared in such a manner that the National Safety Council can either accept it in its entirety, or reject any portion of it, or consolidate it in any way it may see fit.

#### HOW ACCIDENT DATA WILL BE USED

In coming to this conclusion, we had in mind the many uses to which reliable data on public accidents could be put. There are three general

groups of personal injury accidents: Industrial, public, and home. Industrial accidents are being pretty well taken care of at the present time. Fairly reliable and uniform statistics are being kept throughout the country. The National Safety Council is now entering upon the task of establishing uniformity in the matter of reporting and keeping nationwide public accidents. It is proposed that a standard method of reporting and listing public accidents be prepared for adoption in a few cities at first, with the thought that gradually other localities will take it up until ultimately the entire country will be reporting these accidents on a fairly uniform and reliable basis. The data ultimately compiled will be of untold service in many ways. It is highly important, therefore, that the start be made on a right basis because the tables used at the start are likely to be the tables whose use will be spread to other localities and ultimately throughout the land. The National Safety Council wants to avoid having to recommend a radical change in the table a year or two after it is placed in use.

In order to determine the degree of detail that our survey should go into, it is first necessary to determine what kind of data will best serve the country's needs. In other words, why should we bother to get this information at all? What people are going to use it? And to what use will they put it?

In the first place these data on public accidents will be of great educational value. Newspapers, magazines and all manner of publications will be continually writing short articles on the various causes of accidents, pointing out the number of people killed and injured, the time of day they are most apt to be killed or injured, how many injuries result in blindness, how many in total incapacitation, etc. Schools will ultimately take up the work and educators will introduce accident prevention wherever the opportunity is afforded. The point I am driving at is that all of these people will be seriously handicapped in their work unless they can have data that will answer the detailed questions regarding public accidents. It would be rather difficult for a person to write an article on accidents caused by fruit skins thrown on the streets and sidewalks unless that person could have some reliable data as a guide.

Next to the educators come the people who specialize in accident prevention devices. Data on public accidents will be of extreme value to them. The manufacturer of a fender for automobiles will be keenly interested in the tabulation of injuries caused by motor vehicles striking pedestrians. The manufacturer of portable folding parachutes will be deeply interested in the various airplane deaths and injuries that could have been avoided by the use of a parachute. The manufacturer of fireproof interiors for theatres and public buildings will want to know the toll of life and limb occasioned by fires in such buildings. The manufacturer of a non-shatterable wind-shield will want to know how many cuts are due to broken windshields. Here again the table of public accidents will prove of little use unless it goes into sufficient detail to furnish just such information as will help each particular branch of accident prevention endeavor.



**LAW-MAKERS NEED ACCURATE INFORMATION**

Then again there are the legislators who are continually busying themselves with traffic regulations and with other public safety measures. In considering a bill to require automobilists to dim headlights, for example, it is quite important to know the accidents that have been caused by glaring headlights. In passing on a bill to license and test operators of automobiles periodically as to their fitness for driving, it is quite important that they know the number of accidents caused by reckless and incompetent drivers. In legislating as to interlocking elevator gate devices, it is desirable that they know the toll of life and limb occasioned by the lack of such devices. Instances can be cited without number wherein a table that goes into detail about public accidents will prove of benefit to the legislative bodies.

In fact, there are probably very few people or organizations in this country that would have much use for merely broad, general tables of public accidents, whereas thousands of people would be aided considerably and the whole safety movement could be vigorously pushed if the data were collected in detail.

The National Safety Council will therefore undoubtedly wish to collect these data in detail unless it should be shown the collection of detailed information is practically impossible.

In answer to this, it is our opinion that nine-tenths of the task of collecting the data is in getting communities to do it at all. Once the machinery is put into operation in a given community for having the truth about accidents reported to a central point, the actual work of classifying that accident is a very small matter, whether there are five hundred codes or only fifty codes. If we go about this in the right manner, it ought to be almost as easy to code in detail as it would be to use only a few general all-inclusive headings, exactly as it is almost as easy to find a given word in a large dictionary as in a small dictionary. Of course, it is realized that the work of sorting and finally compiling the accidents is increased a great deal where the number of codes has been increased. However, this is only a small fraction of the total year's work and it ought to be well worth while. Even if it should be decided that the totals are not needed in any such detail as originally planned for, we can always simplify the work of compilation to any desired extent.

It is urged therefore, that this committee prepare blank forms for public accidents which will go into considerable detail as to causes and results, and that the reasons for so doing be presented to the National Safety Council along with the presentation of the forms.

**FIVE MAIN GROUPS**

Proceeding now to a closer scrutiny of our proposed blank forms for the reporting of public accidents, you will note that we make provision for distinct and separate preliminary or field reports for five general classes or groups of public accidents, namely:

1. Highway vehicular accidents.
2. Highway non-vehicular accidents.
3. Aircraft accidents.
4. Accidents peculiar to buildings and structures.
5. General or miscellaneous public accidents not falling within the first four classes.

The blank report forms for these preliminary reports can readily be filled out fully and fairly accurately by a patrolman or any other reporter of average intelligence.

These preliminary reports should, however, be supplemented by more detailed reports, always, if at all possible, by the original reporter and blanks for this particular purpose have also been prepared and are submitted for your careful consideration as a part of our report.

The preliminary or field report blanks are shown in Plates 1, 3, and 4, and the supplementary, more detailed blanks are shown in Plates 2, 3A, 3B, 4A, and 4B.

These blank forms are largely self-explanatory, but we may add that if our general scheme is accepted we would suggest that the five classes of accidents be reported on five different colored forms and that the size of the blank forms carried by patrolmen or others for field reports be such that the blanks can readily be carried in the pocket. Ultimately, we would suggest that the items reported in the supplementary blanks be coded to make them more readily tabulatable by mechanical methods.

We realize also that a simple outline of instructions would be desirable either in the form of a booklet, or, perhaps, in a more condensed and compact form on the reverse side of each report blank. Once the form and substance of the blanks are agreed upon, these other details can be easily and quickly worked out by our committee.

In conclusion, as chairman of this committee, I wish to express my sincere appreciation of the co-operation which I have received from many sources and I am particularly indebted to Messrs. A. Ryder and H. P. Stellwagen of the Automobile Department of the National Workmen's Compensation Service Bureau for the great pains taken and arduous labor performed in the drawing up of these tentative blank forms. We invite criticism and suggestions and hope as the result of discussions at this congress by as many as will take an interest in the matter, to reach final conclusions and so perfect these blanks that they can be printed and put into use on a fairly extensive scale not later than January 1, 1921.

(After some discussion from the floor, Chairman Talbert was authorized by the meeting to appoint a committee to consider and adopt the report forms prepared by Dr. Crum. The members of this committee met at luncheon immediately following the morning session, adopted the report forms, and recommended that the National Safety Council have these forms printed<sup>1</sup> and distributed among cities in the United States which have a population of 25,000 or more, so that the proposed standard method

<sup>1</sup>Copies of these forms may be secured through the National Safety Council.

of reporting accidents may be put into effect in all of these cities not later than January 1, 1921, if possible. The committee which reported the adoption of the blank forms prepared by Dr. Crum consisted of the following persons:

Rufus Jarnagin, Secretary, Metropolitan Safety Council, Chairman.  
H. H. Herdman, General Manager, Oregon and Columbia Basin Division.  
Mr. R. S. Vitt, Coroner, St. Louis.  
Dr. Frederick S. Crum, Assistant Statistician, Prudential Life Insurance Co.  
C. C. Varnum, Acting Secretary, St. Louis Local Council.  
B. V. Verhayen, Secretary to the Judge Advocate, St. Louis Police Dept.  
R. C. Haven, Manager, Minneapolis Local Council.  
E. B. Lefferts, Manager, St. Paul Local Safety Council.  
F. J. McNulty, Deputy Director of Public Safety, Newark, N. J.  
C. M. Anderson, Manager, Milwaukee Safety Council.  
Sydney H. Coleman, Secretary and Manager, Buffalo Local Safety Council.  
A. H. Lintz, Manager, Cleveland Local Safety Council.)

---

GENERAL SESSION  
PUBLIC SAFETY

September 28, 1920

C. M. TALBERT, Chairman

Chairman, Public Safety Section, National Safety Council  
Director, Department of Streets and Sewers, City of St. Louis

---

TUESDAY AFTERNOON SESSION

**C**HAIRMAN TALBERT: Three years ago at the Congress in New York City, the Executive Committee of the National Safety Council undertook, after considerable discussion, to enter the public safety field. There was some doubt on the part of the officers at that time as to whether there could be a public safety campaign organized or carried on, or whether such a thing was susceptible of being systematically applied so as to produce tangible results. The whole matter was rather indefinite at that time. It was undertaken, however. It has reached the point where we feel we can say that certain definite principles have been established.

I don't propose to burden you with statistics. I do, however, want to repeat to you the gist of what was said this morning at the opening of our committee work because it does state our position, some of the things we have done, some of them we hope to do, and a little outline of conditions as they exist at the present time.

"First, emphasis should be given to the fact that while approximately one-fourth of our population is subject to industrial hazards under conditions that are subject to considerable control both of men and surround-

ings, practically every man, woman, and child is subject to some form of public hazard. These hazards are the ordinary every-day hazards of the pedestrian, such as street cars, steam cars, elevators, and others of this nature, but the great outstanding and predominant hazard, regardless of locality, is the automobile. As a death-dealing instrument, to which every individual is subject, the automobile stands entirely in a class by itself, and it is to this problem that our greatest effort has been and must continue to be directed.

"What it means in numbers can be stated tersely and effectively as follows:

"During 1919, there were approximately one-half as many people killed by automobiles as in all factories, mines and railways combined. The number of deaths from this cause is increasing in almost exact mathematical ratio to the increase in the number of automobiles in use. In 1910 there were approximately 4,000 automobiles in the United States, in 1919 seven and one-half million, and the present prediction is that at the end of the present year there will be approximately nine and one-half million. There were in 1919 over 10,000 people killed by automobiles. There was approximately one death during every thirty-two minutes of the sixteen hours commonly allotted to our active life. There were as many people killed in the year 1919 as in all the years from 1906 to 1912 inclusive. During the time of this tremendous increase both in percentage and in actual numbers, there has been a decrease in fatalities on railways of thirty-three per cent, on street railways twenty per cent, and in all accidents and deaths outside of traffic and including industrial, twenty-eight per cent. In the fields of organized industrial effort there has been a substantial reduction, while the traffic hazard has shown an enormous increase.

"During the past three years in particular the Council, through the officers of its Public Safety Section, has been making an intensive study of the situation and has, with at least a certain degree of success, evolved a system which can be applied by communities to this type of accident prevention. Its officers have determined, at least in their own minds, that certain basic principles can be applied to the problem of public safety just as there are fundamental principles which can be applied to the problem of industrial safety.

"It shall be the purpose of the various sessions of the Public Safety Section to bring out these various points, and it is the hope that by the presentation and discussion of the various subjects on the program, we shall be able to present to those interested a fairly comprehensive scheme.

"The foundation of this is that public safety depends absolutely on developing public opinion and arousing the general community interest, and that this can be done by and only by a definite community effort organized on a sound financial basis with a paid secretary in executive charge, whose duty it shall be to see that all various parts of the program be carried out.

"The first duty of this organization should be to co-operate with the law-making and law-enforcing bodies. The public and other schools offer the greatest field for ultimate results. The committees should be

composed of the best citizens whose names will carry weight with the general public. Advantage should be taken of all organizations of a public nature who have to do in any way with traffic or highway control. The public press must be interested and they always will be, as a matter of general news interest, if the proper organization is effected.

"Our problem for the coming year would appear to lie along the following lines: First, to develop a definite public safety organization in as many communities as possible; second, to encourage safety work in public and parochial schools; third, to secure the co-operation and financial support of public utilities, insurance companies, automobile manufacturers, and others who have a direct interest in promoting public safety; fourth, to bring about co-operation among the various organizations now working on a standard traffic code; fifth, to co-operate in giving wide distribution to the chauffeurs' lessons that have been worked out by the Council; sixth, to organize a more aggressive campaign of publicity in the newspapers and magazines.

"It is not expected in this presentation to cover the ground of any of the different points mentioned, but rather to give an idea of what lies before us. The reports of the secretary and other officers will give the details of the various steps to be taken."

I have read this statement to indicate to you who do not attend the Public Safety Section sessions just what our problems are and, in a general way, to indicate what steps we are taking.

I am going to ask Mr. Price, who is the General Manager of the Council, to explain the relationship that exists between the Council and this particular section.

#### RELATIONSHIP BETWEEN COUNCIL AND PUBLIC SAFETY SECTION

C. W. PRICE (General Manager): If I were asked to name what is the most interesting and the most significant and to me the most inspiring thing that has happened in the last year in my experience, I would say instantly the coming of the idea among employers of labor, among business men everywhere, that we can never solve this industrial safety problem, we can never in any way touch or control the larger problem of public safety, until safety has been incorporated in the community life and has been organized and built up as an active, vital community proposition.

In going about the country and visiting various cities, I am constantly being asked to speak before chambers of commerce and groups of business men. Business men everywhere are more interested in what I say about public safety and school safety many times over than they are interested in what I say about industrial safety. Business men everywhere are beginning to get this big new idea which is, in my opinion, the biggest idea that has come to us safety men in ten years. They are beginning to realize that the most effective way to reach the workman is not inside of the plant but outside of the plant; that when we organize safety as a community affair, when we get the churches and the newspapers and the police and the clubs and the women's clubs and the Boy Scouts interested, we are surrounding our workmen with an atmos-

phere of safety. When their little boys and girls go home night after night and talk to their mothers and fathers about safety, you are attacking the workman on a new and open side. I believe, friends, that we are going to be able to reach our workmen in a more direct and effective way than we have been able to reach them before by any effort on our part in our plants. That is the first thing.

Here is another significant thing that has happened. I think that on an average I receive one letter a week, sometimes one letter a day, from chambers of commerce. Do you know that chambers of commerce all over this country are waking up to a new realization of the seriousness of this automobile hazard? Chambers of commerce are looked upon as the logical community organizations to assume leadership. Therefore this problem of safety is literally being forced into their hands. Whether they will or not, the chambers of commerce of this country are going to be compelled to take up this problem, and that is another hopeful sign.

Looking forward to the future work of the National Safety Council, as I see it, industrial safety is more and more going to take its logical place as an indispensable part of efficiency. Less and less will there be need and occasion for propaganda work. This big and growing field for the National Safety Council is here—offering opportunities for saving human life in this country that we have never had in any work that we have done in the direct service which we have rendered to our industrial members. We are offered an entirely new and enlarged field of activity that we didn't dream of a long time ago.

I shall now introduce to you Mr. Smyth of Kansas City in the place of Dr. Inches, the Police Commissioner of Detroit. The commissioner sent word the other day that it would be impossible for him to be present. Mr. L. J. Smyth is the secretary of the Kansas City Local Council. He is the chairman of the Traffic Committee of the Public Safety Section and has, during the past few months, been spending a good part of his time in traveling through the different cities observing traffic conditions. He is going to talk to you on "The Traffic Officer and His Relation to the Public."

#### THE TRAFFIC OFFICER AND HIS RELATION TO THE PUBLIC

L. J. SMYTH, SECRETARY, KANSAS CITY LOCAL COUNCIL, KANSAS CITY, MO.

There is no other single branch of municipal government that is doing the effective work that the traffic officers are doing in every big city in the United States. Let me say, furthermore, that there is no one city organization that is getting less real co-operation from the people of the city, from the courts, or from any other organization than the traffic police. That may sound like a rather strong statement, but I recently visited twelve cities, and I have studied traffic in a number of other cities, and let me say that, except for Detroit where they have a real traffic court, and for St. Louis where our good friends Judge Mix and Judge Ittner are really on the job, traffic law enforce-

ment is absolutely a joke. The answer is simply this: You are making a farce of your police traffic work in the cities. Traffic cannot be regulated unless law enforcement backs it up. You cannot get law enforcement in the city unless you have public sentiment on the job every day in the week fighting for fair and impartial law enforcement.

Have you ever gone out on the corner and looked at a policeman, really looked at him? I did that this other morning after Talbert asked me to make this talk. I went out and spent about thirty minutes standing at an intersection and looking at a "cop." Really, he is an awfully interesting fellow, and if you will go out and look at him as I looked at him, you will find that he has got one of the biggest jobs imaginable. It is no path of roses to stand out on a street intersection in the downtown district of a city and regulate traffic. Five out of ten automobilists that pass the intersection either don't know or don't care about traffic laws. One hundred and ten out of every 100 pedestrians, if you can imagine such a thing, are "jay walkers." That includes all of us, that includes every man, woman, and child. It includes every man and woman in this audience, if I may be permitted to take a shot at you. I am a "jay walker." I have been guilty twenty times of "jay walking" since I have been in Milwaukee. Why? Because I don't keep my mind on the thing I am doing when I am on the street. My mind rambles. I do not do any of the things regularly that the pedestrian must do, if the streets are to be made safe, and believe me, the motorists are not to blame for all of this trouble by any means. I would say that one-tenth of one per cent of motorists are careless drivers because they want to be careless. I will say that practically all motorists are at times careless, but the pedestrian is just as careless as the motorist, and if you will analyze accidents, whether they are accidents to grown-ups or children, you will find that in easily fifty per cent if not seventy-five per cent of the cases, the fault lies with the victim rather than with the motorist. There is no getting away from facts. If you are going to solve this problem of street deaths, you have to get the facts first and then with the facts as a basis get busy and do things.

I am getting a little bit away from the traffic officer in his relation to the public. At the same time, the traffic officer's work is the most important element in traffic regulation and street safety. If we don't obey the signal of the traffic officer, we are hopeless when it comes to solving street accidents.

#### TRAFFIC REGULATION ACTIVITIES MUST BE CO-ORDINATED

The traffic officer belongs to one of three arms of police traffic organization. The crossing men constitute one department, the motor-cycle men a second and a very valuable department, and the third department is that of the mounted squad, the men who get into the heavy hauling traffic and untangle it, the men who ride between intersections in a great many cities in the downtown districts to enforce the parking laws and to untangle the jams that come frequently in the more congested blocks. If a department of police is to be effective, it must be co-ordinated.

In Kansas City we are just beginning to realize the necessity of a co-

ordinated traffic department. In the past we have had a lieutenant in charge of a group of crossing men, another lieutenant in charge of the motor-cycle men, and another in charge of the mounted men. The traffic officer at the crossing had absolutely nothing to do with the motor-cycle man or the mounted man, and vice versa. What is the result? When any case or condition arises that requires co-operation between the mounted or the motor-cycle man and the crossing man, you don't get it. We are finding out that we are not getting co-operation, so we are beginning to organize a co-ordinated traffic bureau.

In the cities that I have visited recently, I find that the only effective traffic work comes in the department that has its inspector or commissioner of traffic at the head, its lieutenants in charge of the different traffic departments, sergeants working under them handling the various shifts, all of the organization responsible to the one man at the top.

I find, furthermore, that where the most effective work is being done, the accident record bureau, which is something that every city must have within a short time, is one of the most effective means of tracing the accidents and finding out where to concentrate effort to stop accidents.

This morning in our Public Safety Section meeting, one of the speakers referred to the splendid record being kept by Inspector May at Cleveland. I was in Cleveland a short time ago, and I looked at some of their systems. It is a system which every member of the Public Safety Section, every one in this room today, should take back to his home city and endeavor to secure its adoption, because I absolutely believe that if we are going to get to this street accident proposition, we are going to have to find out by some regular, sensible system where our accidents occur. In Cleveland there is a map that would take the space, probably, across this screen; it is a map of the city of Cleveland. They use the different colored pins to show their accidents. The white pin is the fatal accident. The red pin signifies some other kind, and so on. They are able to look at that map any time for a period of a month, six months, or a year, any period they like, and tell from those pins just exactly where their accidents are occurring. They can tell where their fatal accidents occurred, where their street car accidents occurred, where their automobile collisions occurred. The head of the traffic department can send his men out to do business with that map as a guide.

This accident record bureau keeps a complete list of every kind of accident. To begin with, Cleveland has an ordinance requiring the reporting of all accidents. Cleveland doesn't run her accident bureau on the haphazard plan that some of our younger cities are doing, the way, for instance, we are doing in Kansas City. The only accident record that we are able to obtain at this time is the accident record from the coroner's office which shows fatal accidents only. We have no law for the compulsory reporting of accidents, no matter how trivial. In the eastern cities where they have that, they are able to know what is going on and can go out and help to eliminate the hazard that is causing accidents at any certain spot. A traffic officer may be required there at some time during the day. The condition may require a standard. It may



require the elimination of left-hand turns. It may require any number of various types of regulation, but when you know where the accident occurs, when you know where the frequency of the accident is greatest, where the accidents are serious or minor, you can get some action.

That is a part of the traffic officer's job, and when I say traffic officer, I am referring to the traffic department of police which includes the commissioner or the inspector or the captain of traffic and all of the men and departments under him.

#### PROBLEMS OF THE TRAFFIC OFFICER

What are some of the problems of the traffic police? I think probably the greatest is the "jay walker." I think probably the second greatest is the man who refuses to obey the cross walk ordinance, or the man who drives his car clear up to the curb line in the downtown district, blocking the path of the pedestrians and requiring them to go out into the path of moving traffic. The only thing that is going to stop such violations of walking and driving laws is education. Out in the residence district we have our speeding. In all parts of the city we have our motorists with the one light, the fellows that let one bulb go out and don't take the trouble to put a new one in. They are a menace. We have our bright light problems and a thousand and one others. But this problem of traffic regulation will be solved only when the people of the communities get together with the traffic officer.

I want to say just one word about the greatest problem that the traffic officer has or, rather, that the police department has, and which is one of the most unfair practices that I know of in any city. That is the practice of bringing influence, whether political, religious, personal, or what-not, to bear to prevent proper law enforcement.

In Kansas City we make drives, every now and then, against those who violate traffic laws. We will have as many as 150 or 200 such cases listed for one session of court. How many of those people do you suppose show up? We are lucky if we get half of them. When we make those arrests, the offender is taken to the police station. He puts up a bond, set usually by the police after conference with the court, sometimes it is \$6, sometimes it is \$11, sometimes it is \$101, sometimes it is even \$500. The next morning the offender fails to show in court. The judge, turning from one case to another, calls as fast as he can, "Bond forfeited," and on to the next case. I have known of seventy-five to one hundred cases of offenders who failed to show up; their bonds were declared forfeited and no further action was taken. I say that is making a farce of police regulation. Suppose the man did lose \$6 or \$11 or even \$500, that is no penalty. The man who can afford to pay \$500 doesn't show up and he loses \$500, and it means no more to him than fifty cents would to the other fellow. The only way we are going to get effective regulation and get the respect for the police departments that must come if we are to cut down the accidents on streets, is to cause to be issued, in every case where a bond is forfeited, an alias warrant and have the motorist brought in anyhow. When we do that, we shall stop a lot of

violations, we shall gain some respect for the police authorities as well as the police courts, and we shall cut down the accident rate due to reckless and careless driving,

#### EDUCATE THE CHILDREN TO AVOID STREET ACCIDENTS

There is still another angle that I would like to touch upon in connection with traffic. It doesn't concern the traffic officer, but it is so important in attempting to solve the whole problem of reducing the street death rate that I feel it is equally important and must be considered along with the question of traffic regulation and law enforcement. That is the question of education within the home to reduce the child death rate. I took at random about ten cases of children's deaths in Kansas City not long ago, covering a period of some ten or twelve months. It was rather interesting to observe that almost every one of those accidents proved to be an accident in which the driver of the truck or automobile that caused the death was absolutely blameless. In fact, there was just one where the motorist really could be blamed for the accident on account of reckless driving. Where does the blame lie there? Certainly it doesn't lie with the little child. You can't put the responsibility for a death of that kind on the victim. You can't put it on the motorist when the motorist has his car under control and when the child suddenly dashes out from behind another car. I finally have come to the conclusion that the blame must be placed on the parents. Either the child was not given proper safety education within the home, and, possibly, in the past, not the proper safety education in the school, but, unquestionably, either lack of education or improper education in the safeguarding of its own life was responsible for the death of that child, and the blame must come right down to the parents.

When we consider traffic regulation and safety, we must also consider law enforcement and education. We are not going to reduce accidents on the streets by any one of the three, nor by any two of the three. It is going to take all three to make a showing and to reach the goal that we seek.

#### CONCLUSION

In summarizing, let me leave this suggestion: The traffic problem has not been solved in a single city in the United States. Judge Mix is having his troubles in St. Louis. Inspector Jackson in Detroit, in spite of a wonderful system, is not getting the results he wants. Inspector May in Cleveland is having his difficulties. Why? Because the people of the communities as a whole are not giving the proper support to the police department. They are not making the proper demands for proper law enforcement, so that it seems to me that in the next year the big problem of the National Safety Council's Public Safety Section, the big job of every one of us interested in safety, is to go back to our home towns, find out where our systems are weak, find out if we have enough traffic officers and whether they are competent, find out if we have an accident record bureau that gives us some basis for ascertaining the causes of accidents, find out if we are getting proper law enforcement, and if not,

get on the trail of the influences that stop law enforcement. Finally, above everything else, we must create a community-wide sentiment in favor of absolute impartiality, the strictest law enforcement, the most effective education in the schools and in the homes and throughout the city, and organize a great, big, concerted movement of the entire citizenship to stop this death rate.

CHAIRMAN TALBERT: I am sure Mr. Smyth has given us an intimate view of the traffic officer's troubles, and I hope that our general scheme of education will help the weak points in traffic regulation to which he has referred.

The next subject is "Law Enforcement and Its Application." It will be presented to you by the Judge of the Municipal Court of the City of St. Louis. It has been my fortune, either good or ill, as you may view it, to have known the Judge for some time. I have not yet addressed him "Good Morning" in his official capacity. I know he will tell you that that does not mean that I haven't violated any of his ordinances, but merely that I haven't been caught. The Judge is doing great work in the city of St. Louis. He has laid out for himself certain rather rigid principles, and I will say that, to the best of my knowledge and belief, he is living up to them. The Judge knows the trials and tribulations to which he is subjected and he knows the weak and strong points of our existing regulations. I will present to you Judge Mix of St. Louis.

JUDGE GEORGE E. MIX: I just want to say a word or two preliminary to my talk proper in reference to what Mr. Smyth said. I just want you to get me on one or two of these things. He spoke about fixing the judges. The newspapers in St. Louis have published articles regarding the money that it cost some people to try to fix Judge Mix. Mr. Smyth said something about defendants not appearing in court. Any defendant who fails to appear in the City Court of Judge Ittner or Judge Mix learns that in the United States of America whether a man be an automobilist, a minister, a priest, a rabbi or whatever he may be, the courts come first! They have learned in St. Louis not to trifle with the two City Court Judges.

## LAW ENFORCEMENT AND ITS APPLICATION

JUDGE GEORGE E. MIX, MUNICIPAL COURT, CITY OF ST. LOUIS, MO.

There is an old saying that the wise man learns from experience, but I like to modify that and use the expression, "The wisest man, and woman too, for that matter, learns from the experience of others." Applying that to the automobile proposition and the subject of law enforcement, I trust that you will be able to learn from the experiences of those of us in St. Louis something that you will be able to take home, which will help to improve conditions in your community.

The experiences of St. Louis are experiences that I believe all of you may profit from and by.

We have a splendid mayor in St. Louis, Hon. Henry W. Kiel, who is

very much interested in traffic law enforcement because St. Louis has come to be known as the safest big city in the United States in the last two years and because he wishes to keep St. Louis first and foremost as the safest and the best city in which to live in the United States.

#### MOTORISTS MUST STUDY TRAFFIC LAWS

In connection with the operation of an automobile, there can be no more important feature in its operation than the point of operating it in strict accordance with the law. If you will pardon a personal reference, I have had automobiles since 1911. I understand automobiles and can take an automobile apart and put it together again, and I have heard of people going out and buying automobiles, then buying accessories, extra tires, tubes, all kinds of adjuncts to the wind-shield and spot-lights and so forth, spending all kinds of money for accessories, but the only thing they ever got free in connection with the operation of an automobile is a little book of traffic laws. We have those books in St. Louis in this form. A thorough understanding of the contents of this book saves lots of people in St. Louis money.

Now an intelligent person will start out to run an automobile although he has never heard of the traffic laws or read them, knows nothing about any of the requirements, and then when he is arrested, he seems seriously offended. I sometimes ask some of those well-meaning people how they ever learned geography or arithmetic, and after pinning them down I learn that they learned geography or arithmetic from a book. Then I ask them, "How do you expect to learn the traffic laws? From the air?"

Some people in St. Louis buy automobiles and Fords and go out on our boulevards and take as many as one lesson. Then they go down town in the traffic in the spirit of "Get out of the way, here I come!" The next day they are in the city courts.

In St. Louis we have two very fine courts. To begin with, the court-rooms are beautiful rooms; they are large rooms of the same size and character as the Circuit Courts; the furnishings are right up to date and the courts are conducted in a clean-cut, wholesome, dignified manner. People who are brought into those courts are taught right from the very opening of court that respect is due the court as an institution. We are not tucked away in some gloomy, dingy old stall or stable, as you might say, over a police station, but we are furnished and provided with excellent court-rooms, and that is one thing that I think every city should be interested in—providing its city court judges with decent, wholesome, and sanitary court-rooms.

As to the enforcement of the law, you know there are two schools of medicine; one is the allopathic, the other is the homeopathic. As I understand those two schools, the allopathic gives you a bath-tub of medicine with a drop of water, the homeopathic gives you a bath-tub of water with a drop of medicine. Now when you take that latter treatment you may have to go back several times for more, but when you take the allopathic treatment frequently one good dose cures. Judge Ittner and I are allopaths.

## FAIRNESS TO THE MOTORIST

To illustrate my point: The traffic laws in St. Louis are unfair to the automobilist. Like the traffic laws of all other cities, they are in substance the New York traffic code. New York had the first large experience in traffic and developed a code or a system of laws. Other cities have, for the most part, adopted those laws with minor exceptions as to parking, lighting, one way streets, and speed. In St. Louis the speed limit is six miles at crossings. That is all right. It is eight miles in any business district and ten miles elsewhere. Surprising as it may seem to you, I don't believe one person has ever appeared in my court who has ever been able to answer correctly the question as to what speed the law allows in St. Louis. As a practical automobilist, when I went to the bench a year and a half or two years ago, I recognized that ten miles was unfair to the automobilist. I recognized that ten miles an hour stripped the automobile of all of its efficiency. You might better return to the horse-drawn vehicle days and do away with all the hazard and all the danger than to try to drive automobiles or have automobile trucks driven for you at no greater rate of speed than ten miles an hour. Judge Ittner and I went to Chief O'Brien, our Chief of Police, and we arranged with him, co-operating with him through the traffic officers and motorcycle officers, to permit the automobilists in St. Louis to travel twenty-five miles an hour without being arrested for speeding. Of course, they may be arrested on a careless driving charge if they are just moving, for instance, through traffic contrary to the officer's signals. But on speeding, they are allowed to go twenty-five miles an hour, and then the motor-cycle officers, in a spirit of fairness, usually let them go twenty-eight or thirty.

Now as to that allopathic dose: We say to the automobilist, "When we give you 150 per cent leeway, twenty-five miles as against ten, we are giving you something that no competitor ever gave you or ever will give you," and that is true. "When you violate the 150 per cent leeway, you must pay."

There is a certain psychology about the enforcement of traffic laws, and in order to establish some kind of an idea that would permeate and penetrate the minds of the automobilists in St. Louis, Judge Ittner and I placed the fines on this basis: \$1 per mile per hour at least for the first offense. *At least!* And we tell them never to lose sight of those two words. At least \$2 per mile per hour for the second offense or treatment, if you please. And \$500 for the third offense or treatment. Furthermore, third conviction under our law will be certified to the Secretary of State at Jefferson City, Missouri, and the license of the chauffeur or owner revoked for all time.

You ask, "What is the result of that allopathic treatment?" This is going to surprise you. In nineteen months of that kind of treatment there have been only four repeaters. In that time there have been in our courts probably 10,000 to 11,000 automobilists charged with speeding.

## CONSTRUCTIVE WORK OF COURTS

A constructive program is being carried on in our courts. The first

speeder called on the morning docket is told what the law allows him to do and what the judges allow him to do. We explain the law to the violator so that he knows what he should do in the future to avoid violations and arrest. For instance, a man leaves the curb without extending an arm. We inform him that the man back of him is not a mind-reader, and we ask him sometimes if he is a mind-reader and how he would like to have the fellow in front of him leave the curb suddenly without extending his arm. Oh, the modesty of some automobilists! Instead of extending the arm as the law requires them to do, they put out a polished finger-nail.

Some automobilists pride themselves on their ability to drive without sounding the horn. Judging from the way some people use a horn, you would think it was the most dangerous appliance on an automobile. Two automobiles collide at a crossing. One sounds its horn, the other doesn't. You are the judge. Simple, isn't it? Horns were made to be sounded, and there is not a state in the forty-eight which does not require horns as standard equipment. The automobilist who fails to sound his horn is playing and trifling with human life. What would you think of the operator of a steam engine who passed over street crossings in the rural districts without sounding his alarm? Put yourself in a jury box, when some farmer or his widow is suing the railroad company. The testimony shows that the engineer did not sound his alarm. That widow is entitled to your support. The difference is that the railroads always have assets.

Out of eleven cases of speeding in my court one morning a few months ago, seven of them were paying for their machines on the installment plan. One of them was going forty miles an hour. Had he left somebody's widow and somebody's orphans in St. Louis, how much could he have paid toward their support?

We instruct the automobilists regarding stopping back of street cars. The law requires the automobilist to stop at the rear of a street car that stops to take on and let off passengers, and it requires him to remain at a standstill until the street car resumes motion, not until the conductor or motorman closes the step or door.

Many drivers try to pass automobilists to the left. We then instruct the automobilist that he has not only violated the law but he has made of himself a road hog, in that he has gotten over onto the side of the street that belongs to the fellow coming from the opposite direction.

Those things appear perhaps more or less important. I want to show you how important they are to St. Louis. Out of the ninety-seven deaths caused by automobilists in St. Louis in 1919, seventy-three were the result of excessive speeding which could have been eliminated, passing street cars that had stopped to take on and let off passengers, which could have been eliminated, and passing street cars to the left going in the same direction, which could have been eliminated. Seventy-three human lives, that were just as dear to the members of their families as your life and mine are to ours, were crushed out through causes that have no excuse, no reason for ever existing. The automobilists are taught those things. In my court, I have a death chart showing the number of deaths, and

each day, as there is a new death reported, the court stops for a moment while the janitor places the new figure in a little space reserved, where the figures may be changed. The point in all this is that law enforcement and education in the traffic laws must go hand in hand. The city courts of St. Louis are two courts in the United States of America where rich and poor, high and low, have the same treatment meted out to them regardless of anything.

PROVING THAT SPEEDING DOES NOT PAY

Along the line of education. First, we have these traffic books on our benches. We present these books to the law violators. We particularly mark the section that the person has violated. In some cases of young men, we insist that they sit in the court-room and read the book all through during the morning session. Then we ask them if they saved any time by that speeding. Figure it out. You are arrested and taken to the nearest police station, you are detained and have to answer a goodly number of questions; it is a half hour usually before you are back to your car and on your way. The next morning you are in court from one hour to three. When the automobilists have those lessons driven home to them in an educational way and then have the pleasant experience of paying to get out, they don't come back again. After all, that is what we are after—to prevent them from coming back. That there have been only four repeaters in St. Louis in 10,000 cases in nineteen months speaks favorably for that system.

We have a great many collisions. I have in my hand a card that shows the distance in which an automobile may be stopped going at a given rate of speed on a level street, a dry street, with the brakes in proper condition. The question of brakes always enters into collision cases, and the automobilists are provided with these little cards.

Also, along educational lines, we have conducted in St. Louis just recently an anti-"jay-walking" campaign. That created a great deal of agitation and irritation, and people wrote letters to the newspapers complaining about it, but that did not stop the Safety Council at all because we realized that once we had thousands and thousands of minds revolving around that question of anti-"jay-walking," we were producing results. In the next week or two we propose to put on an anti-"jay-driving" campaign.

The police in St. Louis have been taught to be courteous and to make helpful and constructive statements explanatory of the traffic laws to the autoists rather than to abuse them. The automobilists, too, have been taught not to abuse the police. Some well-meaning church member has a chauffeur, the chauffeur speeds and does two or three other things that he should not do, and he is arrested. That man appears in court the next morning. That man would stand on the platform, perhaps, and he would berate the young fellow who drives the light Ford delivery truck, yet that man sits in court the next morning, a violator of the law, setting the very worst kind of an example to the young men in the court-room awaiting their turn on the docket. We have taught those people

that the police have the power to arrest them and that they have no power to arrest the police.

We have conducted in St. Louis two chauffeurs' schools with memberships ranging from 600 to 800 chauffeurs. We have had the traffic officers present at those chauffeur's schools. The traffic officers are not much on speech-making, but they say "How do you do?" and "Glad to meet you!" and shake hands, and then when the chauffeurs and the traffic officers meet on the street corners, there isn't that antagonism that there usually is otherwise. It has been my pleasure to speak at those meetings and suggest, to the chauffeurs who make their living in the streets and to the traffic officers, how much better it is that they should know one another. When the traffic officer sees the chauffeur coming he will nod, and the chauffeur will holler "Hello, Officer! How are you?" Neither will have the thought in his mind that the other fellow has it in for him. We have tried to overcome that feeling of antagonism that exists in so many cities on the part of the chauffeurs and the traffic officers. We have tried to make them friends.

In May, 1919, one of the chauffeurs of the Columbia Transfer Company, one of the biggest transfer companies in St. Louis, was arrested and brought into my court. The Columbia Transfer Company employs more chauffeurs than any other concern in St. Louis. The company sent one of its men to my court and wanted to know if I wouldn't let the fellow off. I had fined him \$20 or \$50 for careless driving, and I told representative of the company that if he were doing his duty toward his men, instead of spending his time talking to me, he would go right back to his place of business, post a notice explaining why this chauffeur was fined and tell all the rest of the chauffeurs that they would be fined the same amount, perhaps more, if they did the same thing. Then I said to this man, "You go back there and be fair with your chauffeurs. Get your chauffeurs together. Get these traffic laws. Place a copy in the hands of every chauffeur. Take up these traffic laws with you chauffeurs. Teach them the law. Train them so they understand the law, and they won't go out on the streets and violate it. It is their pocket-books that they are burning up, not your company's pocket-book. If you pay the fine, I know that you will exact from the chauffeur retribution at so much per week." That man went back to the Columbia Transfer Company and did all those things. That Company employs about 130 chauffeurs. They drive all kinds of trucks and taxi-cabs. From that day to this, as a result of the constructive educational propaganda work carried on by this company, not a single chauffeur or driver employed by this concern has appeared in Judge Ittner's court or mine.

#### TEACHING THE PEDESTRIAN

We have tried to teach not only autoists but also pedestrians the greatest laws that were ever written, and they are not found in the traffic books. We have taught these laws to them by talks at public places. One of these is a law that an automobilist somehow or other seems never to observe. It is as old as Confucius and it is called the Golden Rule. If the automobilist would go out in the street any day of the week with



a spirit and an intention to do unto the other automobilists as he wished the other automobilists to do unto him, he could cut down deaths and accidents one hundred per cent, I believe.

The other law is found in the twentieth chapter of Exodus, which no man has ever been able to change by subtracting or adding one syllable, and that law certainly applies to automobilists. It is in these words, "Thou shalt not kill." A man has no more right to kill you or any member of your family with an automobile than he has with a shot-gun. That is still the law, friends.

Let me show you what all this has meant. In addition to these sources of instruction, we have also taken up the matter with the St. Louis Team and Truck Owners' Association which embraces within its membership practically all the owners of trucks in St. Louis. We have convinced them that the loss of time and money caused by carelessness on the part of their chauffeurs is a serious proposition for them to consider. Now, did you ever stop to ascertain how the inefficiency of the automobile truck compares with the inefficiency of the freight car? Almost every haul in the transportation problem today begins with an automobile truck. An automobile truck takes the goods from the factory to the freight depot. Then a train steps in and takes the goods from, we will say, Milwaukee to Chicago. Then a truck takes the goods from the freight depot in Chicago to the department store or the ultimate destination. Among the railroads, less than two per cent of their haulage capacity is in the repair shops all the time. In the truck hauling industry, over fifteen per cent of the haulage capacity is in the repair shop all the time. The two ends of the transportation system today are not beginning to hold up and support the middle.

Industrially, how has all this affected St. Louis? You who are looking for new industries to locate in your towns and cities, listen. In nineteen months under regular, consistent, faithful traffic law enforcement, fourteen factories have located in St. Louis in preference to any other city, after studying and comparing the traffic and safety conditions of St. Louis with other cities.

The automobilists, as a class, are an intelligent set of men. How in the world men of this type, who can afford to buy automobiles, can go out in the streets and neglect their obligations to their fellowmen is more than I have ever been able to learn or understand. The law-abiding citizen who, when his friend is arrested, so far forgets himself as to call up the city judge and ask that judge to let that law violator go free hasn't quite learned the full lesson of what real American citizenship means. As I said in the early part of my talk, in the United States the courts come first, and God be merciful to the city or the municipality that sinks so low that its city courts, which come in contact with the great mass of people, lose all respect for themselves, and the people lose all respect for them. The American citizen who dares to ask a city court judge to prostitute himself and his court to satisfy some man's pocket-book is no better than an I. W. W. or a Bolshevist.

As proof of that, I say this: If the I. W. W. or the Bolsheviki or a body of anarchists were to kill as many people in your town and mine as

the law-abiding automobilists kill, you and I would want to go out and help lynch them, wouldn't we? Anyway, that is pretty nearly the spirit of Americanism that pervades the city of St. Louis, thank God!

TRYING TO PUT SOMETHING OVER ON THE JUDGE

There is nothing like being a good loser. If you get caught violating a traffic law, take your medicine. If some of your friends get caught, don't try to prostitute that court of yours. Be a real American and do not ever let anybody think that you have got a friend who has a yellow streak in him. And if you are caught, be a real American and don't show a yellow streak yourself. Go to that court like a man, and I tell you it does the judges of the two city courts in St. Louis good to see a man once in a while who is a real man and to hear him say, "Judge, I forgot myself. I made a mistake. Fine me." That man goes off easy, that man has leniency shown him, and he is entitled to it.

I had a rich man's son down in my court a few months ago charged with speeding about forty miles an hour. When he went on the witness stand, he was asked by the prosecuting attorney why he was going so fast. I suppose he thought the judge didn't understand anything about an automobile, so he said he was going fast because his carburetor was flooding and he couldn't stop his engine. You who understand a little bit about automobiles know that if your carburetor is flooding, it will usually start your engine bucking and kicking and will most frequently make your engine go dead. Anyway, no matter how fast he was going, he could have disconnected his gear shaft and his engine could have been traveling at the rate of 100 miles an hour and his car standing perfectly still. That boy paid at least \$12 per mile per hour for the first offense, and \$20 added for a little perjury. He was told in plain English why he was being fined \$100.

Another boy down there driving a Ford was charged with having his tail light out. I recognize the troubles that the owners of the large trucks have with tail lights, and we are not severe in those cases. If the officer can testify that the lens on the light was warm, or had some warmth in it, we let them go upon promise to fix the tail light. This boy took the stand and said that the reason his tail light was out was because it rained awfully hard that night, as he put it, and the light became short-circuited. I asked what kind of a car. "Ford." I asked him what model. "1915."

"Coal oil lamp?"

"Yes, sir."

I said, "Well, now, son, if you can tell me how you can short-circuit a coal oil lamp, I'll let you go free." Well, he paid.

When the automobile is recognized as a dangerous vehicle, when the automobile is claiming, as it is each day, a life every thirty-two minutes of the sixteen hours that we are supposed to be awake and doing, when the automobile hazard reaches a stage where business men in every community are interested in overcoming that hazard, when the automobile reaches a stage where not only in pleasure but in work it is a destroyer of life, two things must enter in to stop it: One is strict, im-

partial, fearless law enforcement; and the other is a system of propaganda or education whereby the owner and the chauffeur or the driver, as the case may be, is fully acquainted with the traffic laws.

PROPER LAW ENFORCEMENT PROTECTS ALL

While the judges of your courts may be criticized once in a while for fining somebody, just pause and ask yourself the question, "When is my little child going to be run over by one of them?" Bring the lesson right straight home and let this meeting, if it means nothing more to you than this, be a meeting the influence of which will cause you to go back home and help you to be a better citizen, as a man who stands for law enforcement, as a man who stands for the protection of life, limb and property, because every time the law is enforced, not only our pedestrians are protected, not only our law-abiding automobilists are protected, but the law violators themselves are really protected against themselves.

In closing, permit me to suggest this: That law enforcement by the judges so far as the judges are concerned means protection to all men, women, and children, be they pedestrians or autoists. And it has for its reward this: Full knowledge of the fact that human lives and souls are still worth more to your community and to mine than is the speed or careless driving of any automobilist.

CHAIRMAN TALBERT: The National Safety Council has two or three times, in its literature, sent out the statement that St. Louis was being known as the safest large city in America. Some of you undoubtedly now begin to understand why it is so classified. We take considerable pride in that notoriety. We take pride in our officers of the law in St. Louis who are helping to make it so. I want to say to you that our Public Safety Committee of the city is composed of men of that type. The two police judges are members of that Committee, the Chiefs of Police, the representatives of the Police Department, and all of the city officials with whom we can come in contact are helping us to do that. I believe a great many of you will understand why we are producing results in St. Louis that are being taken as an example to other big cities in the country as to what can be done towards making a big city safe to its people on the public highways. I want to say that the Judge does do the things he has told you about. It is a part of the every-day routine of his courts. He does fine members as he says he does. I have been importuned by friends and acquaintances many times myself, being as close as I am to the general public, to go to Judge Mix and see if I couldn't do something about their arrest. I haven't yet. I don't think I shall.

I count it as my distinct loss that I have not until today had a personal acquaintance with the next speaker. I have known of her and her work for some time. I know the interest she has in the subject. I feel that she will present it in a way to make it interesting to you. Without further comment, I am going to introduce Dr. Kate Waller Barrett, who will speak on the subject of "Women's Interest in Public Safety."

## WOMEN'S INTEREST IN PUBLIC SAFETY

DR. KATE WALLER BARRETT, PRESIDENT, WOMEN'S FEDERATED INDUSTRIAL CLUBS OF AMERICA, ALEXANDRIA, VA.

Women have the same interest in safety that men have. They are interested in it upon the same specific lines, and in addition to that they have certain interests that are specifically those that belong to their sex. Women are interested in the safety of humanity in a way that men are not, in addition to the way that men are, because they know the value of a human life. They know that every man and every woman in this world has been brought here because some woman has yielded up a part of her life in the bringing.

I never stand beside a corpse that I do not think of the first moment that that body opened its eyes upon this world and looked into the face of a pale, stricken woman who had gone into the valley of the shadow of death in order that it might come into this world a living human being. I never see a wasted life, I never see a shattered life, that I do not think of the romance and the dramatic interests and the dynamic force that was brought into that life because some woman forgot herself and was willing to face death in order that life might continue upon the face of the earth. I do not believe that any man in the world can understand the value of human life so well as woman.

The other day in Cleveland, I had the privilege of looking into the faces of those 200,000 boys in khaki that came back from the battlefields of France, and marching beside them, unseen by that hurrying crowd of thousands that looked on and applauded, I saw that shadowy procession that passed along—every one of those 200,000 mated by the dead that sleep today under the poppies of France and Belgium. I bear on my bosom today the emblem of France, the red poppy of France, that I hope will be adopted as the flower of the American Legion, because I want those boys wherever they go to remember and understand the great loss of human life that followed the victorious end of the great World War.

When I looked at those boys, I thought that they had come back safe and that they had come back with an appreciation of the value of human life which, possibly, had never come to them until they faced death over there, and until they saw death around about them and understood and realized what it meant. Then they appreciated the coming back to their homes, the years of prosperity and happiness and joy before them, the very animal life to say nothing of the intellectual and spiritual life.

## WOMEN THE EDUCATORS OF THE RACE

I do not believe there is anything in the world today that should appeal to us more than the conservation of human life, man and woman alike, but to woman especially do I feel it should come with an enormous dynamic force. Women should realize their responsibility to this great educational movement for safety, because women are the educators of the race. You may not believe that, but may I ask you, "What would educa-

tion do if it were not for language, and who is it that teaches people to talk if not women?" Did you ever stop to think of the gift of language that was given to woman and why it was given to her? You have laughed at woman's tongue, and you have talked about women talking so much. Of course they have talked; that was the big job that was given to women by God, that they should teach children to talk. Do you suppose language would have reached the magnificent point it has, do you suppose the vocal chords would have been developed, do you suppose the fine enunciation of sound would have been developed by a lot of men? No, they couldn't have done it even if they had wanted to do it! The growth and development of language was due to women. Who would begin, except a mother, with a little tiny baby and teach it to say "Ma-ma, ya-ya, oog-oog"? "Oh, listen to baby! He said, 'Mama'." Nobody but that mother would know what the baby said, but that quick ear tuned to the fine sounds caught the significance of it all, and she was able to teach and train the baby in order that its vocal chords might be developed. So, throughout generation after generation, women have developed the splendid speaking qualities of the human race of today. The honor rests upon the shoulders of women as the eternal educators of the race. Women today must take up this great subject of education in safety.

It is no good to begin with larger boys and girls, or it is hardly any good, I may say. Better late than never, perhaps, but if we are going to do something great and splendid in this movement, as I am sure we shall, we must begin with the little child, teaching it to protect itself, making it understand the dangers that beset us all, teaching it not only to protect itself but also to protect the other children.

The other day I was riding in an automobile with a little relative of mine that I have had the privilege of training. A child ran out in front of my machine very suddenly, and my little ward said, "If that little boy had been properly taught, he wouldn't have given the driver such an awful shock as to run in front of the machine like that, would he?" That boy had had a training that made him feel responsibility, and when that boy grows older and becomes an automobile driver himself, he will not be inconsiderate of the life of the child in front of him, because as a little child he was taught to consider the welfare and the comfort of others.

If we are going to do this work beginning with little children, we must begin with mothers. We must educate the mothers to educate their children and to demand from the teachers of their children that a certain time be given to consideration of these things. When women begin in that way, they will be ready then for the larger responsibilities resting upon them, such as legislation and education in a broader and bigger and more national sense.

At this particular period in our development, I feel that woman's interest in safety is possibly a little different from what we have been considering hitherto in this session. I believe that the whole question of women in industry and the safety of women in industry is one that women should be particularly interested in at the present time. We

haven't been considering the conservation of life in the factory and in the shop and in the activities of industrial manufacturing. I believe it is there that women must take a very great interest. Industry as it is organized today is organized by man for man. Women have had a little part in it in the past—a very little part. I have frequently said that the most consideration they have received is that when they were needed they were kicked into industry, and when they weren't needed they were kicked out. That is just about the way the whole woman problem has been handled hitherto.

#### THE MODERN WOMAN'S ATTITUDE TOWARD PROTECTIVE LEGISLATION

An interesting thing is that women are so enormously enamored of their freedom and so dreadfully scared that they will be thrust back as dependents upon the bounty of men, that they have resented any sort of protection that legislatures have wanted to extend. I remember when the eight-hour day law was pending in Congress I was called upon by a committee of girls from one of the large restaurants, and they said to me, "We don't want an eight-hour day law. We wish you would go up to Congress and fight that law. We don't need it." I told them that I was in favor of the eight-hour day law and I felt it should be passed. They said, "You have never been a waitress in a restaurant. What do you know about it?" I said, "No, I have never been a waitress in a restaurant, but I have been waited on many a time, and I have had the opportunity to study you from the view-point of a physician and a woman of science, and I know a great deal more what is good for you than you know." They were very much insulted. After the law went into effect, in less than a year's time they wouldn't have gone back to the old law for anything. That is simply an example to show you how little women themselves understand and realize what is good for them. I may say that men know just as little. Men are just as much in the dark as women are.

I have been particularly struck with the broad-minded, splendid attitude of this country towards this whole problem of women in industry. I believe it is going to be solved in a judicious and proper way. I believe it is going to be solved so that women can take part in the great industrial production of the world and that they can have in their own souls that which to me is the greatest blessing that life can bring—the creative power called into action, so that you can feel that you are doing and being something and creating something that is really worth while in the world. I think that is the greatest happiness that can come to a human being. I do not believe that women are going to be robbed of that. I believe that women in industry are going to come into their own. I believe that industry is going to be so standardized that woman will have a place in industry, and still it will be so arranged that she will have the protection that as a woman she is absolutely obliged to have if she is going to do her part in mothering the human race.

Compare the bodies of a woman and a man. There is no comparison between the two. The body of a man is so much more efficient for work than the body of a woman. Why? Because man was made to work,

and woman was made to be the mother of the race. We must never lose sight of that. Wherever it is necessary that a woman is sacrificed as a mother, it is bad for the industry in which she works, it is bad for civilization, it is bad for morality, whether it seems to be good from the view-point of the earning power of the woman or not. I believe that industry will be prepared for woman, and if she will be given a place where she can make the very best possible return and be the very best producer and at the same time not sacrifice human life, that will be the object she wishes to attain. That sacrifice of human life is going on, around us every day. You haven't been awakened to it, perhaps, because the machinery for really discovering just where women stand and how much they have been injured in industry has been wanting. We haven't been able to know the truth because everybody has been ignorant upon this great subject.

#### THE NEW GARDEN OF EDEN

I am looking forward to a new Garden of Eden. I hope you catch the emphasis on the new. I never did like the old Garden of Eden. If ever I heard anybody talk about the perfect Garden of Eden I always said, "I don't want to go in that direction, for, in spite of its being in Holy Writ, I think of all the disagreeable propositions that humanity has ever faced the Garden of Eden was about the worst, and I think it has been guilty of bringing the worst results on humanity." Think of it! One man, one woman in a garden. Everything to please them and yet falling out over a snake the first thing. Then there were the children. They had two children and they got to fighting and Cain killed Abel. Wasn't that a lovely end to the family in the Garden of Eden? I never cared about that proposition at all. This is going to be a new Garden of Eden, and men and women are going to work in it side by side with an appreciation and understanding of the dignity of humanity and of the dignity of the association of the sexes, the dignity of man reacting upon woman and woman reacting upon man physically, mentally, spiritually, and morally. And in the midst a little child! The first figure that appeared upon the horizon when this old world was revolving in mist was a woman with a babe clasped to her breast, and the last figure before the final dissolution of all materiality will be a woman with a babe clasped to her breast. We are looking for that new Garden of Eden where all the good things which our boys of our country have fought and bled and died for will be realized, where all the good things that you and I have striven for in the arena of life, in the industrial arena, in all the places that have tried men's and women's souls with a devil offering a price for us at every turn of the road, will be realized. That is the arena you and I have been battling in, if not upon the battlefields of Europe, and thank God we have got to the mountain top and thank God we can see before us a new world and an opportunity to begin over again and start anew with a different relationship between the various branches of the human family. That is what you and I are facing today.

You may say that it is an enormous proposition. You may have been pessimistic and you may have thought that things were falling to pieces.

It is not so. It is the dawn of a new day, a glorious day, in which humanity will be glorified.

A STORY OF SERVICE

Soon after the Civil War, I was told the story of a boy that wore the Blue. It thrilled my childish heart and my father, who was an old Confederate soldier, told it to me, although it was about a boy that wore the Blue. This boy was from Maine. He had begged to enlist in the army but his mother couldn't bear to have him go. There were three others already with the colors. He ran away from home, and by the strange fortunes of war he found himself in the same regiment with his father down in Tennessee. It was the night before a big battle; the boy was called for guard duty. His father went before the officer of the day and remonstrated with him not to put the lad on duty. The officer was obdurate and the boy was put upon guard duty. That night the father was aroused by the rapid firing of musketry down in the pine belt where his boy was stationed. Hurrying down there, he found the boy fast asleep; he had got so tired walking back and forth and he didn't see any enemy anyway, so he fell asleep on the post of duty. He was court-martialed and condemned to die. The father was almost wild with grief. He got a furlough and hurried to Washington to see if the President wouldn't pardon his son. When he got there he found great difficulty in seeing the President. The time of his furlough was almost over and one day when one of the White House guards was on his rounds, the father approached him again and said, "Don't you think I could possibly see the President today?"

"No, he has no time for the likes of you. These are great days in Washington." Just then a tall, gray figure emerged from behind a clump of evergreens and came forward. It was the President. He walked over to the two men and said, "Who is this fellow that wants to see the President?" The officer said, saluting the President, "Oh, he's only a private that has been hanging around here for several days." The President put his hand on the man's shoulder and said, "Don't you know that the safety of this country depends upon only privates? Come in, my man." He took him into the White House and heard the story of the boy and his condemnation to death. It was then that he used the expression that you have often heard quoted. Lincoln said, "Well, he has committed a great crime, but I guess the country can use him better alive than dead anyhow." He pardoned the boy. The father started back. He found the boy, when he arrived, in solitary confinement and the day was near for his execution. When the father entered the cell and handed the boy his pardon, he threw his little blue cap into the air and said, "I'll die for old Abe," and he meant it, for soon after that he was reinstated in the army and was made color-bearer. On the morning that his regiment was in the great battle and was going up the steep incline, the guns bristling and shooting, he was so enthusiastic that he went far in advance of the regiment with the colors. The commander, fearing the colors would be taken, shouted, "Bring the colors back to the



regiment!" But the boy looked into the face of the serried ranks as they came nearer, he planted the colors and above the shriek of shot and shell his shrill young treble rang out, "You bring the regiment up to the colors!" With a wild rush the regiment went up to the colors and the fort was taken. When the smoke of battle blew away, there they found him and in his slim fingers was held a fold of the flag he loved so well. When they got him back and fixed his little body for burial, out of the inside of his coat pocket fell a crude engraving of Abraham Lincoln and on the back of it he had written, "I'll die for old Abe," and he had done it.

That is the clarion call to us today. As I looked at the ranks of those boys marching under the Stars and Stripes in Cleveland, I said, "This is the clarion call to the world—that we stand where our boys did when they stood upon European soil, not for self only but for the world and the safety of the world and for the glory of humanity."

CHAIRMAN TALBERT: I told you a moment ago that it was my distinct personal loss that I had not known Dr. Barrett before now. I appreciate now the fullness of my remark then. In the name of the entire Public Safety Section and the Congress, I want to thank her for the inspiring address that she has given us this afternoon and say that we appreciate it very, very much indeed.

I want to introduce to you the next speaker in the fewest words possible so that we may not miss any part of his talk. Mr. J. P. Freeman, District Field Executive, Boy Scouts of America, Chicago, will address us on "The Boy Scouts' Part in Safety Work."

### BOY SCOUTS AND SAFETY FIRST

J. P. FREEMAN, ASSISTANT NATIONAL FIELD DIRECTOR, BOY SCOUTS OF AMERICA, CHICAGO

No one who reads the newspapers can fail to be impressed as well as depressed by the enormous number of preventable accidents there reported. Ignorance and carelessness are still as they always have been the greatest enemies of the human race.

This sad fact occurs to a good many of us from time to time, but it does not occur to many of us to do anything about it, to make any definite, organized efforts to awaken the public consciousness to the vital importance of safety legislation, practice, and propaganda.

But while most of us have been content to let things go on as they always have gone on, trusting to luck that they will get no worse, or at least not affect our town, or family or selves, a force has been quietly at work on the constructive side with results more wide-reaching than can be easily estimated. This force is the Boy Scouts of America and it and they are at the service of the public in this as in all other respects, ready like Postum "for instant use."

Since the founding of the Scout Movement, in the United States, a little over ten years ago, nearly a million boys have been exposed to

influences and given systematic training which make for public and personal health, safety, and well being. Scouting gives splendid instruction in first-aid and life-saving work and trains its boys to act promptly, intelligently, and efficiently in the face of danger and emergency, but it regards it as no less important that they should be trained in the knowledge of how to prevent accidents or disaster from occurring.

#### SAFETY WORK STARTS AT HOME

Safety First procedure starts right at home with a Scout. On his hikes he knows how to recognize and avoid poisonous plants and fruit and takes no chances of typhoid because of indiscriminate drinking at polluted springs. He doesn't risk cramps by going in swimming too soon after eating and he knows he has no business in a canoe unless he can swim as well as paddle. He is taught to take all sanitary precautions in setting up his camp site, and so to build his small camp-fire that it does not end in a big forest fire. At all times he learns to "stop, look, and listen", for signs of danger of anything out of the ordinary. Being "mentally awake" is the first step in safety work. Nipe times out of ten accidents occur because somebody was muddle-headed. A Scout keeps his wits as well as his pocket knife bright, clean, and sharp.

In town he is alert, looks where he is going and what is coming. No "jay walking" for him and no foolish risks in getting on or off of cars. He learns to do even these simple things just right, which is more than the public as a whole knows, as witness the hundreds of preventable accidents already mentioned which fill the daily press. Moreover, it is part of a Scout's training to know where the nearest fire alarm box is and how to use it in time of need and where the nearest drug store and police stations are, in case he needs to put in an emergency call. He knows how to take care of himself equally well in the open country and in congested city streets and what is more he knows how to take care of the other fellow, which counts double on the score of Safety First.

A Boy Scout is first, last, and all the time a responsible individual. If he sees a heap of flammable rubbish lying around where some careless smoker's match is liable to start trouble, or a motion-picture machine not properly guarded by an asbestos cage, or a refuse dump breeding flies and disease it is his job to report these things at once to the proper authorities. He knows what to do to avert a panic and how to help the police manage an obstreperous crowd. He is up on the local traffic rulings, fire laws, and health ordinances. He obeys these himself and endeavors to see that other people do the same.

#### SCOUTS WORK FOR PUBLIC HEALTH AND SAFETY

Boy Scouts have over and over demonstrated their willingness and ability to do active work in the interests of public health and safety. They have fought flies and fever-breeding mosquitos and pestilence-spreading rats, conducted city clean-up and walk-right campaigns, given first-aid and safety-first demonstrations, distributed thousands of pieces of liter-

ature urging fire prevention and health precautions, co-operated with fire wardens, police commissioners, automobile clubs, and health officers in enforcing legislation and arousing sentiment along the lines of public safety.

In several towns Scout patrols are a regular authorized part of local fire departments and in many schools Boy Scouts have been placed in charge of the fire drills required by law and serve in shifts in guarding dangerous crossings near school buildings, taking especial care of young children to the relief of both parents and teachers and to the considerable lessening of the liability to accident.

If you want any safety-first propaganda put across you won't regret it if you get in touch with your local Scout Headquarters, whose leaders will gladly put themselves and their boys at your disposal for quick, effective, thorough action. A Scout is nothing if not active. During a certain campaign in Kansas City, the Boy Scouts distributed 100,000 pamphlets to 50,000 homes in one evening. Can't you find a use in your business for an energy like that? Don't you need a bunch of wide-awake lads to prick public sentiment wide awake, too? Scouts will give first-aid demonstrations, "stage" accidents, canvass your community for fire traps or disease breeders, post road signs, help clean up your city, and abolish jay-walking. In fact, there is very little they can't do if you can provide the right leadership and set them going.

How many of you know how much of the Scout program is directed to the prevention of disease and accident, the insistence upon common sense, cleanness and carefulness and clear-headed conduct which are closely allied to this Safety Movement of ours?

Take the matter of fire prevention alone. Strong emphasis is placed at all stages of scouting on the strictest observance of fire laws, the necessity for taking every precaution when building a fire in the open, the knowledge of what to do in case a fire starts or is discovered under way. The Merit Badge in Firemanship, open to first-class Scouts, is the most popular of all the special Scouts's subjects. Its requirements are as follows:

#### REQUIREMENTS FOR MERIT BADGE IN FIREMANSHIP

- 1 Know how to turn in an alarm for fire.
- 2 Know how to enter burning buildings.
- 3 Know how to prevent panics and the spread of fire.
- 4 Understand the use of hose,—unrolling, joining-up, connecting to hydrant, use of nozzle, etc.
- 5 Understand the use of escapes, ladders, and chuts, and know the location of exits in buildings which he frequents.
- 6 Know how to improvise ropes and nets.
- 7 Explain what to do in case of panic, understand the fireman's lift and drag, and how to work in fumes.
- 8 Understand the use of fire extinguishers; how to rescue animals; how to save property; how to organize a bucket brigade; and how to aid the police in keeping back crowds.

How many average American adults could pass this test? Not many possibly. Yet in the year 1919, 5,778 Boy Scouts met its requirements in full. Think of it! Nearly 6,000 boys in one year actively dedicated to the cause of fire prevention in all its aspects ought to make a dent somewhere, ought it not?

Safety First proper is also a popular merit badge subject. Note the requirements:

- 1 State four or more dangerous conditions in the average home and indicate what steps should be taken to correct these conditions.
- 2 Produce satisfactory evidence that he is personally responsible for the application of at least two constructive safety-first principles in his own home.
- 3 Name the most serious violation of public safety principles which has come under his observation and produce satisfactory evidence that he has done all within his power to correct the same.
- 4 State in writing at least six of the most important regulations covering street safety to meet the conditions of the neighborhood in which he lives.
- 5 State in writing at least six of the most important regulations covering street safety to meet the conditions of the school he last attended.
- 6 Submit in writing an outline of his own plan for school fire drill and explain the method of properly carrying it into effect.
- 7 State in writing at least six violations of safety-first principles which are responsible for accidents in connection with railroads.
- 8 Stand a satisfactory examination showing a knowledge of the importance of the safety-first movement and the most important principles it involves, and satisfactorily demonstrate his ability to assume leadership in case of fire, panic, or other disaster (Badge—green cross on white ground).

Notice that these tests begin at home, in the boy's own house, school, and every time anybody starts something in the interest of safety. It is what he has done himself, what he has observed himself, what plan he can work out for himself, what he can show he can do himself that make up the test. Over 2,000 boys passed this test last year. Does anybody imagine they did it without making any ripple in the minds of the people around them? Anybody who knows boys and the single-track quality of their minds at a given time will admit the probability that some at least of these 2,000 odd boys started something in their home towns, and every time anybody starts something in the interests of safety first, it is all to the good. The more people become alive to its importance the happier the world will be.

Public health is closely allied to safety and public health instruction as well as personal hygiene are counted essential in Scout training. In 1919, nearly 5,000 Scouts qualified for merit badges in personal health and nearly 5,000 more qualified for the badge in public health, to earn which a Scout must pass the following tests:

REQUIREMENTS FOR MERIT BADGE IN PUBLIC HEALTH

- 1 State the chief causes and modes of transmission of each of the following diseases: tuberculosis, typhoid, malaria.
- 2 Draw a diagram showing how the house-fly carries disease.
- 3 Tell what should be done to a house which has been occupied by a person who has had a contagious disease.
- 4 Describe the method used in his community in disposing of garbage.
- 5 Tell how a city should protect its milk, meat, and exposed foods. State what are the laws in his community covering this subject, and to what extent they are being enforced.
- 6 Tell how to plan the sanitary care of a camp.
- 7 State the reason why school children should undergo a medical examination.
- 8 Tell how he may co-operate with the health authorities in preventing disease.
- 9 Produce satisfactory evidence that he has rendered service in some effort recommended by the public health authorities in the interest of public health.

Again you will notice the essentially practical quality of the test. The Scout desiring to qualify for it must do his own investigating as to the working in his own community, what is actually being done as to garbage disposal, protection from poisoned foods, general sanitation, and disease prevention. He must know enough about sanitary problems to plan a satisfactory camp and prove that he has actually rendered service to the health authorities.

Here is your citizen in the making, the boy who is father to the man who in a few years is going to insist on his community being a clean, decent, healthy place to live in.

We who believe in the Scout program feel strongly that Scouting has got hold of the real thing and that the more a community uses its Scouts to keep bringing about better conditions of health and safety, the more public opinion can be roused to personal responsibility, and without personal responsibility on the public's part, no amount of campaigning and legislation can accomplish much.

ADJOURNMENT.

WEDNESDAY MORNING SESSION

THE meeting was called to order at 9:30 a. m. by the Chairman, Mr. Talbert.

In the absence of Mr. H. P. Coffin, Manager of the Public Safety Section of the Oregon and Columbia Basin Division of the National Safety Council, Portland, Oregon, who was scheduled to present the report of the Committee on Standardization, Chairman Talbert suggested a round table discussion on the standardization of traffic color signals. A lively discussion on this subject followed. It was pointed out that of the prin-

cipal colors used in traffic signals red is the only color which has anything like a universally accepted meaning. Every one knows that red means danger. The difficulty with this color, however, lies in the fact that its use is not uniform. It was originally intended that red should be used as the signal to stop, but the most frequent use of this color is rather as a warning to proceed with caution. A common misuse of this color is to place a red light or a red sign at points where there is no real danger. This has led to greater or less indifference on the part of the public in observing this signal either as a sign to stop or as a warning to proceed with caution.

It was also brought out in the discussion that green lights are frequently used as color signals, but there is no uniformity with respect to the meaning of such signals in various localities. Railways use this color to signify that the track is clear and every thing is all right ahead. On the highways green is sometimes used as a warning sign signalling the motorist to proceed with caution. In some places the use of a green light on highways is similar to its use on railroads, namely, to indicate a clear road ahead.

White lights are generally used for purposes of illumination only. It was reported, however, that in some localities white lights were used as signals to proceed. Often a large luminous white globe with the word "Slow" painted upon it is used as a sign to proceed with caution.

It was suggested by some of the members present that an effort be made to abandon the use of red as an ordinary warning sign and to use this color only as a signal for stops, or to continue the use of red as a warning sign and adopt some other color for the stopping signal. Several objected to this in view of the fact that red is so generally accepted as the danger color that to substitute any other color to indicate danger would create such confusion in the minds of the people that accidents would be increased instead of diminished. Some of the members contended that neither green nor red should be used as a warning signal and that yellow should be the standard color adopted for all such signs and signals. This suggestion brought forth the criticism that yellow lights indicating danger would be confused with the lights from ordinary oil lamps which burn with a yellow flame.

It was evident from this round table discussion that standardization of traffic color signals is needed and that it is highly desirable to adopt standards for the uniform use of color in traffic signals. It is clear that one color should be used as a signal to stop, another as a signal to proceed, and a third as a warning signal to proceed with caution. It became apparent from the discussion that no agreement could be reached at this meeting, and a motion was, therefore, made and carried that Chairman Talbert appoint a special committee of three to give further consideration to the question of standardizing traffic color signals and to report their deliberations to the Thursday morning session of the Public Safety Section. Chairman Talbert appointed Dr. H. E. Bradley, Police Surgeon, Milwaukee, Mr. B. F. Verheyen, Secretary to the Judge Advocate, Police Department, St. Louis, and Edward H. May, Police Inspector, Cleveland.

REPORT OF COMMITTEE ON TRAFFIC HAZARDS

LOUIS J. SMYTH, DIRECTOR, KANSAS CITY DIVISION, NATIONAL SAFETY COUNCIL, KANSAS CITY, Mo.

In submitting the report of the Traffic Hazards Committee I am not certain that our committee wants to report favorably on any national traffic code.

In considering uniform traffic laws our committee has used as a basis what is known as the Proposed Uniform Vehicle Law, which has been drafted, revised, and finally approved by a committee representing the American Association of State Highway Officials, the National Automobile Chamber of Commerce, the American Association, and the Highway Industries Association. This, undoubtedly, is in many respects a splendid code, but in discussing it as the basis of the kind of code the National Safety Council would want to endorse I wish to call attention to some of the weak points that may creep into such a code.

The most effective provision of the vehicle law is that which requires the licensing of all automobile drivers, yet the law is weak in that it does not require the proper physical and mental examination of the applicants for a driver's license, and in that it provides for a system of appeal from suspension or revocation that practically nullifies enforcement.

Again the law is weak in that it fixes a minimum penalty of only \$10 and a maximum of \$50 for illegal registration or obtaining of plates. I want to impress on the members of the Public Safety Section that the penalties imposed for violation of the provisions of a traffic code should be severe in the extreme. In many cases the penalty should be jail sentences rather than fines, and when the driver's license is suspended or revoked the appeal hearing should be before only the very highest type of official, certainly not before the ordinary police magistrate.

Article 4 of the Proposed Vehicle Law, which concerns the authorization of pupil operators, should certainly be incorporated into any traffic code that is recommended by our section. Too many persons are permitted to pay their money for a machine and without any instructions drive it upon the streets of our cities. Many of the accidents that bring death and injury to people are caused by these inexperienced drivers who in an emergency lose control of their cars.

This code, in my opinion, should state definitely the requirements to be passed on certain points, such as rules of the road, signalling, and the mechanical construction of the car. It should provide that brakes must be kept in good condition at all times, and the penalty for failure to keep the brakes in good condition should be revocation of license.

This law should require that the person who fails to stop in case of accident and render assistance shall be deemed guilty of a felony instead of misdemeanor, and the penalty should be imprisonment in the state penitentiary.

I might go on indefinitely to criticize what I consider the weak points

of the proposed Uniform Vehicle Law. After all, there is a difference of opinion as to penalties as well as requirements, and I want to recommend that the Proposed Uniform Vehicle Law furnish the basis of a national uniform traffic code. Such a code will do more when adopted by all states than anything else toward saving human life in the streets of cities.

I understand there is to be a meeting of a committee appointed at the recent session of the National Traffic Officers Association in San Francisco and that this committee, which will meet in Cleveland early in November, will further consider a national traffic code. I think the Public Safety Section should be represented at that meeting and that our representative should be asked to use the Proposed Uniform Vehicle Law as the basis of his deliberation at that conference.

I, therefore, in submitting the report of the Traffic Hazards Committee suggest that the Public Safety Section continue its efforts toward getting a national traffic code that can be recommended for adoption by all State legislatures.

INSPECTOR EDWARD H. MAY (Cleveland): I do not know how a person not connected with a police department can grasp a situation and get it down in as concise form as Mr. Smyth. He has all of the traffic man's ideas. His report shows that he has made an intensive study of traffic, and I believe he is right in not recommending definitely a traffic code for adoption at this session. It is too big a job for the time we have.

The National Traffic Officers Association held a convention in San Francisco a month ago, and after discussion the automobile men, the National Safety Council, the Automotive Association, the Truck Drivers' Association and the Chamber of Commerce appointed a committee to design a national traffic code.

This committee was unable to complete its task and adjourned to meet at Cleveland on November 9. At this meeting there will be members of police departments and national organizations. The automobile men will be there to protect their interests. The business men will present their side of the question. The police departments will give their views. I believe all interests are agreed that we should have in every state a drivers' license law.

The present situation is most deplorable, for instance, in the state of Ohio, as in many other states, every known criminal can operate an automobile. Every insane man can drive; even a blind man can operate an automobile, as far as the law is concerned. Everyone, whether mentally or physically qualified, is permitted to drive. The result is a "go as you please" system.

Accidents are increasing in all large cities. The death toll increases, the number of injured grows constantly, and property damage is becoming enormous. We must do something. We should see that every person before being permitted to drive is mentally and physically fit. We should endorse a national traffic code and help to get one that will produce results.

(Mr. C. W. Price, General Manager of the National Safety Council, at



this point moved that the Public Safety Section endorse the principles of operators' examination and license, that the Public Safety Section be represented at the Cleveland meeting by the Chairman, Mr. C. M. Talbert, and that the Public Safety Section accept the report of Mr. Smyth for the Traffic Hazards Committee. The motion was carried.)

#### THURSDAY MORNING SESSION

**T**HE meeting was called to order at 10:30 a. m., Mr. C. M. Talbert, Chairman, presiding.

**CHAIRMAN TALBERT:** We have two or three things of importance to come up this morning, one of them being a report of the committee that was appointed yesterday. Another item on the program is a report of the Vigilance Committee, of which Mr. J. H. Bruner, of St. Louis, was Chairman. He has been ill for some time and will not be present. We have, however, Mr. C. H. Stewart, of St. Louis, and we have also the executive secretary of that Committee.

Yesterday afternoon we appointed a committee of three to come back to the session this morning with a recommendation on what further action, if any, should be taken on the color of traffic lights to be used on public highways. I should like to ask the chairman of that committee if he is ready to report.

#### REPORT OF COMMITTEE ON COLOR OF TRAFFIC LIGHTS

**MR. B. F. VERHEYEN** (Secretary to the Judge Advocate, Police Department, St. Louis): The committee unanimously decided that some action should be taken immediately upon the standardization of colors because we consider this traffic or public safety situation as most serious, and there is no time for delay.

**CHAIRMAN TALBERT:** May I ask whether the committee reached any conclusion in regard to the use of colors?

**MR. VERHEYEN:** We are of the idea that red is the danger color, but we stand two to one as the caution color. Two of us are in favor of green for caution, and the third party is opposed to it.

**CHAIRMAN TALBERT:** I take it, then, that this Committee is in favor of this Section making a further investigation and report as soon as possible its recommendation for standardizations of color signals.

**MR. VERHEYEN:** Yes. Whatever is to be done should be done immediately, because many cities are making improvements and if there is going to be a change it should be made at once.

**CHAIRMAN TALBERT:** Last night I met Dr. Lloyd, of the U. S. Bureau of Standards, and he asked whether the section was doing anything on the standardization of signals. I told him of this committee. Some time ago the Bureau offered its services in making studies of color contrasts and all matters of that kind. Dr. Lloyd stated yesterday that he would again

place at the disposal of the Section the services of the Bureau to make any investigations along that line that we desired.

INSPECTOR E. H. MAY (Police Department, Cleveland): I seem to be the disagreeable element on the committee. I could not bring myself to agree to the proposition of changing what has been established for so many years throughout the public highways as have been danger signals and signals to go ahead. I agree with the committee that it is desirable to have a light which will indicate stop, and another which will indicate caution, that is, to use caution. It is very desirable also to have another light to indicate that the coast is clear and it is perfectly safe to go ahead. If we are going to start out and build something new, that would be the proper thing to do. Unfortunately, green has been the color which is used by the police departments as an indication to go ahead. Every place in the United States where they have a signal light for traffic, green means to go ahead, red means stop, or use caution, and I am afraid that the cost of making that change would be just opposite to what we are trying to attain, and that is, the saving of human life. Maybe I am wrong, but I don't like to agree to something which I think might cause a great many to be injured or killed.

CHAIRMAN TALBERT: I understand then, Inspector May, that your recommendation would be that a further study be made of this proposition, perhaps a written report, before any definite conclusions are reached as to what that should be.

INSPECTOR MAY: I think we should. We consider red, danger; blue, go ahead. I thought possibly a way out would be to get some other color as a stop signal, it might be yellow, might be something, but let us retain those danger signals that we have that are in use in public highways, and let them retain their present significance and meaning. Then if we are going to get a stop signal, let us adopt that.

MR. EDWARD M. COFFIN (Staff Engineer, Associated Industries of Massachusetts, Boston): In one of the suburban sections near Boston, when there is a heavy automobile traffic, green lights have been used with very favorable comment from the automobilists. It is easily distinguished from the red lights, and I know the impression generally is that that is the best color for that sort of a traffic signal.

CHAIRMAN TALBERT: Is there any representative of any automobile club here? Let's see what the man who drives a car thinks.

#### DISCUSSION

MR. FRANK J. McNULTY (Deputy Director of Public Safety, Newark): We have come to the conclusion that it would be well to use a green light and a red light. The red light should be to warn the traffic, that is, to warn the driver that he must go with caution because there are people coming from the sidewalk over to the safety aisle all the time.

The green light is placed on the other side. This is done because a red light on each side of the safety aisle is confusing. Where there is one safety aisle and two tracks, a driver coming along on the right will

be confused. By putting the red on one end and green on the other, we avoid this confusion. I believe Inspector May is right. I think instead of helping, we are liable to cause greater confusion by making a change in present common practice. However, if we can get a light that would mean stop, then we might get somewhere, but the minute that you use red light for any other purpose than you are using it today, instead of helping, in my opinion, you are going to confuse, and you are going to have more accidents because it is going to take a long while to educate the people.

Some gentleman said the other day that forty per cent of the people were color blind and couldn't distinguish every color. If that is so what are extra lights going to mean? More confusion. You might say, to get around that, "Well, anybody who can't distinguish all colors, shouldn't be allowed to drive a car." You try something like that. Instead of your safety movement progressing, it is going to fail, because the municipalities are not going to agree to any such proposition, in my opinion.

CHAIRMAN TALBERT: The main thing is lack of understanding. The Committee seems to be going to emphasize the necessity for uniformity. In one city red is used, in your own city red and green, and the driver wonders what the signals mean.

MR. McNULTY: He sees the red when he comes toward the red, but the green can't confuse him at all. He sees only red. The green light will tell the pedestrians that want to get to that safety aisle whether it is safe to go, and the driver coming toward the red is warned to go cautiously by that spot.

MR. ROBERT SCHMITT (Louisville Car Wheel and Railway Supply Co., Louisville, Kentucky): It just occurred to me that the people we are trying to reach are the general public. The general public idea of light is that red means danger, green caution, and white go ahead.

INSPECTOR MAY: I don't know of any police department in the United States which has a light signalling automobiles on the semaphore arm. They have their lights on top of the semaphore. Red means to stop, and as soon as the semaphore is turned, the light shows blue, indicating go ahead. That is what is used in Washington, Buffalo, Detroit, and Cleveland.

The new traffic sign on Fifth Avenue, New York, has the three-light system. Red means to stop; green to go ahead, and then there is a signal, a yellow signal, that means everything must stop. Red is used as a warning.

I refer you to local communities where your policeman has a light, and at a crossing where he turns to stop traffic, when he turns the green, you go ahead. It means that the coast is clear. That is the impression that seventy-five per cent of the automobile drivers have.

Now, the white light, as I understand it, is illumination. I don't know that the white light means anything else besides illumination. Maybe I am wrong. I shall be perfectly willing to adopt anything that will help.

MR. VERHEYEN: You all agree with Inspector May that red is danger.

Now, then, if green means go ahead, why not get the third color, for instance, yellow, to mean caution? Red positively is danger, stop; green, go ahead, and yellow, approach with caution. It might be well, too, in addition to the colors, to paint on the red globe the letters "Stop", on the yellow "Caution", and on the green "Go ahead."

CHAIRMAN TALBERT: Apparently, we are not going to make any great headway beyond the point that some effort should be made to standardize traffic lights and colors, and at the same time, the significance of those lights. I believe we are all agreed on that.

What is the sense of the Section? There are only three or four talking about this and there are about forty or fifty here. I should like to get the idea of the rest of you, whether we shall proceed on this, or whether we shall go ahead. If there is no expression on it, then I shall ask that committee to continue in session during the interim, and prepare, if they can, a written report, which will be presented to this meeting, and then, if it meets with approval, forward it to the meeting in Cleveland in November.

Is the Section ready to go beyond that point?

MR. SMYTH: I would like to move the adoption of the report of this special committee, and the appointment of another committee to take up the thorough investigation of this matter in all cities, to make a report as early as possible on the best combination of lights, having in mind red as stop, used only in danger.

INSPECTOR MAY: I think I would let that committee approach the matter without any positive instructions as to what the color means. Let them go at the matter open-minded and do what they think is best.

MR. SMYTH: We can't very well do that and adopt the report of this special committee which has reported that red is the danger or stop signal. We can't approve or adopt, and appoint a committee absolutely open-minded. This committee has reported that red is the stop signal.

INSPECTOR MAY: The report of the committee was the advisability of standardizing our lights and appointing a committee to make a further investigation. That seems to be a difference of opinion whether red means to stop or whether it means danger. That seems to be the controversy. We know it means danger, but we don't all agree that it means stop.

MR. C. H. STEWART (Laclede Gas Light Company, St. Louis): I don't believe you can adopt any better method than the standard signals of railroads.

(Mr. Smyth's motion, to adopt the report of the Special Committee on Color and appoint a committee to investigate the matter thoroughly in all cities was carried.)

#### APPOINTMENT OF COMMITTEE TO INVESTIGATE TRAFFIC LIGHTS IN ALL CITIES

CHAIRMAN TALBERT: I should like that committee to consist of five members. I will ask Mr. Verheyen, Mr. Bradley, and Inspector May to serve, and add two other men, one from an automobile club and one from some other industry.

That committee is to make an investigation and report as early as

possible. I suggest that some information be gotten together before the meeting of the traffic men in Cleveland. The local council secretaries have a meeting every three months, and it is highly desirable to have these matters presented to them. They are pretty thoroughly in touch with all members of this committee and all members of this Section. I shall ask that Committee to have a report by the middle of November.

Let us proceed with the report of the Vigilance Committee. I will ask Mr. Stewart to present this report.

### REPORT OF VIGILANCE COMMITTEE

C. H. STEWART, LA CLEDE GAS LIGHT COMPANY, ST. LOUIS

Mr. Bruner, who is chairman of this committee, unfortunately is ill and unable to come to Milwaukee at this time. In looking over his papers in a hurried manner, I find that definite plans for organization of a vigilance committee have been adopted by the Oregon and Columbia River Division, Kansas City Division, and the Delaware Safety Council.

The plan outlined by Kansas City is probably the most complete. It includes by-laws, credential cards, instructions to vigilantes. The entire committee work has been definitely outlined. We haven't had time yet to write up in detail the definite plan that we are following in St. Louis.

I do not know which city was the first to inaugurate this vigilance committee work. In St. Louis, we started the work about two years ago, and it was started in rather a haphazard manner. Anybody that came along and wanted to join a vigilance committee, signed a card which wasn't much of an obligation card, and as a result there were about thirty-four on the committee.

About a year ago, we felt that this committee should be reorganized and put on a business basis, and we took off a tabulation of all of the reports made by the vigilantes and from that list we selected men who had been most actively engaged in this work. We then presented our plan to the Board of Police Commissioners, which up to that time had not been considered in connection with this vigilance work in St. Louis.

We designed an application blank which would give us desirable information on every applicant for this work. These forms were all submitted to the Police Board and discussed, and they finally approved our application blank and our plan. Every vigilante must be sent to the Chief of Police. In fact, the Chief of Police passes on this man's credentials. Our application blank is somewhat lengthy, an oath of office is incorporated with it, and it is approved by our committee. Then it goes to the Chief of Police and he checks up this man's record. If he is acceptable, the Chief of Police finally approves him.

We also issue a credential card which is for the purpose of identifying the vigilante at any time that may be necessary, or at any time that he may require the services of a licensed officer. Several of our members have been licensed, have taken out licenses, which have been issued to

them by the Chief of Police, which gives them police powers on the street and permits them, if necessary, to carry arms.

SELECTION OF PERSONNEL IMPORTANT

We have found that it is very necessary to scrutinize the personnel of our vigilance committee. The personnel of our committee includes some of the most important business men of our city, presidents and general managers of the different corporations, and without mentioning this in any disrespectful way at all, there are only three men who classify themselves as clerks that are members of our present vigilance committee. The balance of the committee is made up of executives and prominent business men of the city.

We have report cards similar to those used in Kansas City, Portland, and Wilmington, and these cards go to the secretary of the Complaint Board, a part of our municipal government. The secretary of the Complaint Board writes the violator a very courteous letter, calls his attention to the violation, explains the law to him and asks his co-operation in reporting further violations. We could show you not only dozens but hundreds of letters that have been received in answer, in many instances pledging their support to the movement and asking if they could not be made members of the vigilance committee.

Our present committee consists of about 125 vigilantes. I just received a report of the work for last week, and there were 306 violations reported at last week's meeting. In looking over the total work done by our committee to date, the total violations amount to about 10,000 during a two-year period. We are very fortunate in having sold the safety idea to both the judges of our police courts. Many of you who were in the Public Safety Session the other day heard Judge Mix. It is unnecessary for me to comment any further as to his ability to enforce the law. Our other judge is equally interested in handling these cases. We have, however, encountered some trouble and difficulty in connection with the city attorney's office in St. Louis.

I neglected to state that our police department is not a city institution. The police of St. Louis are state officers, whereas, the city government is conducted as your government here.

CONSIDERING ADOPTION OF KANSAS CITY PLAN

We are hopeful of having what is called the Kansas City plan adopted in St. Louis. This plan is being considered by the police board at the present time. If this plan can be carried out, we expect to have a commanding officer of the police department appointed as traffic director of the police department, which includes the traffic squad, and this man will receive the reports of the vigilance committee and handle the matter according to the plan Mr. Smyth has worked out for Kansas City. We believe that that will be more effective. We believe that the period for moral suasion to a certain extent has passed. It has come down to a question of law enforcement, and the only way you can get law enforce-

ment is to have enough policemen and motorcycle men to arrest the violators and take them into the court.

We have secured a good deal of publicity in the newspapers on account of the activity of various members of the committee. You can readily imagine when we go out and arrest the Mayor's son, there would be quite a little stir among the newspapers and the people of St. Louis. Fortunately, the judges have been impressed by the personnel of our organization and when our members appeared as witnesses against violators, we usually have been able to win our cases.

MR. SIDNEY H. COLEMAN (Buffalo Safety Council, Buffalo): May I ask a question? Have you figures showing the number of second complaints that have come in on persons who have received this letter?

MR. STEWART: I have no figures on that. I know there have been a number of cases where a second, third, fourth, and even a tenth complaint has come in on the same violator, not a gross violation, but, perhaps, just a minor violation such as a machine being parked without proper lights at night. That was one of my reasons for saying that the time for moral suasion has passed. We feel that motorists of St. Louis ought to know—they have been given every opportunity to know—what the traffic laws are and how they should drive safely, and how they should conduct themselves. For that reason, we are inclined to feel that a strong effort must be made to arrest these people, bring them into court, and fine them.

Mr. Marsh, the secretary of the Complaint Bureau, has kept records of that kind, but I haven't them with me. I know there are a number of cases where there is more than one complaint against the same violator. With this new scheme being proposed, there will be a record of the complaints, a record kept of every report made, and that will be kept with additional effort.

MR. COLEMAN: The objection has been raised in our city that there might be cases where spite would enter into the complaint and jeopardize the value of the service.

MR. STEWART: We have tried to avoid any situation of that kind by a careful selection of the members of our committee. It is hardly believable that your prominent business men, attorneys, presidents, secretaries, and general managers of corporations would stoop to petty action of that kind. In our application blank we insert this: "Do you belong to any society, organization, or association, or have you any principles, scruples, or opinions that would prevent you from properly discharging your duties as a member of this Committee?" We felt that that would take care of any circumstances of that kind.

CHAIRMAN TALBERT: I shall ask Mr. Smyth to lead the discussion and answer any questions you care to ask.

#### DISCUSSION

MR. SMYTH: When we started out to organize a vigilance committee, we decided unless you put some real teeth into the organization it

would be ineffective, so we started by getting our police commissioner on an executive committee, and we found that that, after all, did more to put it over than anything we could do. We got, at the start, the cooperation of the police, and the result of our first meeting was an agreement that we would organize a vigilance committee and operate under the police board and the local safety council. All reports turned in by a member of the vigilance committee were to be acted upon by this lieutenant of police, and in no case would any man be permitted to escape with merely a letter.

I think that is the big thing in this plan. If you write a letter, you put the violator to no inconvenience. If you make him come in, it amounts to an inconvenience, so, from the very start, when a vigilante made a report, the offender's license number was turned in to this lieutenant of police, his name and address looked up, and he was asked to call within three days. When he came in, he stood in line half an hour or an hour before he was seen by the lieutenant and given a talk. In this letter he is never told of the offense reported against him, he is merely told that he has violated the traffic ordinance.

We give him no chance to say anything. He doesn't know what has happened, what he has done, until he gets to the Bureau. When he gets there, he is told he is guilty of such and such violation of traffic ordinance. He is given a talk on that particular section. He is asked if he knows what the traffic ordinances of the city are, if he knows the rules of the road, and so on. He is then given a good lecture—it is all done very seriously—and then told not to repeat the offense or any other violation of a traffic ordinance.

Our slogan is that there is no escape. He can't get by if he ignores that letter. We give him three days after the date of the letter, three days of grace. We have one motorcycle man who does nothing but go out and get the fellow who fails to answer that letter. We started out on the theory that police departments are not getting the respect to which they are entitled from the public. Unless they do get that respect, unless they are recognized as the protecting force of the city, the entire traffic problem is unsolved. Our theory has been that the vigilance committee of the local safety council must be the organization that backs to the limit the police department. When the motorist violates the traffic, he must be brought in. If he won't come when he violates the law—we have a method of handling them when they get rough, when they are "hard-boiled". Even when they come in voluntarily, they feel that they have rights, because they have a Mercer or something like that and can go any speed they want to, and don't have to recognize the laws.

We first had a problem handling those fellows. They came in, they were fresh, they virtually told the police that they had political pull or some other influence, didn't have to obey laws, and didn't want to be bothered. One of the most prominent men in Kansas City created a new system through his attitude. When he came into our court, we put him in jail for a few hours. He was a very prominent man. He had influ-



ence. He couldn't get it in our court. Our agreement with our police commissioner was that no influence of any kind went with our traffic bureau.

We happened to have a lieutenant in charge who has absolutely no regard for anybody's standing or influence, so we took this prominent man along about three o'clock one afternoon; about half past six we brought him out, and he had a great deal of respect for the law.

We found that that will work, and that it is one of the most important things you can do in committee work. If your police department is working with you, if you have the nerve to say that traffic problems are a matter of life and death, and that there shall be no use of influence, you can put over your traffic work. You can stop these violations; you can catch this type of man who violates the ordinances. We are not looking for the man who is guilty of a minor offense. We are out for the man who thinks that the streets belong to him and that no other fellow has rights. Whether your police or traffic courts are effective or not, your police have this power and can take a repeater at noon, lock him up, and hold him until late in the evening.

I believe the laws of most cities permit twenty-four hours of holding a man on a book for investigation. I don't know whether that is the rule in all cities, but it is in Kansas City. Twenty-four hours in jail is a better cure than a hundred dollars fine, and it works.

We have had very few repeaters. We don't turn in many reports. We have an organization of about 220 vigilantes. We don't average more than ten reports a day, but our vigilantes are asked not to turn in insignificant cases. We want to get the fellow who is really a menace, keep him out of the police court first, but, if necessary, take him in later. Our police commissioner said thirty days after the Bureau was organized that violations had been reduced eighty per cent. That was an exaggeration. He is a member of the vigilance committee. He is enthusiastic, but I do think we have reduced violations twenty-five or thirty per cent.

Unquestionably, the vigilance committee is going to do more good than any one other feature of public safety activity.

MR. L. A. DEBLOIS (E. I. du Pont de Nemours & Company, and Delaware Safety Council, Wilmington, Del.): The point that stands out very clearly in my mind is that you have two classes of offenders to deal with: one is a very large number of purely careless drivers of decent reputation, men who know the traffic laws, but are in a hurry to catch a train, are in a hurry to get home; the other consists of the consistently reckless and indifferent drivers.

Now, our experience shows that if your safety council is known as having the absolute co-operation of the city government, courts, police department, and so on, your warning letter is extremely effective in the first class of offenders. Of course, there is no way to tell actual results. Presumably our traffic offenses by those careless people have decreased about fifty per cent in the one year and ten months that our committee has been working. That would be my estimate. We, I think, have re-

duced a very large number of traffic violations of that character. In other words, we have gotten the careless decent driver.

We are beginning to get the reckless driver, and we are getting him in this way: Formerly, we handled all matters directly from the secretary's office, that is, the vigilance committee reports came to him on a postal card form. He issued his warning letter, requesting a reply, requesting the individual to appear at the office and a very large number did appear at the office. Recently, we have gotten the city courts to accept the vigilance committee reports. Now, when the warning letter is sent, it goes to the city courts, the city clerk keeps a record and when the police make an arrest for traffic violation, before the case is called, the clerk looks up the record, gives the judge a memorandum of the vigilance committee's complaint standing against him, and the judge considers that in hearing the case. That was found extremely effective, I think, largely through the general propagation of the knowledge that those records actually have a court value against the men.

It is not necessary with us to have vigilance committee men sworn in as special officers. On a clear-cut offense, indicating to a vigilance man or woman that an arrest should be made at once, instead of a warning message, they call up the Chief of Police, and the chief puts a man on the case. It is unnecessary for the vigilante to be identified at the time the arrest is made. We have had very few of those cases for the reason that we have found the vigilance men as a rule are loathe to take the necessary time to appear in court.

One other point: Your vigilance committee is of use in another way. If you have enough members, you will find that they will enable you to bring cases to court that otherwise wouldn't appear in court. For instance, we had a case of an elderly woman killed at a street intersection. A moment before she was struck, one of the vigilantes was engaged in taking the number of the car, and we had him, of course, as a witness. We have three or four cases of that kind.

We had a case of a collision. One of the men happened to be one that we were waiting for, really, because we knew he was a reckless driver. The police could find no witnesses at all. We were fortunate in picking up a vigilante who had witnessed the speed of this fellow one block ahead of the place where the accident occurred.

Get a number of vigilantes on the street, and you will find them useful when you least expect it. Their work is surprising, absolutely surprising.

MR. E. B. LEFFERTS (St. Paul Division, National Safety Council, St. Paul, Minn.): I wanted to ask whether there was a record kept of reports other than those made by vigilantes. In other words, if a motorcycle man picked up a violator, do you not keep a card index record of him the same as the vigilantes' reports, so that you have a complete record? We are doing that in St. Paul.

MR. SMYTH: We keep a report of every arrest by a vigilante. We have an index by numbers and cross index by name. In other words, when a man is booked at a police station, the lieutenant of our traffic bureau

gets that record, following out what Mr. DeBlois has said. That record is taken into police court every morning. We have arranged, since the organization of the committee to have traffic cases heard on alternate days, so our lieutenant in charge of traffic can be in court with the names of every man and a copy of his record. If the man has ever been reported by a vigilante, the judge knows that; if a man has been previously arrested, that is all in the hands of the judge of the court when he hears that case.

The importance of that is when a fellow comes in and says that this is his first offense and is not telling the truth, the record is there for the judge to examine. It is very important as a part of the vigilance committee work to keep that record up to date, and to indicate arrests as well as reports by the vigilance committee.

Just as an illustration of that, we had a motor car salesman not long ago who was caught going fifty miles an hour on the boulevard. We showed through our vigilance committee record that this man had been reported a number of times. He was fined \$50 in the police court. He began to bring pressure to bear and appealed to the criminal court. The vigilance committee went to work to see that his fine was upheld in the criminal court, and much to our surprise, through the use of our records, and the fact that we appealed to the court, his fine was jumped from \$50 to \$500.

MR. H. H. HURDMAN (Oregon and Columbia Basin Division, National Safety Council, Portland, Oregon): We have the co-operation of the police department and of the municipal court in the enforcement of the reports of the violators. We have very little difficulty in getting complete co-operation of our committee members.

I am confident that if this movement spreads throughout the country, the question of the control of the automobile traffic of the cities will be very greatly advanced. I want to say that we have followed the plan as has been outlined by Mr. Smyth with the exception that we send out the letter on the first offense, and on the second, we bring them in.

MR. J. C. TOWNSEND (Grand Rapids Division, National Safety Council, Grand Rapids, Mich.): Our vigilance committee is newly organized and has been functioning for about six weeks. It is fashioned along the same lines of St. Louis, and Kansas City, with a maximum of fourteen members and a police enrollment of ninety.

So far, while our reports are coming in very generously, we have had no second reports on any one. We have a little form in addition to the personal letter that goes out to the offender, giving him specific instructions as to what will happen on the second offense.

It is a nice, cordial, friendly letter he receives at first from the local safety council office, but he is informed that the second offense will be answerable at the police station and to the Chief of Police. Our people are writing very cordial letters, after receiving the letter of caution, and one man felt so good about it that he enclosed \$5 to help the work along with postage and other things.

One particular thing we have in consideration is the necessity of what might be known as a flying squadron, fifteen or eighteen men, who would be commissioned as deputies, sheriffs, and police officers, who could be sent out on special missions here and there through the city at the call of the police, and we feel that this is going to be worked out in the near future.

CHAIRMAN TALBERT: We have so encroached upon our time by the discussion of this interesting subject, that I must allow just two more minutes for one more gentleman to close this discussion. Mr. Price has asked to say a word.

MR. C. W. PRICE: In going about the country, I find policemen discouraged about making arrests because they can't get prosecution. I find citizens wondering how they are going to get this thing started, and more and more the idea is growing on me, and I am repeating it over and over again, that we can only have law enforcement as we develop public opinion. We can develop public opinion only through organized effort. I don't know of any more effective means of molding public opinion and doing it quickly and effectively, than an efficient Vigilance Committee.

CHAIRMAN TALBERT: I think the next speaker will be glad to intermingle in his report, some of the questions that have been heard.

I have the pleasure to introduce to you the Honorable George E. Mix of St. Louis, who is to report on law enforcement.

#### REPORT OF COMMITTEE ON LAW ENFORCEMENT

JUDGE GEORGE E. MIX, MUNICIPAL COURT, ST. LOUIS

In St. Louis real, frank law enforcement began in the early part of the year 1919, insofar as traffic laws are concerned. Automobiles increased in number, and the traffic laws increased in number, but the automobiles overran the traffic laws. In 1918, the last year in St. Louis before traffic laws began to be enforced, the total number of automobiles in St. Louis was about 32,000. The total number of deaths was 160.

In 1919, the automobiles in St. Louis had increased from 32,000 to 48,000, an increase of 16,000, or 50 per cent. In 1919, the number of deaths in the year could have run as high in proper ratio as 150 in contrast with deaths to the number of 100 in 1918.

Traffic law enforcement stepped in there and instead of the deaths in St. Louis in the year 1919 running to 150, as the automobiles had increased fifty per cent in number, traffic law enforcement cut the deaths to 97.

The number of accidents in St. Louis in the year 1918, with practically no law enforcement and 32,000 machines in the streets, averaged about 700 per month. In 1919, with an increase of fifty per cent in the number of automobiles, the number of accidents in St. Louis, instead of averaging 700 per month, were cut to 500.

Now, if you are interested in the number of accidents that occur in the

streets, then just listen to the property damage loss, keeping in mind the fact that the property damage loss is paid, by whom? The people of your city. Money doesn't come out of the air, from out of the clouds, from Heaven, or from any other place, to compensate people for property damage loss, and you know it. That is a material, physical loss that any business man can see and understand. In St. Louis, the property damage in 1918, with 32,000 automobiles in the streets, was about \$785,000, over three-quarters of a million dollars.

In 1919, under traffic law enforcement, and an increase of fifty per cent in the number of automobiles, you could logically figure that the proper damage loss would run \$1,200,000, but it was cut down to \$660,000.

Is law enforcement an economic and financial success? Ask the business man who pays those losses.

#### ORGANIZING THE COMMUNITY INTERESTS

Now, in connection with this law enforcement and law enforcement generally, don't think that any one of us is capable of going back into our own towns and trying to put it over single-handed and alone. You can't do it, and it wasn't done that way in St. Louis. You may interest your automobile club, your safety first committee in traffic law enforcement, in safety first, if you please, but let me assure you that the formation of that safety first committee and the manner and method in which you keep it together is the all-important subject.

First of all, you should arrange to have a monthly dinner in some hotel or convenient eating place. It should be strictly informal. The dinner should be held about half past six in the evening, and you who are starting the movement should invite men and their wives to attend that committee meeting, informing them in your letter that he and she, particularly he, has been appointed a member of that committee. You don't have to tell him that you appointed him. He is honored with the fact that he has been appointed a member of the safety first committee.

Now, you have got to use judgment in your selection. Don't forget the judges whose inspiration is absolutely necessary to make a success of this undertaking.

You are learning from the experiences of others. In order that that lesson may be made clear and that you may have a practical view of it, let me tell you our experience in St. Louis along that line. Every month a public safety first committee dinner at one of the hotels, a cheap dinner at a dollar or a dollar and a quarter a plate, is given. It should not be more than that. If you do not get enough to eat there, eat more when you get home, but remember it is public safety first and your stomach afterward. Don't think you can make a success of that dinner at a high price. You can't do it.

#### POLICE SHOULD BE REPRESENTED

Among those men to come to that dinner should be your Chief of Police. The officer in charge of your traffic officers should come. By traffic officers in large cities, you all know whom I mean—the man down

in the heart of the city directing the traffic. It might be well to invite some of the traffic officers, or all of them. Tell them they are members of this committee.

Then invite the officers in charge of your motorcycle squad. It might be well to invite the members of the motorcycle squad, and their wives. You should invite the officers—particularly the president and secretary—of your automobile club or clubs. If possible, you should invite their boards of directors to attend these dinners.

You should have the officers, particularly the president and secretary, of your automobile dealers' or agencies' associations, and the officers of the association of tire dealers.

You should have the prosecuting attorneys who deal with the prosecution of these cases on that committee. Invite them and their wives.

Invite your team and truck owners' associations. Get all of them if you can. They will be the biggest boosters or the worst knockers you have ever met, and after you have trained them, you will find they are the best boosters in your city.

If you have no truck and team owners' association, invite half a dozen of the leading truck and hauling men of your city. Get the officers of the civic clubs, your chambers of commerce, your city clubs, civic organizations of any and all kinds, into that committee dinner and on the committee. And then, get the officers of the women's clubs in your city.

Don't forget the judges. I am going to tell you they are human and they like to be invited to join such things and such institutions because with all the others whom I have named—I don't care how much you respect or disrespect them—if you don't invite your judges, you have a body without a head.

You can get all these other organizations and these other people who represent these organizations to work, and the automobilist goes before the judge, and the judge hasn't been invited, hasn't been seen, and hasn't been talked to, by you—the complaint is general in the United States that the judges are easily misled, easily convinced that some politician is entirely innocent, or that some wealthy man is always innocent—well, that judge still remains in that state of mind.

In St. Louis, we had a meeting of women automobile drivers. It was held one afternoon, and it was a cold, bleak, threatening afternoon. The meeting had an attendance of 500. There were several speakers, Mr. Morey, Dr. Payne, Dr. Vitt, and myself. The meeting was for women drivers. Every seat in that auditorium was occupied and they were standing up in the rear. Get the women interested in your city in traffic law enforcement.

Dinner meetings have no limits as to the size of your committee. The larger the meetings, the larger the committee, in other words, the greater your influence.

This is a simple system that anyone may take back to his city and carry into effect. It is a practical plan that has been done in a practical way in St. Louis.

## FIRST OFFENSE BUNK

Now, as to law enforcement along other lines: I believe in fines and I don't believe in any of this first offense propaganda. Automobilists—most of them are human—form habits exactly like the pedestrian. Some people walk along in a slow, easy-going way, and others are more lively. Automobilists form the same habits. Some of them jog along ten to twenty-five miles an hour, but with others, why, the automobile wasn't made to go less than thirty-five or forty. They are human and they have habits. If you will stop to consider this thing, you will find that that is pretty generally true. You frequently have expressed the opinion, "I don't like to go riding with So-and-so. He drives too fast. I would rather ride with So-and-so. He drives at a speed which is safe."

Now, that being the case, when an automobilist comes into court—and you can take this message home to your judges—and he says, "Judge, this is my first offense," let the judge tell him as we do, "This is not your first offense, this is just the first time you were caught."

Before I went on that bench, I had read in the newspapers about men being fined as much as \$5 and costs, and in one of the city newspapers it was casually remarked that this was one man's seventh appearance on violation of traffic charges. Seventh appearance! Four have called on Judge Itner and me twice. What do you gain by trifling with law violators? A man goes out and says, "I am guilty, but this is my first offense." What are you going to do? The man with a machine going too fast was there with a weapon ready to kill, and the only reason he did not was because nobody stepped in his path. He was there with a weapon ready to kill just the same as if he had had a gun in his pocket. Teach them a lesson once and let that last for a good, long while. I believe in severe fines and no trifling with the law violator. Either you trifle with him or he trifles with the court.

I believe in imprisonment. Unfortunately, in St. Louis—here is a serious thing we have to contend with there—we cannot imprison, we can only fine, so that in the cities from which some of you come, where you have the right to imprison, get in to the judge's head that the prisons were made for something, and now that we don't have drunks to put in them, we ought to use them for the automobilists.

You can go into any city from Boston to San Francisco and you will find the courts, now that the poor, down-and-out drunkard has passed, have as a substitute the automobilist. Fine record, isn't it? A disgraceful record, seriously speaking. So-called business men, law-abiding men, men who would want you or me as jurors, to send everybody to the penitentiary who attempt to burglarize their homes, violate the law in some form or other, and should expect to pay the penalty. The way to teach that to your people at home is to form this committee along the lines I have indicated.

## IMPOUNDING THE AUTOMOBILE

I want to suggest a form of punishment that I believe is the most supreme form that has ever been adopted, and it is so effective that

apparently political influence has prevented its being adopted generally, and that is, the impounding of the automobile by the city. To illustrate, suppose a man is brought into a city court in June, charged with excessive speeding, or with some serious or minor violation, and the judge says, "Your machine will be impounded for ninety days," and orders the marshal or constable, as the case may be, to take that machine into the possession of the city, hold it in the city garage and keep it away from that man ninety days.

The newspapers would publish that and what would be the result? Would you go down there the next morning for a traffic violation? Would you advise any of your friends, who appreciated the use of their machines to go out and violate the traffic laws? Just think of the psychological effect on the people of the city!

Did you ever have your automobile laid up two or three hours longer in repair shop than you expected it would be? Do you recall what you said? Would you want to repeat it here? Did you ever have the painter tell you he would have to keep your machine two or three weeks longer than you had expected to leave it? Did you ever stop to think what a torture that is to you?

Now, get your minds back quickly to the man who in June is caught violating the traffic laws and his automobile is taken away from him and impounded for a period of ninety days,—June, July, and August, the summer months, without his machine!

If every city in the United States would adopt an impounding ordinance and every state an impounding law, so that the automobile of a law violator could be taken away from him one day or a half day, up to, say, three to six months, all the judges would have to do would be to pinch the automobile and the automobilist would receive his punishment through the direct line, and he couldn't kick about having to pay any money.

That, in my opinion, as one who has given this traffic proposition considerable thought, would be the most effective manner of safeguarding the streets.

#### HOW INSURANCE COMPANIES CAN HELP

Now, there are other things. The insurance companies—and by the way, I want those of the executive committee who are here to take some action to make some effort to have these laws carried into effect—place a premium on careless and reckless driving. The liability insurance companies, for a stipulated amount, will insure you against everything and some automobilists covered by the liability insurance do not care whether they run into some one or some one's machine or not. They say, "Oh, well, I am all protected by insurance."

Therefore, the executive committee of this association should take some steps toward inducing every liability or automobile insurance company to issue a policy and only such kind of a policy to automobilists as would afford the automobilist a graduated premium return. By that I mean this: (I believe there are only two companies in the United States who



are writing this kind of a policy. All the others are writing a full coverage policy, or such as you wish to take out, fire or theft.) Suppose your premium for full coverage as far as liability is concerned is \$150. Suppose the insurance company says, "In the event any losses suffered as the result of your driving do not exceed say, \$100, then the automobile insurance company will return to you \$50."

Think of the difference in the effect on the automobilist's mind if he is covered by such a policy, instead of being covered by a policy on which he knows he isn't going to get anything back. To illustrate that, I have a friend in St. Louis who has a Packard Twin Six. He drives the car himself as a form of recreation. We were accompanying him and his wife to the theater one night. He parked his car on an angle. He got out of the car and noticed that it was projecting a little too far out into the middle of the street. He said, "I think I will get back in that car and park it a little more to the curb. I just paid \$161 the other day for insurance, and it is a new kind of policy. In this policy I get back 40 per cent of what I have paid if my losses do not go over \$100, and I am going to save that 40 per cent." There was an inducement held up to that man to be careful, to be watchful. If you could interest the great liability companies in the United States to write such a policy, you would be doing a wonderful work toward the preservation of life in our streets.

#### NEED FOR UNIFORM SPEED AND LENS LAWS

Another thing that the executive committee should do along the lines of law enforcement is to make nation-wide effort to obtain universal speed and lens laws. It is extremely unfair to the automobilist who lives near the border-line of a state to get over into another state where the laws differ so greatly that the automobilist is often the innocent victim of arrest. A national effort should be made to induce automobile manufacturers to install lenses of a lawful type. In very few states today are plain lenses allowed by law. In almost all the automobile factories, automobiles are turned out with plain lenses.

The manufacturers' attention should be called by the executive committee of this Association to the fact that they owe it to the public to obey the law themselves, and they should equip the cars in the plant not only with horns as every state requires, but with lawful lenses.

Another thing that ought to be called to the attention of the manufacturers is the fact that all tail lights and dash lights should be connected in series. The tail light is a serious proposition. In every large city, the department of the city complaining most seriously about tail lights is the fire department. You will have to admit that the fire department is an important department in your city, and a pile of wood or a pile of coal in the streets must be lighted, and so a pile of tin, whether it is a Ford or an automobile, must also be lighted with red lights. The automobile manufacturers build most of their cars today with a tail light and dash light in no wise connected. When connected in series, if the tail light goes out, the dash light goes out also, and the driver instantly knows that the tail light is out.

An effort should be made by this association, the National Safety Council, to take up this important matter with the automobile manufacturers. It doesn't cost them any more to connect that tail light with the dash light than it does not to do so.

In most states, there are laws against cut-outs. Yet the automobile dealers are building automobiles with cut-outs attached to their mufflers. There should be a slogan adopted along the line of law enforcement, "You shall cut out the cut-out."

In St. Louis, we have two districts that are known as hospital districts, and you know it is a strange thing about some of these good citizens. They just delight in passing those hospitals with their cut-outs wide open. An automobilist sometimes develops a strange disposition. Now, if he were in that hospital, or if his wife were in that hospital, and quietness in that quiet zone were essential, he would want you and me to keep our cut-outs closed. In almost every state in the United States there is a law against the use of cut-outs and that law should be enforced. The best way to enforce the law is to get right at the source and that is the manufacturer who puts it there. There is no better way.

This world is full of troubles. In order to overcome the troubles in the traffic line, we have got to carry broadcast throughout this country a propaganda on safety first, and to that end, you should talk safety first. You should be preachers of safety first in the streets from the standpoint of value of human life, from the standpoint of decreasing the number of accidents, from the standpoint of decreasing the property damage loss, and from the standpoint of eliminating the damage suit expense to the employer of chauffeurs. Go throughout this entire country and spread the thought of safety first in the streets, and as you preach it, practice it.

CHAIRMAN TALBERT: I am sure we want to thank Judge Mix for his very able talk.

We have on the program the report of the publicity committee. I want to ask for that and to say that we will have the report of the membership committee later. I will call on Mr. DeArmand, Commissioner of Public Safety, Davenport, Iowa.

#### REPORT OF PUBLICITY COMMITTEE

LOUIS G. DE ARMAND, COMMISSIONER OF PUBLIC SAFETY, DAVENPORT, IOWA

I don't think enough cities avail themselves of the publicity offered by the National Safety Council. I made a trip through eight or nine of the large eastern cities this spring, and it was surprising to observe how few cities had any publicity, or public display of the bulletins and other printed matter sent out by the National Safety Council.

When I got this big broadside that was sent to most cities (showing posters) I took the posters to both leading papers and had them put up beside the baseball scores, so that everybody could see them. They are here for distribution. Almost everybody is interested in baseball and it takes but a minute to see the score, so they read this.

Public Safety is purely a selling proposition. It has to be sold to the public. Seventy-two per cent of the buying influence is women's, and it is women who read the advertisements. Wherefore, advertising would seem to be the logical way to bring the message to the women.

Another diligent reader of advertisements is the resident of the suburb. The suburbanite is not 100 per cent interested in city news, particularly traffic news. However, the suburbanite likes to trade in the city, and in order to trade profitably, he reads the advertisements before he and his family go to the city.

Our suburbanite traffic as we all know, in all cities, is very heavy, possibly much more heavy than some of you would imagine. You would be surprised at the large number of suburban buyers that come in.

Before entering into this report I wish to state that the observations set forth here are the result of an extensive trip through eastern cities last spring, during which a study was made of traffic conditions and methods of giving publicity to traffic matters.

That you may appreciate the problem that confronts the public safety director as a publicity man, I think we should be reminded that the days when motor clubs vainly fought for recognition for the motorist are past. In the old days the law makers who owned cars were in the minority. Today they, and the judges who try motorists, are in power.

We may say, "Yes, but our laws prohibit drivers from parking in restricted districts, from exceeding speed limits, and from using any other than a certain type of lens in their headlights," but I think you'll agree that in general the motorist does not take the motor laws seriously but considers them made for the other fellow.

We know that every driver will break the speed law if he is in a hurry, or if he thinks he can get away with it. We know that the accepted idea back of our laws is to build up the fear concept in the minds of motor car drivers and so get them to drive properly. Fear and ignorance usually go together, but today people are wise.

The old time publicity of daily occurrence that heralded the fact that fifteen arrests were made yesterday for traffic violations, and that such and such fines were imposed, is not in evidence today in our daily papers. This publicity that promised to throw fear into the hearts of the motorists has now become a filler with newspapers. By that I mean that if there isn't enough other news to fill the columns of the papers the police or motorists' court items are put in.

We must not overlook the fact that in some cities the chief of police or commissioner of public safety is still able to get a certain amount of good publicity across but the day of the ordinary traffic story is gone. The city editors don't want it—in fact they cannot use it because with a business manager saying that twenty-four pages is the limit for the day's issue, advertisers begging for space, and a front page and editorial page reserved for news and articles, items about traffic are looked upon as "dope."

News, then, to get by the city editor, must be sensational, alive, thrill-

ing—or it doesn't get into print. The item that special officers are to be stationed at certain corners to control and regulate pedestrian traffic is lucky if it gets ten lines in the city dailies, while the interview with Mr. Blank of San Francisco to the effect that the local city's traffic regulations are to be copied by San Francisco scarcely elicits the lifting of an eyelash by our modern city editor.

Now let us face conditions as they exist today. The press agent type of public safety story is not wanted. The press agent, in fact, has been condemned by the various newspaper publishers' associations. Therefore, unless we have a live story we are classed with the press agent and our publicity for newspapers is not wanted.

How then can we get publicity—the most potent force within our reach—to achieve the ends we desire?

#### A CONTINUOUS ADVERTISING CAMPAIGN REQUIRED

Most cities conduct a safety first week each year. This is to be commended. Such an event brings forth a tremendous amount of free and paid for publicity on safety, but it only runs a week. We know that if Mr. Wrigley would advertise his gum for only one week a year he would not get sufficient publicity to carry his sales over the other fifty-one weeks, and we also know that a retail merchant must advertise oftener than one week in a year to stay in business. Yet for only one week a year do we advertise safety efficiently.

If it is worth while for us to devote our time and energies to educational work in schools, placing signs on our streets, issuing circulars, and making a supreme effort one week each year to impress safety on the minds of the public, it surely is worth while to consider the tremendous effect that would be produced upon the public were we to put a little added effort into getting our city officials to appropriate a fund for advertising every week in the year. Only by such a method can everyone know that jay-walking is dangerous, that the speeder is a menace to society, that a car with poor brakes is a death-inviting infernal machine, and that there is one law that must be observed by everyone, namely, "Drive and walk as you would have others drive and walk."

Now let us see what other cities have done in the way of publicity. Philadelphia is the only community that I know of where a definite idea was worked out in advertising form and used in newspapers and street cars. In Philadelphia the Rotary Club raised \$1,000 and conducted a campaign to educate the jay-walker. It paid Philadelphia. Street railway systems have long used street car advertising to educate the public in safety. Where local safety councils have been established, as in St. Louis, Cleveland and other cities, fine campaigns have been carried on, but as yet no association or city has ever built up a really business-like paid advertising campaign to extend over a long period of time to further public safety.

People forget quickly nowadays. One week's effort is good and has a

lasting effect upon a certain number but our accident reports indicate that too many people will forget.

I recognize the value of all forms of advertising but it seems to me that in advertising safety to the public it can be over-done. Therefore, in my opinion, I would confine a campaign to the billboards, street cars, and newspapers. I would make the campaign a vivid array of timely safety facts, brief and pertinent, so that the public can get the message through suggestion and not through wordy arguments. Such a campaign should be paid for by the city. It is something that concerns every person in the city, therefore it is a civic problem.

Our city officials are not blind to the force of advertising; nevertheless, they will have to be sold public safety advertising and the idea that they are obligated to educate the citizens of the city in safety principles, just as they now safeguard them with traffic police, garbage collection systems, honest weights, and red lanterns on piles of rubbish. To go one step further and protect the lives of the public, and particularly the children, by hanging out the white light of publicity is only good business; just ordinary common-sense directed to a problem that cannot be solved in any other way.

CHAIRMAN TALBERT: I should like very much, if it were not so late, to bring up some discussion on this matter. It will be brought up again to morrow morning.

ADJOURNMENT.

#### FRIDAY MORNING SESSION

THE meeting convened at 10:30 a. m., Chairman Talbert presiding. CHAIRMAN TALBERT: There are two or three important things to come up this morning, one of those being the preparation of the report of the nominating committee. To conserve our time, I want to ask Dr. Payne to present his report. I am going to suggest that we proceed at once with Dr. Payne's paper, and when the committees are ready to report, we will hear them.

#### REPORT OF COMMITTEE ON SCHOOL HAZARDS

DR. E. GEORGE PAYNE, PRINCIPAL, HARRIS TEACHERS' COLLEGE, ST. LOUIS

I think the most important thing in connection with the elimination of hazards insofar as school education is concerned, is to make an adequate study of the causes of accidents and base the instruction, whether it be in schools or elsewhere, upon the data thus gained.

Take one illustration: When we came to study the causes of utility accidents for a period of three years, we found that there were forty deaths and perhaps a thousand injuries among school children in St. Louis from public utilities, that is, from the three sources, railroads, street railways, and electric lighting and power companies.

When we took those cases and analyzed them to see what were the causes, we found that there were four situations in which these accidents happened: First, stealing rides on the street car, which is a very common practice in cities of the country; second, running or skating in the street, or playing in the street and being struck by a street car; third, grasping live wires, dangling wires, and climbing up into trees and getting hold of wires; fourth, playing on railroad tracks.

Here we have four simple situations in which all these deaths and accidents occur. How simple it is to eliminate accidents when you once know what causes them. So far this year, we have had only one fatal accident from public utilities to a child of school age, as compared with sixteen deaths last year. I am speaking of children of school age. There have been no fatal accidents to children reported by our power companies or by a steam railway, that is, to children under sixteen years of age, simply because we made ourselves familiar with the causes of these accidents and then proceeded to consider our instructions in reference to these causes.

The whole procedure was to analyze just as specifically as possible all public situations in which accidents occur and to make the instruction applicable to those situations. I think you can make the school children perfectly conscious of dangerous situations that will make them think of the possible danger—every time they pass one—and, therefore, avoid acting irrationally.

(Showing charts relating to school hazards.) In St. Louis, and it is true in Milwaukee and many other cities, the Board of Education requires a report of every accident that occurs from the time the child leaves home in the morning until he reaches home at night. That requirement is made because of the fact that the school board in Missouri is responsible for any accident that occurs to a child from the time he leaves home in the morning until he gets home at night; that is, they can be held legally responsible for any accident that occurs. For that reason I think the school accidents, in spite of the fact that no specific propaganda has gone on in the schools for safety, have been decreased.

The data have been filed. Such information has to be kept on file so that in case of legal procedure the evidence will be available. For that reason, during these three years, we had only two deaths occurring to children going to and from school, and only three hundred accidents.

#### ACCIDENTS IN ST. LOUIS HIGH SCHOOLS

Here we have our seven high schools. (Indicating on the chart.) From September, 1918, to January, 1920, a year and four months, we had a total of 84 accidents in the high schools. They are distributed as follows: 34 in high school A; 24 in B; 11 in C; 8 in D; 4 in E; 2 in F; 1 in G. At once you would consider that high school A was particularly hazardous and that this community was one in which accidents were particularly prevalent. The fact is that the school is new and mechanically perfect so far as physical hazard is concerned. The community is free from accident situations and is in a residence district. You come to the conclusion, therefore, that the cause of accidents there is not due to

physical hazards, but is due solely to the attitude of mind of the children and their parents with reference to accidents. Therefore, it must be a matter of education because the only way you can affect the mind is through education. It is the ideal of safety.

(Next chart.) This chart shows 18.4 accidents in high schools per thousand of school population on down to 1.1 per thousand of school attendance.

Table I. Accidents in Grade Schools of St. Louis September, 1918-January, 1920:

Distribution by School Districts

| Number<br>of<br>Schools | Number<br>of<br>Accidents | School<br>Population | Number of<br>Accidents<br>Per 1,000<br>Pupils |
|-------------------------|---------------------------|----------------------|-----------------------------------------------|
| 1                       | 9                         | 900                  | 10.0                                          |
| 1                       | 8                         | 700                  | 11.4                                          |
| 5                       | 35                        | 4,500                | 7.8                                           |
| 5                       | 30                        | 4,200                | 7.1                                           |
| 5                       | 25                        | 4,000                | 6.3                                           |
| 122                     | 228                       | 100,000              | 2.3                                           |

We had, in the grade schools, during this sixteen months' period, 335 accidents. As you will observe from Table I, in 17 schools we had half the accidents, with a total of 14,000 school population. 14,000 out of 100,000 school population afforded half the accidents. Here you find again it is not due to the number attending school.

Table I shows just what the problem is. Take the school with 11.4 accidents per thousand pupils. That school is within three hundred yards of the high school which shows a total of 34. You find those grade schools surrounding that high school showing exactly the same conditions as are found in the high school.

The elimination of these by accident instruction may be illustrated by what I said in reference to utility accidents, but may be also shown in reference to other accidents. We had a district that was particularly hazardous. It has three lines of cars running through it. It has the railroads on the one side coming into St. Louis. It has one very congested street, probably one of the most congested in the city. It had a high record of fatalities—I think four deaths in one year.

A few years ago, in that district there were four deaths, and no year went by without a death to a child of school age. There is where we worked out the plan of teaching safety, and in the past year we have not had a death in that district nor have we lost a day's attendance from school. One child jumped off an ash-pit and broke his arm, but he continued to come to school. No accident has occurred during the school day and none outside of school hours to children in that community.

(Next chart.) I want to show you the deaths that occurred during the same period. For the five years previous to 1919, we had an average of 125 deaths a year to children under twenty. Out of that number, 50 were in 1917 and occurred to children between six and sixteen. Up to 1917, the number had been increasing from year to year.

## EFFECT OF ANNUAL SAFETY CONGRESS

You who are from St. Louis know that when the National Safety Council held its Annual Congress there in 1918, some very effective work was done in moving pictures and in sending statements into the homes. For a month or two after the Congress, no accidents occurred because that work was done. The total accidental deaths to children for that year was 36, and I attribute the reduction to the work of the National Safety Council during the period that it was there.

We began to work out our plans soon after that, but the number of deaths in 1919 went back to 49. We were doing work in the schools that year, but the effect of that year, 1918, was carried over. Now, in 1920, when this chart was made, up to this morning, the first of October, unless an accident occurred yesterday, we have had only sixteen accidental deaths as compared to 49 last year.

Our superintendent said, addressing the teachers at the opening day of school, if no other service had been rendered to the city of St. Louis, \$26,000,000 would be well spent in saving the lives of those children. Coroner Vitt said at our meeting the other night that he didn't know when a child of school age had come into his court.

In spite of the fact that the hazardous conditions have increased enormously on account of street traffic, there has been an increase this year in the total number of accidents over these last years up to October 1. We hope to decrease it before the end of the year. The accidents to children have been cut in two. We hope to get to the end of the year without a single death. Now, that the thing is beginning to come into Catholic and parochial schools as well as the public schools, I feel sure that we shall come out all right. There were 49 last year, 36 the year before, and 50 the year before that.

(Next chart.) This chart shows the causes of accidental deaths to children during 1917, 1918, and 1919: Automobiles 46; street cars 15; wagons 5; railroads 5; firearms 9; burns 21; drowning 9; and from all others, 25. This year we have practically eliminated deaths and accidents except from the automobile. That is our problem now, as shown by our experience this year.

## TEACHERS KNOW ACCIDENT CAUSES

By the way, there again you see what we are doing. I went through all this data very carefully, defining the causes of these accidents, and they have been brought to the attention of the teachers in this city so that every teacher knows exactly what the danger is. She isn't saying to the children, "Be careful." She says, "You must avoid automobiles by looking both ways when crossing the street and by not playing in the street." She is saying, "You must not handle firearms at all. You must not handle fire. You must not start a fire with coal oil or gasoline. You must do certain things, and not certain others." She is not only instructing them in that way, but she is dramatizing it. She is showing how these accidents occur. She is having them live it, and then they are organizing schools into groups in which they can get together and discuss



these matters. Every school is coming to be a safety organization, a miniature safety organization, such as a large community safety organization.

Table II. Accidental Deaths to Children of School Age, St. Louis, 1917, 1918, 1919, and Jan.-Feb., 1920:

| Number<br>of<br>Schools | Number<br>of<br>Accidents | School<br>Population<br>(approx.) | Accidents<br>Per 1,000<br>School<br>Population |
|-------------------------|---------------------------|-----------------------------------|------------------------------------------------|
| 1                       | 6                         | 900                               | 6.9                                            |
| 1                       | 5                         | 900                               | 5.5                                            |
| 3                       | 12                        | 2,500                             | 4.8                                            |
| 14                      | 42                        | 10,000                            | 4.2                                            |
| 18                      | 36                        | 16,000                            | 2.3                                            |
| 25                      | 25                        | 20,000                            | 1.2                                            |
| 48                      | 0                         | 35,000                            | 0.0                                            |

In one district there were 6.9 accidental deaths for every thousand children of the school population; in another, 5.5. By the way, these districts were generally located in the districts where we had the highest number of accidents and not where one might expect a large number. Table II also shows that the accident problem concerning children is not a problem of the whole city. There are certain sore spots that need specific attention for various social reasons that I cannot take time to discuss here. The attitude toward safety in these districts is not what it should be.

My point is that by analyzing all the accident statistics and bringing the facts to the school children, you can virtually eliminate accidents from the city. In fact, not only the public school accidents can be eliminated in this way, but the industrial accidents as well.

#### DISCUSSION

CHAIRMAN TALBERT: The feature upon which Dr. Payne is to be congratulated is not only that he has accomplished results, but that he is able to show it, to show that the school work that he is doing is able to produce results.

MRS. C. B. HARDIN (St. Louis): May I add that this school that has the most perfect record from accidents is the one adjoining Dr. Payne's school, Harris College? There are evidently better effects when nearer the source.

CHAIRMAN TALBERT: I think too much emphasis cannot be laid upon the importance of this work. Statistics are essential if we are going to get this particular idea effectively through the country. In other words, the mere statement to anybody that certain work is successful or that certain efforts along certain lines bring results, is not sufficient. You have to prove it by figures. You must be able to prove to people who are interested that you are getting definite results.

I will now ask Mrs. Payne to make her report.

## REPORT OF COMMITTEE ON HOME HAZARDS

MRS. E. G. PAYNE

NATIONAL CHAIRMAN OF COMMITTEE ON HOME HAZARDS, ST. LOUIS, MO.

In the complex conditions of modern life, "home" today may mean, not the spacious rooms of the home of former days, but the "Parlour, Bedroom, and Bath" of theatrical familiarity; or a de-ficiency apartment with Murphy-in-a-door beds and other space-saving devices. Throughout the range of whatever kind of a home shelters the family, the problem of the hazards to be found there is a matter of great social concern. Especially should it concern us women of the Safety Council.

The problem of accident prevention has been faced and plans for the solution are already in operation in Industry, in School education, in Public Utilities, and in Public Safety, and it seems to me to be a particularly happy privilege that is offered to women to help solve the problem of Hazards in the Home, for that is peculiarly our province and our domain.

Probably few people realize that more accidents happen in and about the home than under almost any other condition. The Travelers Insurance Company of Hartford, Conn., states that during 1917 nearly 28 per cent of the total number of claims paid for accidental injuries (not including industrial accidents) were for injuries received in and about the home—the number being considerably larger than that for any other class of accidents.

While many of these accidents produce only slight injuries, yet a considerable portion of them result fatally; and however serious or slight they may be, the social problem which they present, in these days of conservation and efficiency, is serious. Accidents almost always entail loss of time, both on the part of the ones injured and of those required to minister to them. There is the physical suffering which follows, and the mental anguish if the case is serious or fatal. There is the expense which, being unexpected and therefore not planned for in the family budget, in many cases is a serious inconvenience to meet. And there is the loss of life if the accident results fatally—a loss which is incalculable from the point of view of future possibilities and hopes, and immeasurable in its effect upon those who are left.

The seriousness, therefore, of home hazards—most of which might be eliminated—must appeal to all who give the matter their attention. Again quoting from the Travelers Standard, during 1915, in one county alone of Illinois, one hundred five children were fatally scalded or burned, while in the same year in New York City, one hundred seventy-nine persons were killed by fires resulting from matches, lamps, candles, bonfires, etc., sixty-five of these being children under fourteen years of age. In our own city of St. Louis, according to Coroner Vitt's report, in the first seven months of this year, there were twenty-eight deaths from burns alone, fifteen of which were children under fourteen years of age.

But burns are not the only home hazard. The causes of accidents in

the home might be classed as follows: falls, burns, cutting, poisons, and miscellaneous. *Falls*: either by slipping on floors or on rugs that move on polished floors; falling down stairs; falling from dangerous ladders or from ladders that slip when propped; or falling from window-sills. In the city of Chicago alone, in one year, fifty people were killed by falling from windows.

*Burns*: The common match is a quick servant but a deadly enemy to those who handle it carelessly. One-fifth of all the fires in the country are due to matches and people's carelessness with them. The open fireplace, unless properly protected by a screen, is a menace. Many accidental burns and scalds occur from tipping over of kettles, tubs, and other receptacles; from escaping steam; from spattering grease; or from children falling into hot liquids. Another danger is from children playing with bonfires and jumping through them. Electric lights, electric irons, percolators, toasters, vacuum cleaners, washing machines, mangles, and other electrical equipment for modern housekeeping are a frequent source of burns and serious fires. We have also the hazard of burns resulting from the explosion of gasoline, kerosene, and gas.

*Cutting*: Many accidents in the home result from cutting with edged tools, implements, knives, can-openers, broken glass, etc.

*Poisons*: A common danger in the home is poison in any form, which children can get hold of, or adults take by mistake.

Then there are the miscellaneous accidents, such as colliding with the edge of an open door, getting particles of foreign material or acids in the eyes, stepping upon tacks or pins with bare feet, handling firearms, etc.

The means of preventing accidents from the foregoing causes are entirely a matter of education. In this field—as has been done in education in accident prevention in the schools as well as in industry and in public safety—we must first learn every thing that can be learned regarding the causes of home accidents and the ways and means of eliminating these causes, and then there must be a campaign of educating those whose responsibility it may be to make the home safe—and that seems to me to be primarily the function of women.

Some efforts have already been made to bring this work to the woman in the home but there remains yet infinitely more to be done before the problem of safety in the homes has reached the degree of solution that has already been achieved in the problems of industrial safety, school safety, or public safety. Such men as Mr. S. Walter Forster have already done much for the problem of home safety. Mr. Forster has been working upon it for the past fifteen years, and no one can hear him tell about the hazards in the home without at once recognizing the thorough study that he has made of this subject, and the simplicity with which the elimination of those hazards might be accomplished if only the other half of the program of education might be carried on as thoroughly and effectively.

It seems to me, as Chairman of the Home Hazards Committee, that this field of activity offers tremendously appealing opportunities to women—opportunities which are a privilege as well as a grave responsi-

bility. I have reached nearly all of the safety councils in the country which have paid secretaries in an attempt to find out what specific efforts have been made in this work, and find that the movement has hardly started except in two or three cities. However, I find that almost without exception, the safety councils are ready to welcome a Committee on Home Hazards, and especially a woman's committee.

In almost all of the cities in which safety work is being done, women are co-operating in promoting safety in the schools and in endeavoring to secure the co-operation of the Women's Clubs and Churches in a general way, and in some cities more specific work has been done.

In Minneapolis a school for women drivers of automobiles was attended by five hundred women. In Syracuse two women are on the Traffic Committee, and are very active indeed. In the Chicago Safety Council women are represented on their Committee No. 9—Women, Homes, Churches, Schools, and Colleges—and on Committee No. 11—Speakers, Publicity, and Motion Pictures. The Oregon and Columbia River Basin Division at Portland, Oregon, has the active co-operation of women in the Committee of Women's Clubs and Motion Pictures. The Rochester Safety Council has the active co-operation of women only in individual cases, such as that of Mrs. Steinhauser, who has been telling safety stories, similar to the Peter Rabbit stories, to the children.

The Woman's Committee of the Public Safety Committee of Allegheny County has been most active in a campaign for fire prevention in the home. Largely through the influence of their chairman, Mrs. Enoch Rauh of Pittsburgh, 232,000 questionnaires on fire hazards in the home were sent through the public school children into the homes. A 60 per cent return was received on these questionnaires, which was turned over to the fire chief. Largely also through the activity of Mrs. Rauh and her Committee, 50,000 home bulletins carrying statistical information on home fatalities were sent into the homes and were displayed in the windows of homes during their Accident Prevention Week. Mrs. Rauh also made an address before the Congress of Women's Clubs of Western Pennsylvania, as a result of which many club presidents made fire prevention talks before subsequent meetings of their clubs. I have no doubt that Mrs. Rauh and her committee are planning and doing most important work for safety both in fire prevention and accident prevention in the homes.

In St. Louis, in October, 1919, the Woman's Section of the Mississippi Division of the National Safety Council was organized, with Mrs. Charles B. Hardin, Chairman, Mrs. Arthur T. Morey, Vice-Chairman, Mrs. E. George Payne, Secretary, and the wives of many of the men of the Council as members. This Committee has held a regular luncheon meeting once a month ever since for conference and plans, as well as attending the regular monthly dinner conference of the Public Safety Council in large numbers. Their program for last year was to secure general publicity for, and interest in, the safety movement among the women's clubs, churches, and women in the homes. Every woman's organization, so far as we know, was listed and received information on the work of the Safety Committee to be presented to their organization. Our

Chairman, Mrs. Hardin, addressed the Conference of Churches composed of about three hundred ministers of our city churches, and interested them to such an extent that they gave her their signed word to support the work of the Committee. Every Catholic school in the city was visited by a member of the Woman's Committee and presented with the book on "Education in Accident Prevention" which was provided through the courtesy of the Safety Council. A copy also was given to each of the Lutheran schools.

In these specific ways the Woman's Committee took the safety propaganda to the women's clubs, churches and parochial schools—the public schools already having a thoroughly organized system of safety education. We then held a most successful and enthusiastic mass meeting for women drivers of automobiles in St. Louis, which was attended by more than five hundred women—and a generous sprinkling of men. Mr. Arthur T. Morey outlined the general idea of the Safety Movement, which was quite unknown as yet to many of those present. Dr. E. George Payne gave a brief address on the work of Safety Education as it is carried on in the Public Schools. A ten-year old girl gave a four-minute talk on the value to the children of their safety work in the schools. Judge George E. Mix gave an eloquent address on the hazards of automobiles in the city streets, the laws and regulations governing auto driving, and the penalties incurred for violations of the same.

The Woman's Section has been instrumental, through the courtesy of Mr. C. M. Talbert, Commissioner of Streets and Sewers, in placing safety signs at designated street corners, reserving certain streets during a specified time for the play purposes of children.

The women have taken for their *special* work this year the problem of Home Hazards, and already have held a meeting for which they sent out invitations to women, especially those who have children in their homes. Mr. S. Walter Forster gave a stirring and most inspiring address, from which every woman came away determined to do her utmost to help in the education of women along the lines of the elimination of home hazards. That is our purpose during the coming year, and that might well be the purpose of every woman interested in the safety work that is being done in her city. So far as I have been able to ascertain, St. Louis has the only woman's committee which is doing specific work on home hazards.

Let us organize women's committees to carry on this two-fold work of education—first, that of educating ourselves as to what constitute the hazards in the home and how they may be eliminated, and second, the education of every woman whom we can reach by our sphere of influence along the same lines, thereby helping in the great work of UNIVERSAL SAFETY by helping specifically to achieve SAFETY IN THE HOMES.

CHAIRMAN TALBERT: I had rather thought that home was a fairly safe place. I am beginning to change my mind. I always felt that when I got back behind my own doors, I was at least safe from the dangers that follow me through the daily work.

Mrs. Payne is to be congratulated on the paper she has read. That is

by far the best presentation of the subject that I have heard at any time, and as far as I know, it is the first effort to get into formal shape statistical information on the home hazards, what they are, what they amount to, and what can be done to eliminate them. We are certainly greatly obligated to you, Mrs. Payne, and we assure you, it will go a great deal farther than to the few who are here.

We have two important matters to present to the session. Before taking them up, I want to learn whether these other committees are ready to report. We have the Committee on Pedestrian hazards by Mr. Clarkson.

### REPORT OF COMMITTEE ON PEDESTRIAN HAZARDS

GEORGE E. CLARKSON, SECRETARY, WESTERN PENNSYLVANIA DIVISION,  
NATIONAL SAFETY COUNCIL, PITTSBURGH

Safety is the primary object of pedestrian traffic regulation as in all traffic regulation. The importance of such regulation needs no more striking emphasis than a reference to the annual toll in casualties caused by the pedestrian hazard. The importance of uniform regulation in all cities brings to its support no less a force than the already existing ordinances of so many different cities carrying a common purpose and even identical language of regulation. Then again it is founded in reason, experience, and common sense.

In Pittsburgh and Allegheny County, 56 pedestrians were killed by automobiles alone during the last four months of May, June, July, and August. Over half of these took the fatal step outside of the city limits in smaller towns in the county having little or no traffic regulation.

In Pittsburgh alone the monetary saving which can be effected by proper regulation would be far in excess of the entire cost of operating the police department. As compared with the same hazards of industry, although heavy in casualties, the pedestrian traffic hazards on our highways and streets are far more disastrous in their results, whether considered from the standpoint of loss of life or from the monetary loss. The character of pedestrians killed or injured in the streets and highways is higher and the result in monetary loss is therefore greater.

The class of traffic hazard known as the pedestrian hazard is perhaps the most important, with the single exception of the automobile hazard. It is important not only because of the large number of accidents found in that classification but because the hazard itself and its resultant loss in victims and money are not so spectacular as casualties caused by the hazard of fire or street-car, railroad, and automobile collisions. The very fact that the casualty of this class of hazard is inconspicuous and does not command more than passing attention, makes it important. Daily hundreds are the victims of this hazard, and the public press, if not altogether silent, relegates the notice of such casualties to an inconspicuous column, while on the other hand, fire and certain collision casualties with all the harrowing details, even though resulting in many instances in nothing more than property loss, are played up in bold headlines for the attention and edification of the public.

The pedestrian hazard is second only to the automobile hazard in the number and severity of casualties, and thus far, the two hazards surpass any other form of casualty in public safety work and should command our particular attention and concerted action if we are to give any assistance to the solution of the traffic problem.

This committee, of which Mr. L. A. DeBlois is chairman, W. R. Rasmussen, vice chairman, and the writer the executive officer, has given particular consideration to the work already accomplished by the Public Safety Section relating to the pedestrian hazard. The very excellent paper, entitled "Making Walking-places Safe," by Mr. H. W. Mowery, of the American Abrasive Metals Company, New York City, presented at the Seventh Annual Congress in St. Louis and again referred to at the Eighth Annual Congress in Cleveland, was thought to be a most exhaustive exposition of the subject of pedestrian hazards, and one that has met the approval of this committee which endorses this paper and its recommendations as a very important part of this report. It was thought that the remainder of the committee's report should deal not only with the safeguarding and educational measures taken in cities, especially where local councils with paid staffs are operating, but with recommendations looking toward uniformity of standardization of regulations relating to pedestrian traffic hazards in all cities.

#### METHODS OF CONTROLLING PEDESTRIAN HAZARDS

Our investigation extended to thirty cities including the following seventeen cities having such local councils: Minneapolis, Buffalo, Chicago, St. Paul, Syracuse, Milwaukee, New York City, Rochester, Grand Rapids, Portland, Detroit, Cleveland, St. Louis, Wilmington, Kansas City, Cincinnati, Pittsburgh.

The writer sent a questionnaire to each of the local council cities, seeking information designed to cover two very natural aspects of the subject: The first had to do with both the stationary and moving hazards to pedestrians on walkways, including streets and highways. The second concerned the safeguarding and educational measures taken to decrease the pedestrian hazards.

Generally speaking, the information received revealed that all these cities are handling the stationary pedestrian hazards from a safeguarding point, that is, from the point of view of existing ordinances. The only important thing apparently lacking is a standard. The moving hazards to pedestrians on walkways, from the safeguarding point of view, is not being so thoroughly handled, but the safeguarding measures taken more nearly approach uniformity or standardization.

In both of these classes of hazards to pedestrians on walkways, the cities noted are taking educational steps, but such education has been directed quite largely to the moving hazards to pedestrians on walkways, while the stationary hazards to pedestrians on walkways is left to a city department whose education is received usually after the hazard has presented a victim in the person of a plaintiff in a lawsuit, and too often a victim is required before the hazard is removed. And oftentimes the hazard is not then removed fearing a weakened defense to the suit

thereby, or else as incident to the business, hence emphasizing the fallacy that *accidents will happen* and putting the burden of "watch your step" on the pedestrian until some general plan of repairs inaugurated which by chance removes the hazard.

To particularize as to safeguarding steps taken, the information received shows all of these cities have ordinances for the regulations of stationary hazards to pedestrians on walkways. All such ordinances contain language identical as to purpose and almost identical in wording, charging some department of the city, and in some instances two or more departments, with the safety supervision of all walking places, and also with the inspection of such walkways, covering piled building materials, fire plugs, switch throws, gas and water valve boxes and projecting stairs; covering openings in walkways, such as alleyways, sidewalk cellar openings and coal holes; and covering slipping hazards such as icy streets, smooth metallic inserts and inclines.

While inspection covering such hazards on walkways is the rule, yet truly efficient inspection is the exception. Rochester, New York, Milwaukee, St. Louis, and Pittsburgh have attained a degree of efficiency worthy of passing mention.

More particularly as to safeguarding steps taken, my information discloses that all of the cities noted, with some exceptions, have ordinances for the regulation of moving hazards to pedestrians on walkways. The exceptions noted particularly are Pittsburgh, Syracuse, and Grand Rapids.

These ordinances contain some regulations identical in purpose and almost identical in language, such as "Cross streets at crossings"; "Cross streets at right angles and not diagonally"; "Obey the signal and direction of the traffic officer wherever one is stationed." Another regulation quite common to these ordinances is that relating to pedestrians keeping to the right on sidewalks and stopping on the sidewalk only at the curb or at the building line. A few cities impose a penalty for violation of these ordinances on the part of the pedestrian. Milwaukee has such an ordinance which imposes a penalty of \$1 for the first offense, \$5 for the second offense, and \$5 for each succeeding offense, and in default of payment of penalty and costs, the defendant is imprisoned not to exceed 30 days. Is it enforced?

#### EDUCATING THE PEDESTRIAN

From data secured, the local council cities have all used various educational measures in a measure to control the pedestrian hazard, particularly the moving hazard. The systematic distribution of traffic rules and regulations to the traffic offender—the one class of people who most need it, is one of the most effective means of education being used. Publicity secured through the medium of newspapers appears to be the one best educational means used by all local councils cities. Publicity has been quite generally sought and largely obtained. Leading in publicity relating to this hazard are Wilmington, Kansas City, Minneapolis, Portland, St. Louis, Cleveland, Pittsburgh, Rochester, Milwaukee, Buffalo, and Grand Rapids. In my own city of Pittsburgh, many editorials have appeared in the daily papers calling the pedestrian's attention to his



responsibility in automobile accidents and warning him against chance taking in crossing the streets.

Wilmington, St. Louis, and Davenport, have conducted "jay-walking" campaigns, the first named using the professional jay-walker to educate the pedestrian.

The organization in some of the local councils cities and others of a traffic squad of the traffic department and also a traffic court devoting its entire attention to traffic problems has had its educational value. The establishment of safety zones have been effective educational measures. Signals, whether semaphores, whistles, or hand signals used by the traffic policemen in the direction of traffic have been an important means to educate the pedestrian against chance taking. Some of the local council cities have used white lines marking safety zones at crossings. Only one or two cities however, has used the white line to direct the flow of traffic on the sidewalk. A sufficient number of effective ordinances as well as educational measures have been used in connection by the local council cities and in some fifteen other cities which without ever entertaining the hope that it is not a fruitless task in accomplishing standardization of ordinances regulating pedestrian hazards.

Realizing that any standard ordinance adopted should be brief and concise, and last but not least, reasonable, if it is to be followed, and must contain a proper penalty to make it effective, we are not therefore submitting a standard ordinance, knowing our inability to do so, but a brief outline which we recommend to be used as a basis for a standard ordinance covering the pedestrian hazard in all cities. The first part will relate to the regulation of the stationary hazard to the pedestrian on walkways and streets, and the second will relate to the moving hazard to pedestrians on walkways and streets.

#### OUTLINE OF MODEL ORDINANCE

##### Part I

- A. That one or more departments in each city shall be charged with the safety supervision of all public walking places.
- B. That competent inspection shall be maintained as to the following:
  1. Obstructions on walkways and tripping hazards shall be prohibited or guarded.
  2. Openings or holes in walkways or adjoining them shall be removed, prohibited, or guarded.
  3. Slipping hazards, whether from snow or ice, metallic or concrete, inserts, or inclines shall be removed, prohibited, or guarded.
  4. White lines shall be maintained in the middle of sidewalks in congested districts and at street crossings to direct the flow of traffic and avoid collisions.
  5. Large signs shall be maintained in railroad stations, theatres, and public buildings to direct the flow of traffic.
- C. A proper penalty consisting of fine or imprisonment, or both, for violation by the agent of the department or owner of walkway shall be imposed.

## Part II

- A. That one or more departments, preferably the police department, shall be charged with the safety supervision of pedestrians on all public walking places.
- B. That reasonable and competent inspection by every agent or police officer shall be made as to the following:
  - 1. Pedestrians shall cross streets at regular crossing or such other places designated and not diagonally.
  - 2. Pedestrians shall keep to the right on sidewalks, and stop only at the curb or building line.
  - 3. Pedestrians shall obey the signal and direction of the traffic officer wherever one is stationed.
- C. A proper penalty consisting of fine or imprisonment, or both, for violation by the pedestrian shall be imposed.

CHAIRMAN TALBERT: I certainly want to congratulate the committee for reading a paper of that kind. It is one of the best that we have had read in this section, and I like it because in presenting the situation in general, Mr. Clarkson gave us something to do. It seems to be pretty well studied out and outlined. The problem of pedestrians in cities is one of tremendous importance, and that it should be in some way controlled is recognized by every one who has endeavored to formulate rules and regulations.

In St. Louis we have been trying for over a year to draft an ordinance. So far we have not succeeded in even presenting one. I think the foundation of the work as outlined in this paper is very good, and I am sure many communities will take advantage of the plans outlined.

I take it this will conclude the session, so far as the presentation of papers is concerned. There are two committees yet to report, the Committee on Nomination of Officers, and the other the Committee on Resolutions. The appointment of this last committee had been overlooked until yesterday afternoon, when it was called to our attention. I appointed two or three men to undertake to formulate and present resolutions.

We will now call for the reading of the resolutions by Mr. Smyth.

## REPORT OF COMMITTEE ON RESOLUTIONS

Mr. L. J. SMYTH: Your committee desires to offer the following resolutions:

WHEREAS, The Public Safety Section of the National Safety Council, in the sessions of the Ninth Annual Safety Congress, has received the reports of the several committees appointed to investigate and make recommendations on accident statistics, standardization of signs and signals, traffic hazards, vigilance, law enforcement and other matters of public concern, and

WHEREAS, These reports have been thoroughly discussed in the sessions of the Public Safety Section and definite action taken, as shown in the records of the meetings of the section, therefore be it

RESOLVED, That the Public Safety Section approves the accident rec-

ord forms submitted by Frederick S. Crum, Chairman of the Statistics Committee, with minor changes recommended by a special committee appointed to consider these forms; that the Executive Committee of the National Safety Council be requested to have these forms printed and distributed to the Police Departments of all cities of 25,000 inhabitants or over, census of 1920, with the request that they use these forms during the coming year in recording accidents and report back their criticisms to the end that these or revised forms may be designed as standard report blanks for use in all cities. Be it further

RESOLVED, That the investigations looking to standardization of traffic signs and signals be continued during the coming year and that the committee appointed for this work co-operate with the United States Bureau of Standards and the standards committees of engineering societies in an endeavor to report as soon as possible definite uniform signs and signals to be recommended for adoption throughout the United States. Be it further

RESOLVED, That as it is the opinion of this Section that because of the frequent misuse of the red color which is the color of danger, a change in the use of colors is needed that will limit the use of red to real places of danger and provide some other color as a warning of caution, the special committee appointed at this session be instructed to make an exhaustive study of lamps as to color, size, position and visibility, and to report as soon as possible its findings and recommendations. Be it further

RESOLVED, That the report of the traffic hazards committee be accepted, which report is that the public safety section favor the passage by the legislatures of all states of a uniform traffic code, which shall include among its provisions the mental and physical examination and licensing of all persons who drive automobiles, and provision for the suspension or revocation of such licenses for cause. Be it further

RESOLVED, That the chairman of the Public Safety Section be instructed to attend the meeting of traffic officers and representatives of interested organizations at Cleveland on November 9 and co-operate with them in an effort to effect a final draft of a national uniform traffic code, and that the Chairman of this section use the Proposed Uniform Vehicle Law for guidance in the deliberations of the Cleveland conference. Be it further

RESOLVED, That the plan of operation of vigilance committees in St. Louis, Kansas City and other cities be approved and the recommendation strongly made that cities throughout the nation form vigilance committees as an effective means of reducing traffic violations and making the streets safer. Be it further

RESOLVED, That this section endorse the splendid stand of Judge Geo. E. Mix of the Municipal Court of St. Louis for fair and impartial law enforcement and for his recommendation that the automobiles of traffic law violators be impounded for periods commensurate with the seriousness of the offense. Be it further

RESOLVED, That the reports of all other committees as shown in the

records be approved and the officers of the committees given a vote of appreciation for their work during the past year. Be it further

**RESOLVED**, That the officers of the Public Safety Section, especially Chairman Charles M. Talbert and Secretary Carl L. Smith, be given a vote of thanks for the splendid service they have performed in directing the work of the Public Safety Section during the past year. Be it further

**RESOLVED**, That the Public Safety Section welcome the action of the Engineering Section in its effort to interest engineers in the prevention of public accidents, and endorse the resolution passed by the Engineering Section recommending the appointment of an engineer on the headquarters staff to assist the Public Safety Section and its committees in the study of traffic signs and signals, legislation, and engineering or mechanical problems involved in public safety.

**WHEREAS**, The Milwaukee Association of Commerce through its Safety and Sanitation Division, in co-operation with the Milwaukee press, police, fire departments, clubs and organizations, churches, schools, industries and the citizens in general has welcomed the Ninth Annual Congress of the National Safety Council to their city with a civic demonstration in the form of a "No Accident Week" with remarkable results, therefore be it

**RESOLVED**, That the Public Safety Section of the National Safety Council, in the sessions of the Ninth Annual Safety Congress, hereby extend to the Milwaukee Association of Commerce, all co-operating organizations and citizens of Milwaukee, a vote of heartfelt thanks for and appreciation of the splendid service rendered to humanity.

**WHEREAS**, The Milwaukee Association of Commerce through its Safety and Sanitation Division has organized the automobile drivers of Milwaukee County in a Safe Drivers' Club, with a membership of several thousand, and

**WHEREAS**, The organization of this club as a part of Greater Milwaukee's "No Accident Week" has produced remarkable results in the saving of human life, therefore, be it

**RESOLVED**, That the Public Safety Section of the National Safety Council in the sessions of the Ninth Annual Congress, heartily endorse the Milwaukee plan of the Safe Drivers' Club, and urge that these clubs be formed in cities throughout the United States as the most effective means of co-operative effort among automobile drivers to drive safely, avoid accidents, and thereby save human life.

(On motion duly made and seconded, these resolutions were adopted.)

**CHAIRMAN TALBERT**: Before asking the Nominating Committee to make a report, I want to say to you that four or five months ago I appointed a committee and asked the members to give careful study to the recommendations for officers and committees. They have given the matter careful study, and are reporting this morning on the availability and knowledge of the men whose names will be read. It looks as though we are going to have a good many committees. It runs into a pretty good number, but I believe each officer is going to develop some field.

There is one other development, and that is, in the last few years we

have felt the necessity of closer relationship with the National Safety Council. It has happened that each of the presidents who have served have had intense interest in the public safety work. We have, therefore, after a thorough discussion among ourselves, with the officers of the Council, and these presidents themselves, brought into our scheme an advisory committee, such committee to consist of the ex-presidents of the Council. It isn't expected they will do active work, but they will give us the benefits of their experience. We want their opinions and their endorsement and help, not only with the Executive Committee, but also with several outside interests that are showing certain interest in the work of public safety. We feel the need of more support from the officers of the Council. We, therefore, suggested the ex-presidents as an advisory committee. With that explanation, I am going to ask for the reading of the names selected by the Nominating Committee.

#### REPORT OF NOMINATING COMMITTEE

MR. RASMUSSEN: The committee appointed to bring in nominations for officers and committee men for the coming year, beg to submit the following:

The committee after canvassing the whole country for a man to act as chairman, found that we can get no better man to carry on this work than Mr. C. M. Talbert.

Vice Chairman: David Van Schaack, Aetna Insurance Co., Hartford, Conn. Vice Chairman: C. B. Pritchard, Director of Public Safety, Pittsburgh. Secretary: Carl L. Smith, Public Safety Field Secretary, St. Louis, Mo.

#### COMMITTEES

Your Committee in conference with a number of the most interested members of the Public Safety Section feel there should be an advisory body, that such advisory body should consist of men who are thoroughly familiar with the workings of the Council; and who, preferably, are members of the Executive Committee. Your committee, therefore, suggests the ex-presidents of the National Safety Council.

#### ADVISORY COMMITTEE

R. W. Campbell, Chicago, Ill.  
Arthur T. Morey, St. Louis, Mo.  
L. R. Palmer, New York City.  
David Van Schaack, Hartford, Conn.  
R. C. Richards, Chicago, Ill.

#### STATISTICS COMMITTEE

Chairman: Frederick S. Crum, Prudential Insurance Company of America, Newark, N. J. Vice Chairman: S. H. Coleman, Buffalo Safety Council, Buffalo, N. Y. Secretary: Rufus Jarnagin, Metropolitan Safety Council, New York City.

*Ninth Safety Congress*

## BOY SCOUTS' COMMITTEE

Chairman: Homer Hodson, East St. Louis Street Railway, East St. Louis, Ill. Vice Chairman: George W. Ehler, Boy Scouts Executive, Pittsburgh. Secretary: J. P. Freeman, Executive Field Secretary, Boy Scouts, Chicago.

## STANDARDIZATION COMMITTEE

Chairman: L. A. DeBlois, Du Pont de Nemours Co., Wilmington, Del. Vice Chairman: S. J. Williams, Chief Engineer, National Safety Council. Secretary: R. T. Reid, Wilmington Safety Council, Wilmington, Del.

## TRAFFIC HAZARDS COMMITTEE

Chairman: L. J. Smyth, Manager, Kansas City Safety Council, Kansas City, Mo. Vice Chairman: Edward H. May, Inspector, Traffic Bureau, Cleveland, Ohio. Secretary: H. H. Herdman, Oregon and Columbia Basin Safety Council, Portland, Ore.

## PUBLIC UTILITIES COMMITTEE

Chairman: Herman Spoehrer, Union Electric Light and Power Co., St. Louis. Vice Chairman: C. G. Rice, Pittsburgh Railways, Pittsburgh. Secretary: G. E. Clarkson, Western Pennsylvania Safety Council, Pittsburgh.

## VIGILANCE COMMITTEE

Chairman: J. R. Ransom, Commissioner of Police, Kansas City, Mo. Vice Chairman: H. H. Jackson, Lieutenant, Traffic Bureau, Detroit, Mich. Secretary: J. C. Townsend, Grand Rapids Safety Council, Grand Rapids, Mich.

## PUBLICITY COMMITTEE

Chairman: Louis DeArmand, Safety Commissioner of Davenport, Iowa. Vice Chairman: A. H. Lintz, Cleveland Safety Council, Cleveland, Ohio. Secretary: Jack Robbins, Detroit Safety Council, Detroit, Mich.

## MEMBERSHIP COMMITTEE

Chairman: E. H. Fitzgerald, Federal Rubber Co., Milwaukee, Wis. Vice Chairman: W. H. Frater, National Safety Council, Chicago. Secretary: C. M. Anderson, Milwaukee Safety and Sanitation Division, Association of Commerce, Milwaukee, Wis.

## HOME HAZARDS COMMITTEE

Chairman: Mrs. E. George Payne, St. Louis, Mo. Vice Chairman: Mrs. C. B. Hardin, St. Louis, Mo. Secretary: Mrs. L. J. Smyth, Kansas City, Mo.

## SCHOOL HAZARDS COMMITTEE

Chairman: Dr. E. George Payne, Harris Teachers' College, St. Louis, Mo. Vice Chairman: Milton Potter, Supt. of Schools, Milwaukee, Wis. Secretary: Frank E. Morris, Syracuse Safety Council, Syracuse, N. Y.

PEDESTRIAN HAZARDS COMMITTEE

Chairman: Dr. C. H. Kohler, Minneapolis, Minn. Vice Chairman: Mr. John H. Truett, United Railways and Electric Co., Baltimore, Md. Secretary: R. C. Haven, Minneapolis Safety Council, Minneapolis.

ELEVATOR HAZARDS COMMITTEE

Chairman: George E. Elate, Aetna Insurance Co., Hartford, Conn. Vice Chairman: George S. Montgomery, Kansas City, Mo. Secretary: A. W. Koehler, Rochester Safety Council.

SAFE DRIVERS' CLUB COMMITTEE

Chairman: Carl L. Smith, Public Safety Field Secretary, National Safety Council, Chicago, Ill. Vice Chairman: W. R. Rasmussen, Field Secretary, National Safety Council, Chicago, Ill. Secretary: A. H. Lintz, Cleveland Safety Council, Cleveland, Ohio.

MOTION PICTURE COMMITTEE

Chairman: David S. Beyer, Liberty Mutual Insurance Co., Boston, Mass. Vice Chairman: Marcus A. Dow, New York Central Lines, New York. Secretary: H. J. Bell, Chicago Safety Council, Chicago, Ill.

COMMITTEE ON LAW ENFORCEMENT

Chairman: Judge George E. Mix, Municipal Court, St. Louis, Mo. Vice Chairman: Judge John Stelk, Municipal Court, Chicago. Secretary, E. B. Lefferts, St. Paul Safety Council, St. Paul, Minn.

W. R. Rasmussen

L. J. Smyth

E. B. Lefferts

G. E. Clarkson

H. H. Herdman

Nominating Committee.

CHAIRMAN TALBERT: The special committee on color of traffic lights has brought out the fact that we are using all types of lights on the highways, as indicative of safety and caution. After considerable argument, we reached a conclusion that it was desirable to appoint a special committee to study this problem and report as soon as possible, so it could be taken up promptly. This committee consists of Mr. B. F. Verheyen, of St. Louis, Inspector Edward H. May, of Cleveland, Dr. H. E. Bradley, of Milwaukee, Mr. L. J. Smyth, of Kansas City, and Mr. A. G. Batchelder, of Washington, D. C.

MR. R. T. READ (Secretary, Delaware Safety Council): I would like to suggest that all these committees, in their meditations for the coming year consider the rural districts just as much as the traffic situation in the cities. It was brought out yesterday that the farmers are being killed, and we know that they are being injured on their own farms, etc.,

but the traffic in the rural towns, I think, should be given a good deal of consideration in our work.

INSPECTOR MAY: The thought just comes to me that it is an absolute necessity on account of the large increase in the number of automobiles driving out on country roads for each state to have state police. In the city we try to regulate the driving and keep the streets clear as well as we can, but as soon as automobile drivers get out on the highways, they drive as they please, and if you will pick up your papers, you will read of people being killed.

CHAIRMAN TALBERT: I suggest that Mr. Smyth take that into consideration.

ADJOURNMENT.

---

RESOLUTION ADOPTED BY THE ELECTRIC RAILWAY SECTION

BE IT RESOLVED, By the Electric Railway Section of the National Safety Council, assembled at the Ninth Annual Safety Congress, that in view of the fact that approximately ninety per cent of the accidents occurring on the electric street railways are public accidents, it be the sense of this Section that each individual company should co-operate financially and energetically with the Public Safety Section in organizing and carrying on safety campaigns in the locality of each and every electric street railway company.

CERTIFIED COPY OF RESOLUTION ENDORSING PLAN TO ORGANIZE A SAFE DRIVERS' CLUB—FILE NO. 18645

WHEREAS, The loss of life and permanent bodily injuries caused by reckless drivers of automobiles is appalling, and laws and ordinances passed by the state legislature of the State of Wisconsin and City of Milwaukee seeking to safeguard the public from accidents are being ignored and violated and casualties instead of decreasing are increasing to an alarming extent; and

WHEREAS, Plans for organizing a Safe Drivers' Club, whose members pledge their co-operation to check accidents due to violations of traffic laws and ordinances, are now in progress; and

WHEREAS, Every encouragement should be given to those seeking to eliminate this existing evil; therefore be it

RESOLVED, By the Common Council of the City of Milwaukee, that it hereby commends and endorses the plans of the arrangements committee of the safety and sanitation division of the Milwaukee Association of Commerce to organize a Safe Drivers' Club; whose object and purpose will be to check and eliminate accidents caused by reckless drivers of automobiles, and hereby pledges its co-operation and support in eliminating the dangers to life and limb by reckless automobile drivers in the City of Milwaukee.



## Women in Industry Section

September 29 and 30, 1920

---

MISS TRACY COPP, Chairman  
Green Bay, Wis.

---

### WEDNESDAY AFTERNOON SESSION

**T**HE meeting of the Women In Industry Section was called to order at 2:30 o'clock, September 29, by Miss Tracy Copp, Chairman.

#### REPORT OF CHAIRMAN

CHAIRMAN COPP: The Women In Industry Section of the National Safety Council is an infant, just having lived through its first year. It is still alive and I am extremely happy to see so many here.

When the officers were elected last year we decided to add to the committee made up of three officers, two men, employers of women, believing that the Women In Industry Section was a section that should devote its energy and time to the interests of women workers and the employers of women. Our outline as prepared by that committee followed along these general lines:

First, we decided as soon as we were well organized and underway to engage in the preparation and distribution of special pamphlets covering the problems arising out of the introduction of women into new occupations and the usual problems arising out of the general employment of women. We have covered in our plan these general subjects:

A study of the occupations of women with the view of eliminating such hazardous occupations from the routine life of women workers as cannot be made reasonably safe.

We decided further to study the practical methods of reducing physical fatigue; to study the improved methods of factory setting, the necessity of rest and lunch periods, factory clothing, and the general factory equipment, together with the modification of processes or equipment which have resulted in greater comfort for the employers and greater production.

In addition to following out that program, we assisted another new venture of the National Safety Council, namely, the introduction of the

program for public safety and for educational instruction in safety, and as chairman of your section, I communicated with all of the women's clubs in the country—social, educational, and civic—on the subject of public safety, and in my letter to these women's clubs I made the following suggestions:

That members of the women's clubs report to the local authorities violations of safety ordinances and laws and also dangerous conditions and practices.

That they secure the introduction into the schools, both public and parochial, of systematic instruction in safety and follow this up to see that this instruction is carried out.

That they draft resolutions requesting new ordinances and new laws on safety, and insist on the enforcement of existing laws by the public officials.

That a speakers' bureau be formed in each community composed of women available to speak at parents' clubs, women's clubs, and school meetings.

That the women's clubs secure the co-operation of the churches in promoting safety.

That they secure effective and continuous publicity for safety in occupations and co-operate in introducing a safety week in their cities each year.

That they conduct an educational campaign to reach mothers in homes and assist them in teaching safety to children and that they prepare safety bulletins to be sent to every home in the community three or four times each year.

The new program of the Council to promote public school safety has more than justified the labors of the executive officers along that line.

I believe that the next duty that belongs to your chairman is the announcement of a nominating committee to report nominations for officers for the ensuing year, and I shall appoint the following:

Miss Maud Swett, Director, Women's Department, Industrial Commission of Wisconsin; Miss Ida M. Wilson, of Lowell, Massachusetts; Miss Belle Grob, of the National Enameling and Stamping Company, Milwaukee, Wis. We shall expect a report from that Committee tomorrow.

The meeting this afternoon will open with an address by a woman of national prominence. We are extremely fortunate in having here with us so many members of her own profession to hear her; and I hope you will all enter into the discussion that will follow. I take great pleasure in introducing to you Miss Mary Lent, R. N., Financial Secretary, National Organization for Public Health Nursing, New York City.

#### THE PUBLIC HEALTH NURSE IN INDUSTRY

MARY E. LENT, R. N. FINANCIAL SECRETARY, NATIONAL ORGANIZATION FOR  
PUBLIC HEALTH NURSING, NEW YORK CITY

The Public Health Nurse in industry is one of the newest forms of health protection. However, the movement has now passed the embryonic

stage. The experiments being made through the country, with the increasing demands for nurses in industry, are convincing evidence that the work of the Industrial Nurse is meeting with a degree of success that adds impetus to her effort to reach an ultimate standard that will enable her to take her full share in the program to furnish adequate protection for all industrial workers.

Systems and methods of Industrial Nursing have been the subject of important conferences throughout the country. Certain plans of organization have been found effective and fundamental standards and principles have been formulated. With these as a ground work, courses in Industrial Nursing have been introduced into several colleges and schools of nursing.

A Committee on Industrial Nursing of the National Organization for Public Health Nursing has been in existence for several years. Its activities and studies, together with the keen sense of responsibility and realization of opportunity engendered in nurses through their experience in industrial plants, have focussed the attention of the whole national group. Their recognition of the importance of this field was shown by the fact that at the last Biennial Meeting, held in Atlanta, Georgia, in April, 1920, a Section on Industrial Nursing was created, constituting one of the four sections organized up to the present time—the others being on Child Welfare, School Nursing, and Tuberculosis Nursing. This Section will have for its aim during the next two years the careful study and further development of a standardized program and policies of Industrial Nursing; and the extension and improvement of courses in Industrial Nursing to enable them to prepare their students to meet as efficiently as possible the demands of Industry.

At the Convention in Atlanta the following Resolutions were passed by this Section:

#### RESOLUTIONS OF THE SECTION ON INDUSTRIAL NURSING

WHEREAS, The rapid development of public health nursing activities frequently leads to confusion of thought as to the various fields of public health nursing, it has seemed advisable for the guidance of both professional and lay people to formulate a definition of the term Industrial Nurse; therefore be it

RESOLVED, That it is the sense of the section on Industrial Nursing assembled at the first biennial convention of the National Organization for Public Health Nursing that an Industrial Nurse is a graduate, registered nurse (male or female) employed in an industrial or mercantile establishment or public utilities corporation in the interest of the personnel in matters affecting health and welfare.

WHEREAS, It is a well established principle in social work that the family is the fundamental social unit, and that all treatment should be based on this principle; therefore, be it

RESOLVED, That in the interest of a well rounded service the field of industrial nursing be understood to extend outside the place of employment and specifically to include home visitation.

WHEREAS, The position of the industrial nurse brings her into peculiar and intimate relations with the employee; be it

RESOLVED, That the industrial nurse can best serve the mutual interests of employee and management when the department or division of health is in close and direct relationship with the management.

During the past few months it has been my privilege to visit a large number of industries, including rubber companies, steel and paper factories, and others, and to talk with their heads of departments and managers. An analysis of the impressions gathered during these visits brings out two points with special prominence.

First, the rapidly-growing recognition of the part which the nurse can play in increasing the efficiency, economy, production, and general educational standard of industry.

Visiting again certain factories which I had known two or three years ago, I found in one case over 30 nurses where there had previously been 17; in another 17 where there had been none, and so on in similar ratio. In every factory visited either nurses were employed, or the question of employing them was a matter being given earnest consideration. This experience is entirely in accord with figures recently published by the Statistical Department of the National Organization for Public Health Nursing, showing that whereas, previous to 1910, only 66 firms in the United States employed graduate nurses, there were, in the middle of 1919, 871 industries employing 1213 graduate nurses.

The money value of health is shown by the figures published in a bulletin of the Federal Public Health Service, which demonstrated that, based on pre-war earning power of wage earners, the amount of time lost through sickness resulted in an annual loss to the workers of the country amounting to more than \$800,000,000.00. Similar evidence is offered by the National Health Insurance figures for England, covering 10,800,000 persons, which denote a minimum average loss through sickness, of the work of 270,000 persons every year.

Employers have learned to appreciate the significance of such figures as these, and to know the value of the nurse as one of the agents who can help to cut down the appalling loss of efficiency and output caused by preventable sickness.

The second point of importance which came to my attention was the question as to whether it is more advisable to have an industrial nursing service within or without the factory—in other words, whether an industry should maintain its own nurses for the exclusive use of its employees; or depend upon the local visiting nurse association or department of health to give the necessary service. There is a good deal to be said for both systems, and probably the determination of the method chosen would always be largely dependent upon individual conditions and upon the intelligence of the employees and their ability to understand their own needs and to develop their own means of meeting them.

Some of the advantages of a service maintained within the industry itself are, that by spending some regular time in the plant the nurse becomes familiar with the industrial hazards of that particular kind of work and knows better how to instruct the workers to avoid these dangers.

She is better able to acquaint herself with the aims and policies of the firm with which she is connected; and, by studying conditions in the plant, such as lighting, sanitation, etc., she is in a position to recommend changes and improvements which are really of value. A nurse, owing to the peculiar intimacy of her work, learns to know people and their needs and desires as perhaps no one else can do, and my experience of twenty years has taught me that men, women, and children are anxious to tell the nurse their troubles and to ask her help and advice. Thus, her recommendations make for the contentment and efficiency of the work people, because she is able to bring their real needs to the employers.

In some instances, but not always, it has been thought advantageous for the nurse to go into the home of the employee as the personal representative of the firm by which he is employed. A certain type of employee appreciates the interest shown by the employer in sending a nurse.

On the other hand, ideas are changing, and it has been found in some cases that the employee resents the provision of service of this kind by the employer, as savoring too much of paternalism, and that he is apt to regard the nurse as a kind of spy, even though she gives much needed service.

In one factory that I visited, the welfare department had closed down entirely on account of strikes; and the suggestion was made that, were the service provided by the local visiting nurse association, the work people would still have continued to receive necessary care at a time when it was especially needed.

Provision of service through an outside association necessitates that the nurse be responsible to both the industry and the association employing her; but it has also the advantage that it assures the supervision of the work of the nurse by experienced superintendents.

Again, some employees resent receiving care from a visiting nurse association because they regard it as charity. Every effort is being made to do away with this idea, which is now generally recognized as incorrect; however, it still does exist in certain minds.

Whichever method of providing nursing service is chosen, the closest co-operation should exist between the industry and the local health department and visiting nurse association. It is almost impossible for any industry to give a fully rounded out service to its employees, even though it may have a very efficient welfare department of its own, without calling upon outside associations to some extent for the kind of help which they are equipped to give. But again, even should the industrial nurse rely upon the visiting nurse association to give bedside care to the employees, this should not prevent her from keeping careful watch over each case.

While the physician would, of course, be the head of the Health Department of an industry and the nurse would carry out his orders in regard to treatments and see that his plans and system were followed, she should always have direct access to the management in regard to all matters pertaining to her particular problems outside the actual medical care.

One of the questions put to me by the head of a big industry was, "Why is there need of a National Organization for Public Health Nursing?"

Cannot a well organized local service set and maintain its own standards without advice from outside?" My reply to such a question is, "Why should a firm pay \$17,000 for a few months' service of a consultant in order to place its departments on a more efficient basis? If by calling in an expert you can add twenty-five per cent to the efficiency of your nursing service, will it not pay you just as it would pay you to add to the efficiency of any other department?" At the present time, when we are hearing so much about the shortage of nurses, it is essential, if we are to be able to meet to any extent the demands that are being made upon us that we should use every economy of those nurses who are already trained and available to give good service. Training schools are putting forth every effort to train as many women as possible, but this is necessarily a process of time. By adding twenty-five per cent to the efficiency and economy of a nursing staff we are doing the equivalent of adding that percentage of nurses to its personnel—and we can do this immediately without having to wait several years to put our plans into effect. This economy of service has actually been accomplished in certain organizations through the expert assistance of the National Organization for Public Health Nursing. The Organization provides secretaries who act as expert consultants and advisors on all Public Health Nursing matters.

Local associations are too deeply absorbed with their own problems and their own piece of work—work which involves human lives—to give the necessary time and study to methods and systems of administration which are needed to build up high standards and then maintain them by constant guidance and progress.

The secretaries of the Organization travel from state to state and city to city; health departments and private associations lose no opportunity of laying their problems before them and asking for advice. Thus these secretaries are always obtaining new and local points of view, thereby constantly fitting themselves to be better experts and better advisors, and able to be of more help to each community, because they bring to the study of every problem a volume of knowledge and experience that is country-wide in its scope, and embraces local, national, private, and governmental difficulties, opportunities, and points of view.

Separate organizations throughout the country are collecting experience and data of the greatest value; but it is imperative that there should be a national organization to turn to for expert advice to assist in bringing out and interpreting this data and this volume of effort for the benefit of each local association, and for the nation as a whole.

**STANDARDIZATION:** The National Organization for Public Health Nursing is the one and only standard-making body for Public Health Nursing. As its history shows, the initial motive for its foundation was the need of a national standard by which to measure Public Health Nursing work. The need for standardization is as great today as it was in 1912—perhaps even greater, for there are now more than 4,000 organizations instead of 1,692 and the enormously increased demand for public health nurses brings with it the danger of short-sighted efforts to meet the emergency by lowering the quality of the supply.

**SUMMARY:** The peculiar characteristic of the composition of the Na-

tional Organization for Public Health Nursing is that it associates lay men and women and nurses who are working for the care and prevention of illness, into a conscious group, and offers them an organization through which they may create and sustain strong and enduring standards of work which can be undertaken and carried out by nursing bodies for the betterment of public health conditions. This Organization must feel itself vigorous, united, and aware of its great opportunity to do useful and lasting things for the benefit of the country, and help to mould such public sentiment as will support and carry forward its plans.

#### DISCUSSION

MISS JEMIMA BELL (Nurse, Thilmany Pulp and Paper Company, Kaukauna, Wisconsin): What would you say is the function of the nurse in industry?

MISS LENT: Miss Florence Swift Wright, a prominent industrial nurse who has done a great deal of work in co-operation with the National Safety Council, has written a very excellent book on "Industrial Nursing" which goes into every detail, so I can answer your question in no better way than to refer you to her book.

MISS NESTA C. EDWARDS (Chicago): The real problem today, I think, is to determine the functions for the nurse in the small plant with 250 up to 1,000 employees. I think there is where the functions should be set out clearly. That question is constantly coming up as I go from plant to plant. I went to a plant the other day; the nurse was up in the air and the firm was up in the air. They said, "Well, what is the function of our nurse?" The firm didn't have any idea and the nurse didn't have any idea, and yet that woman was a trained nurse, trained in the public health classes.

Here is where they are falling down: They do not know enough of the problems of the business man; they do not know enough of the problems of the rank and file of labor.

The nurse should stop and think, "What license have I to be here; why should the firm hire me?" You have only one reason, in my mind, to be in industry at all and that is to reduce time lost on account of sickness and accidents. That is your function in being there to start with. When you arrive on the job Monday morning, if there is not a first aid room, get the best kind of a room that you can possibly get in the space the firm has got for you. One reason many nurses fail is because they haven't learned the part of adaptation. Some think they can't do the work unless everything is just so. Make that room your first aid room and through your work in that room you must make friendships so the men will want you to come out into the mill or the factory.

I expect every nurse that I have to be in her office at certain hours of the morning, say from seven to ten, and from ten to eleven she is to go through the plant. For what purpose? So if a foreman or any one wants to consult her about an injury he may. If she sees that a window needs fixing or something needs to be put in a more sanitary condition, she will have an opportunity to suggest that it be done.

You are not supposed to do bedside nursing. That is the function of the community nurse. I am going hard for community nurses but not from the factory. Remember that the factory is not a philanthropic institution.

You are there to look after the health of the employees, assist in the safety work, and possibly employ women in the small factories. You may call at the homes of employees when there is illness and report to your firm the condition that you find, but it is not your function to do the actual nursing. It is your duty, however, to put the proper agency in touch with the case so that adequate medical and nursing care will be provided.

That is the function of the nurse in the small factory, to do the first aid work, to look after the soup kitchen, or lunch room, or whatever it may be, to look after absentees, to be the housekeeper of the institution, and in a small plant she may employ the girls.

MISS MARY NOONAN (Nurse, International Harvester Company, Milwaukee, Wis.): I should like to know the function of the nurse in the larger factory.

MISS LENT: In the larger factories that I have visited a certain percentage of their nurses do the outside visiting. For instance, take a plant that employs thirty-one nurses. Now, fourteen of them follow up all the cases of absentees who are reported ill. They do the nursing work to a certain extent. They do not take chronic cases. They do not give long, continuous care to a long case, we will say of typhoid fever. They help to nurse that case with the nurses who do bedside work in that particular city.

In a small plant there will be times where the industrial nurse will have to do some bedside nursing work. If there is only one community nurse, or if there are several community nurses, and they are not equal to meeting the needs of the plant employees, if there is sickness in a home, no nurse can possibly leave that home, if she is a real nurse, without helping to do some bedside work. She must help take care of those people.

I think the point of getting more community nurses is a very strong and excellent one, and I think that sometimes we might even go so far as to say that we aren't doing bedside nursing from the industry, perhaps, in order to get more community nurses for the entire community.

I don't know whether I have got myself into very deep trouble this month in our Public Health Nursing Magazine by writing an article on "Bedside Nursing for all Nurses"; it matters not who employs her. I feel that we are not going to get away from the care of the people. We are trained to be nurses; we are trained to teach and guide and help but we must do it in our way. We can do it better if we do it along the lines in which we are trained to do it and that is so in nursing work. We can teach better if we teach with our hands, and you can't do preventive work unless you show people how to do it. I didn't learn to be a nurse by being told. I didn't learn to put on bandages or give an infusion by being told. I was shown over and over again how to do it.



We expect ignorant people to do those things by telling them. They don't learn in that way and that is why we have so much return of illness and long delays in people's recoveries. We must show them how to do things right and we must do this repeatedly.

CHAIRMAN COPP: This discussion is interesting, but we must proceed. It gives me great pleasure to introduce Mr. Bernard J. Newman, Sanitarian, United States Public Health Service (R), Washington, D. C., who will speak to us on "Shop Standards and Fatigue."

### SHOP STANDARDS AND FATIGUE

BERNARD J. NEWMAN, SANITARIAN, RESERVE, U. S. PUBLIC HEALTH SERVICE,  
WASHINGTON, D. C.

Sufficient progress has been made in the determination of the causes of industrial over-fatigue to warrant the introduction of plant programs for its control. To what extent the formation and adoption of these programs should be left to the initiative of plant managers or should be imposed upon them by governmental regulation of state or municipal origin, may be a mooted question. That such programs, when scientifically determined, yield returns not only in better working conditions and in better wages for employees, but also in larger profits in production for employers, cannot be doubted. That is, programs for the elimination of industrial over-fatigue, when based upon correct principles and constructed by experimental methods, are financially profitable to all concerned in industry today.

In making this assertion I am relying on recent determinations made in laboratory and field studies by researchers largely officers or consultants of the U. S. Public Health Service or other researchers attached to the English Health of Munition-Worker's Commission, as to the causation and control of fatigue.

#### FATIGUE DEFINED

Fatigue may be defined as an inhibition placed on body activity because the capacity to function has been, for a temporary period at least, reduced or broken down as a result of an output of bodily energy in excess of that compatible with normal functioning. It may be a "diminished capacity for work which is the result of previous work", as Prof. Frederic S. Lee<sup>1</sup> phrases it: a definition which he points out has its decided limitations. Or it may be the "sum of the results of activities which show themselves in a diminished capacity for doing work", as Sir George Newman<sup>2</sup> defines it. To restrict the definition to work activities would not be scientifically accurate. Other causes play a part, varying in scope and in degree. These causes, which we will consider more in detail later on, must not be minimized.

<sup>1</sup>Kober and Hanson, "Diseases of Occupation and Vocational Hygiene," page 249.

<sup>2</sup>Report of the British Committee, Ministry of Munitions, on "The Health of the Munition Worker," page 16.

## INDUSTRIAL OVER-FATIGUE

Industrial fatigue is concerned primarily with conditions which arise within industrial establishments or in industrial processes, responsibility for the elimination of which rests primarily with the establishment, and gains from such elimination necessarily accrue to the establishment first and to society afterward. In the absence of specific designation of other fields of fatigue causation, reference hereafter in this paper, will be to industrial over-fatigue.

## PHYSIOLOGICAL CAUSE OF FATIGUE

To appreciate the fatigue problem in industry and to determine an acceptable program for its elimination or reduction to the point where it neither retards production nor increases the cost thereof, we must arrive at a common understanding of the physiological changes in the body as a result of muscular activity.

Life is a continuous process of metabolism. Constituent parts of foods taken into the body are distributed to the cells where they are converted into protoplasm or furnish fuels in easily oxidizable form for the generation of heat and energy. At the same time there is going on within the body as a result of its activities a change of matter into lower forms no longer serviceable to life, the waste products of activity. The strength and activity of the body, i. e., the health of the body, depend upon the adequate supply of food and oxygen to the cells and the activity of the cells in the transformation of this food in the processes of anabolism into living protoplasm or its oxidation in the production of heat and energy. But they also depend upon the removal of the waste products of katabolism, i. e., of destructive metabolism, constantly going on (in intense muscular activity more so than at other times) into lower forms to be finally eliminated as waste. If as the result of energy output the balance between intake, output and waste removal is no longer maintained, retardation in the elimination of waste products takes place and fatigue results.

When, therefore, the statement is made that fatigue is due to the long-continued use of a muscle or group of muscles, what is really meant is that in the constructive and destructive metabolism of the body such activity on the one hand creates in the muscle waste products, such as, carbon dioxide, lactic acid, or possibly other metabolites characteristic of fatigue. Thus there is a chemical change. Moreover, this muscle-waste, accumulating faster than it can be removed, causes what corresponds to a clogging of the muscle, and diminishes the amount of oxygen and glycogen supplied thereto; thus the cells are unable to function satisfactorily, for, it must be remembered, coincident with muscular contraction there is a consumption of oxygen and oxidation of glycogen. A muscle starved of these supplies, ceases to function normally. Fatigue is produced.

In the functioning of the body, all parts are inter-related. A strain on one organ may ultimately reflect itself upon others. One set of muscles over-exercised requires from heart, lungs, the glands involved, and the

nervous system anabolic assistance. The blood and lymph, overcharged with waste in the attempt to remove the katabolic products of the over-worked muscles, distribute to the rest of the body these waste products and induce throughout the signs and symptoms of the originally tired muscles. Fatigue then becomes general.

This brief explanation of the physiological basis of fatigue has purposely omitted several modifying factors. The effect here assigned does not come in a straight line from the cause. General fatigue may not appear, although the exercised muscles may themselves be fatigued. Before the effect is transmitted to the other parts of the body, a rest period may elapse wherein the blood and lymph may remove the excess waste and restore the working power. This is the normal method of functioning the body, and rest is the great restorer of the "tired-out" person.

In the presence of fatigue the body possesses within itself powers of momentary restoration. Witness the reaction of the soldier on a hike to the rhythm of music, or the football player or the marathon runner to the presence and cheers of the crowd. There is evidence sufficiently authentic to establish the fact that excitement may remove temporarily the chemical cause of fatigue. Cannon states that emotional excitement tends to stimulate the discharge of adrenin—a vasomotor stimulant secreted by the adrenal glands. He points out that adrenin "is able to bring about a rapid recovery of normal irritability of muscle after the irritability has been lessened by fatigue". "What rest will do only after an hour or more, adrenin will do in five minutes or less". By it the strength and rapidity of the heart beat is increased, the blood is driven through the fatigued muscles, carrying away thereby the waste products which inhibited their freedom of action.

#### SYMPTOMS OF FATIGUE

Strange as it may seem, it is not always easy to tell when fatigue is present because its symptoms may be masked. "That tired feeling" which is advertised against, if experienced, does not necessarily register fatigue. It may be a symptom of other diseases. There is a normal amount of weariness that necessarily follows work which is healthful and makes a well earned rest enjoyable. This readily yields to rest. There is a fatigue that attacks a muscle quickly, following undue exertion. There are certain symptoms, which the diagnostician groups in his effort to segregate the type of disease afflicting his patient, seemingly well phrased by Dr. Kober<sup>3</sup>: "The general effect of overwork and chronic fatigue are characterized by loss of appetite, anemia, digestive derangements, respiratory and cardiac affections, fatigue neuroses, neurasthenia, and general deterioration of health." Over-fatigue may be present to the extent of producing symptoms without the subject's being aware of the

<sup>1</sup>Cannon, W. B., "Bodily Changes in Pain, Hunger, Fear, and Rage," page 128.

<sup>2</sup>Ibid: Page 133.

<sup>3</sup>Kober and Hanson, "Diseases of Occupational and Vocational Hygiene," page 447.

true cause. It may appear in irritability, in errors of judgment, in mistakes, or in retardation of thought due to lapses of memory.

However, the important facts to remember are that over-fatigue has a causation resting upon the physiological processes of the body; that its presence is sometimes cloaked; that a failure to recognize its social and industrial causes as a first step in a plan to eliminate them, often results disastrously to the individual and to industry.

#### THE COST OF FATIGUE

Fatigue costs may be expressed in terms of the effect upon health, longevity, safety, labor supply, employment stability, industrial contentment, productive efficiency—i. e., alertness, speed, accurate work, minimum waste—as well as output and profits. Evidence to support the foregoing will not be introduced here. Certain facts are, however, illustrative. Recent studies of the working conditions of the foundry trades made by the Office of Industrial Hygiene and Sanitation of the U. S. Public Health Service, show that where the molders work at piece-work there are a greater number of physical ills than where they work at day work, other factors not differing to any marked extent. It is a reasonable postulate that where excessive fatigue is produced and prolonged in labor for any length of time, vital resistance is reduced and the body is less able to resist disease. It is a noticeable feature of production studies that the maximum depression of the output curve is reached after the middle of the shift. Although in shops where there is a definite attempt to limit output, the production curve often does not show any material change at any time during the day.

In two plants working on an eight and a ten-hour day respectively, where intensive studies were recently carried on by the Public Health Service, it was a noticeable fact that "while in the final hours of the day accidents fell with the decline of output" yet the presence of over-fatigue interfered with a parallel decline. There was, in the ten-hour plant, a greater rate of fall in production than in accidents, the accident ratio for such plant actually increasing; that is, although both accidents and production decreased yet the decline of accidents did not keep pace with the decline of production making the number of accidents in proportion to the number of pieces produced greater in the last hour than in the previous hours.

As in case of over-fatigue and sickness so in over-fatigue and decreased production, the cause and consequence is practically self evident, not needing citations either to illustrate or to demonstrate. Indicative though, of the data here, is Dr. H. M. Vernon's<sup>2</sup> report on some experiments which he conducted in a Tin Plate plant in South Wales. The workers were lifting weights of 40 to 80 pounds by long tongs in a temperature of 110° F. They worked on five or six shifts of eight hours each. Plant conditions forced changes of shifts at times to six and four hours respectively. When the work results were analyzed, it was found that when three of the eight-

<sup>1</sup>Public Health Bulletin No. 106, page 117.

<sup>2</sup>"Industrial Fatigue in Tin Plate Manufacturing," *Engin.*, October 19, 1919.

hour shifts were distributed into six four-hour shifts, the production increased 11.5 per cent. The American Committee studying fatigue during the war, found that the output in one large munitions plant was practically nil during the last hour of a twelve-hour night shift. The English Committee working in the same field found among a selected group of employees an increase in production of 9 per cent, when the working hours were dropped from 62.2 to 45.6 per week; while with another group a change from 52.2 hours per week to 51.2 increased the output 21 per cent<sup>1</sup>.

In a discussion of economic losses from over-fatigue, a writer recently gave a mass figure which challenges consideration, not because of any proof of its accuracy so much as because it is both spectacular and logical. He estimated a loss from fatigue to the nation as not less than 20c per worker per day per year. Now, to grasp the significance of this apparently slight loss, recall that the Bureau of the Census estimates that there are about 40,000,000 workers in the United States. The normal working year is 300 days. On the basis of this estimate the monetary loss to the nation from over-fatigue would approximate \$2,400,000,000 per year. Translated into lost time, allowing an average wage of \$5.00 per day per worker, which is a high average, all workers considered, this would mean a lost time from production of the equivalent work of 1,600,000 workers for one year. If one were to carry this out further and count in all the losses in sickness and accidents, to which fatigue is a predisposing or exciting cause, as well as those other losses due to turnover because of the disinclination of certain groups of workers to do hard work, and the dissatisfaction that leads to sabotage and like losses, to the incidence of which fatigue is a contributing cause, then the drain upon society and upon the industrial group in society would amount to almost unbelievable totals.

Based on the capabilities of the worker and not on the capacity of the machine, there is apparently in plant production a law of diminishing returns for energy spent, and a point is reached beyond which labor becomes less profitable. However, the massing of the probable losses in such a spectacular manner, while undoubtedly trustworthy, and attendant upon or resulting from a lack of appreciation of the law of fatigue, does not convince the individual employer of the need to analyze his own plant. The loss is a national one which warrants a nation-wide preventive program. The problem which it presents to the average employer, alike important to the employee, is how so to control fatigue-producing conditions and processes as to enable efficiency to be maintained at a minimum cost in health and welfare to the worker and to the state.

#### TESTS OF INDUSTRIAL FATIGUE

It may be rightly assumed that the foregoing conclusions are founded on scientific determinations. These determinations have not been made by one set of researchers nor confined to one school of thought.

In the United States physiologists and physiological chemists attached to leading universities have been and still are experimenting in this field,

<sup>1</sup>Reprint 442, United States Public Health Service.

originating and developing standard tests for the determination of fatigue and the analysis of the physiological and chemical changes accompanying fatigue. In industrial plants and elsewhere, practical efforts are being made to devise ways to measure abnormal fatigue and to eliminate it. There is an extended literature<sup>2</sup> on this subject. Some publications are wholly theoretical while others deal with tests made and results obtained. Examples here given are illustrative only of types of researches pursued.

#### SOME TYPICAL TESTS EXPERIMENTED WITH

These types may well be divided into at least four groups: First, laboratory tests touching physiological, chemical, and reactions to labor causing over-fatigue; second, factory tests in regard to production; third, physical tests upon employees to determine their capacity for arduous labor; and fourth, a miscellaneous group including all tests of other character.

##### *Laboratory Tests—Treppe*

In the first group will fall tests made with animal muscle. The muscle given a definite load to carry is periodically stimulated by slight electric shocks and undergoes a successive contraction and expansion as shown in varying wave lengths when graphed. Such a muscle, functioning somewhat as in the body, gives a curve with a treppe similar to that formed by the production curve in an output study; that is, there is a slight climb, followed by a steady decline after the peak has been reached. Coincident with this activity a waste product is created, which, under continued muscular activity, inhibits action and causes the decline shown in the curve. Under chemical tests this waste gives a lactic acid reaction. Other waste products are also distinguishable. The interesting feature of this test is not only that it so closely follows the production curve of muscular work in a factory in the early rise followed by a decline, but that when the muscle is washed with a salt solution, the waste is removed, and the ability to function again is restored. Too close an analogy between the laboratory experiment and the normal functioning of the industrial worker in the plant cannot be made, for the former is not controlled by a directing will as is the latter and cannot simulate greater or lesser activity by a control of the output. Many experiments have been made from time to time in a similar direction to determine the nature of the fatigue-producing substances found in the muscles.

##### *Blood and Urine*

Scott<sup>3</sup> summarizes a number of kindred experiments made by such men as Lee, Burrige, Tisse, Fletcher and Hopkins, Ranke, as far back as 1865, Garrett, Colvin, Dunlap, and others. Laboratory studies of live animals were made by Hastings<sup>4</sup> to determine the possible relation of the bound CO<sub>2</sub> in the blood to fatigue. Dogs were made to run in a treadmill at a ten-mile rate until fatigue was induced. "Blood was drawn from the

<sup>2</sup>The Journal of Industrial Hygiene: Vol. 1, No. 1, p. 42 ff. Josephine Goldmark: "Fatigue and Efficiency"—Part II.

<sup>3</sup>P. H. Reprint No. 465, "The Present Status of Our Knowledge of Fatigue Products."

<sup>4</sup>Reprint No. 546, U. S. P. H. S. Reports, "An Investigation of the Changes of the Blood and Urine."

jugular vein," Hastings states, "without exposure to air, oxalated and centrifuged. The reaction of the plasma was determined electrometrically with a Clark electrode. In all cases a fall in the bound CO<sub>2</sub> followed exercise." While the extent of the fall varied with individuals, yet repeated tests of the same subject yielded practically the same fall under the same approximate amount of exercise. Hastings made further tests to determine whether a urine examination would yield data for measuring fatigue. He made observations upon marathon runners, bicycle riders, and surgical patients resting in bed while recovering from simple operations. The results, which showed slightly higher acidity among those who had been through strenuous exercise than among those who had been resting, were nevertheless of little value. In subjects intensely fatigued the hydrogen-ion concentration of the urine invariably showed an increase.

#### *Bacteria*

The effect of fatigue in the incidence and severity of bacterial diseases is shown in the experiments of Emery<sup>1</sup>. White rats fatigued by a revolving cage were exposed to anthrax. They showed more susceptibility than other rats similarly exposed but which had not had their resistance broken down by excessive labor. De Sandro<sup>2</sup> made similar experiments with dogs, guinea-pigs, and rabbits, according to Rosenau, who adds, "Under the influence of the chemical changes induced by the physical strain . . . the defensive powers were much weakened; phagocytosis was reduced, and also the chemotactic power of the cells, the bacteriolycins, antitoxins, agglutinins, and opsonins showed a marked falling off."

#### *Test on Fatigue and Muscular Tonus*

Dr. A. H. Ryan<sup>3</sup> has experimented with an apparatus for recording the tension needed to cause a given extension of certain groups of muscles. He hoped thereby to ascertain the effect of working conditions, such as hours of labor and work processes. His apparatus for testing the pectoral muscles consists mainly of metal slings, with cord and pulley, and a spring balance, delicately adjusted. He found that strenuous, long-continued work decreased the muscle tonus; also short, hard, heavy work gave a quick decrease in tonus—i. e., in the readiness of the muscle for ordinary work under normal stimulus. Loss of sleep reduced tonus. Excitement overcame the effects of heavy work. This is a result also noted in connection with the analysis of the effects of adrenalin.

#### FACTORY TESTS

##### *Output*

Factory tests are more familiar to the average person. They range from the simple output tests where the quantity of production is determined on an hourly, daily, and weekly basis. Automatic registers indicate the output for any selected period. The output test is not always indicative of fatigue. Even a decline in the output curve does not tell the true

<sup>1</sup>Emery: "Immunity and Specific Therapy."

<sup>2</sup>Rosenau: "Preventive Medicine and Hygiene," 405ff.

<sup>3</sup>U. S. Public Health Service Reports, page 1622, July 25, 1919.

story, unless along with it is taken a power consumption test. Florence and Ryan<sup>2</sup> have clearly shown that the latter is best made when the machine has its own motor, rather than power furnished from a central system and shafting. As previously stated, output curves may be discarded where soldering on the job is practiced, except perhaps as an index of such possible soldiering.

#### *Spoiled Work*

Another test which has been used to corroborate the output test is that of spoiled work. With decrease in attention goes an increase in mistakes, as shown in the number of discards in the total product.

#### *Accidents*

From previous statements it will be recalled that there is a correlation of accidents, absenteeism, turnover, and fatiguing labor. In two factories where comparisons were possible, workers on ten-hour shifts showed an absentee record of 3.15 per cent of the total working time, while in other factories on an eight-hour shift the percentage was only 1.53 per cent. Some factors were not eliminated here which are responsible perhaps for a greater difference than really exists, but the figures approximate accuracy sufficiently to make the data comparable.

#### *Cinematograph Records*

Cinematograph records have been taken for the purpose of eliminating unnecessary motions. When such eliminations enable the employee to establish rhythm in his work, with intermittent interruptions in the continuity of the operation, fatigue seems to be correspondingly reduced. Ryan and Florence<sup>3</sup> suggest, as the result of tests made with the automatic rhythmometer, that rhythm, while maintaining the output curve to the end of the day in a lathe operation, yet seemed to mask fatigue. Physiological tests apparently indicated the presence of fatigue notwithstanding it did not assert itself in restricted production. Their test is described further on.

Industrial engineers are conversant with the adaptation of the principle of this test in the program of scientific management as set forth by Taylor in his standardized motions and regularized rest intervals for jobs of certain types.

### PHYSICAL TESTS

#### *Mental and Physical Examinations*

The more important tests as to practical value are those to determine the capacity of the worker for the job. These are: mental, for intelligence, accuracy of judgment, and alertness; physical, for past history as to defects, and for present complaints and current sickness. Such tests roughly indicate the presence of fatigue or the need for more intensive investigations into fatigue-creating conditions.

<sup>2</sup>"Comparison of an Eight-Hour Plant and a Ten-Hour Plant"—Public Health Bulletin No. 106.

<sup>3</sup>Public Health Bulletin No. 106, p. 210.



### *Muscle Tests*

Dr. E. G. Martin<sup>1</sup> has tried out muscle tests for determining body strength. These tests are made in working clothes. A spring balance registers in pounds the strength of eight important muscle groups, and this record is converted into an index of physical working capacity by multiplying the total by 6.67. For effectiveness the test requires a job analysis, setting forth the body strength needed for each job and arrived at by averaging the strength of a group of workers on similar jobs. By making records over a more or less extended period, eliminating those engaged in such work but unfitted for it, as shown by later physical re-examinations, a standard and minimum strength below which it is unsafe to go is ultimately ascertained. Dr. Spaeth would improve this test by a formula which is a ratio to be obtained by dividing the strength total by the weight. Thus workers of given weights would have to register a ratio corresponding to that established for the mean group.

#### MISCELLANEOUS TESTS

### *Rhythm*

Among the tests now being perfected there is one that promises results which may seriously disturb previous opinions. Almost every writer on fatigue mentions monotony, or constant repetition of the same task, as a cause of fatigue. Ryan and Florence<sup>2</sup> have made some tests of the effect of rhythm in industry. In measuring rhythm they attached an automatic rhythmometer to the machines. A signal magnet recorded variations. A mean was obtained by graphing the time and the output of a selected number of workers. A coefficient curve was made for a comparison of rhythm. Certain attempts were made to find modifying conditions which would interfere with the rhythm. They have summarized the results of their test as follows: First, "by relieving attention" of the worker to his task, rhythm helps to reduce fatigue in the day's work; second, "by rendering more uniform metabolism and the recovery involved in the operation" the effect of the work is more evenly distributed; third, "by masking fatigue effects", more even distribution of output is obtained; fourth, by uniform motions and eliminating unnecessary motions, accident frequency is reduced.

#### INDUSTRIAL CAUSES OF OVER-FATIGUE

Manifestly, fatigue is a physiological reaction that can be measured, though there are many refinements in measurement which must be worked out in the laboratory and in the plant. It is true that the physical condition of the worker, his habits, and his activities outside the plant have a marked influence on his reactions to working conditions. If injurious, they make the effect of plant fatigue processes more acute. For this reason industry cannot be charged with responsibility for all cases of acute fatigue; but the working conditions and processes causing extraordinary fatigue can be segregated, and will yield to a plant program for their correction. Such a plant program, which may be expressed as shop stand-

<sup>1</sup>E. G. Martin, "Strength Tests in Industry."—Public Health Reports, August 13, 1920.  
<sup>2</sup>Public Health Reports, Vol. 34, No. 30.

ards, will include features to correct both the direct and indirect causes of fatigue. Distinction between these types of causes is made in that those grouped as direct, acting immediately upon cell life of the muscles intimately involved in the process of labor, create within the cells the waste toxins previously referred to, thereby inhibiting their normal functioning. Those classified as indirect, react upon the normal functioning of the organs of the body, and by inhibiting such normal functioning, ultimately interfere with the activity of the muscles necessary in the performance of the particular occupation in which the worker is engaged.

#### DIRECT CAUSES OF FATIGUE

To summarize, the working conditions which may be classed as direct factors in fatigue causation, are of such types as are commonly associated with muscular strain and which arise from continuous lifting, as in the case of laborers loading pig all day; or from long standing, as with bench hands on filing or weavers operating a dozen or more looms; or among employees engaged in processes where they labor in cramped positions, as garment workers, and workers who have a hard, continuous use of the same set of muscles, such as operators by foot power or sewing machines. To this class also belong those operations calling for continuous sitting in faulty postures which interfere with metabolism—usually on poorly designed chairs,—as with clerical workers, accountants, and tobacco wrappers, as well as those other operations where the hours of labor are long and the work is continuous without intervening days of rest, or where the work is characterized by monotony without the relief afforded by rhythmical action. But the direct causes of fatigue include activities in places where not only is muscular effort imposed by the job itself, but such tasks or others in their vicinity produce excessive noises, as in the case of riveters using pneumatic hammers which tend to effect injuriously the delicate mechanism of hearing or possibly aiding in inducing fatigue in the body by the vibrations incident to the processes which give forth the excessive noises. Included in such direct causes are excessive temperatures with high relative humidities, as in mines and laundries, or fluctuations in temperature with extremes of heat and cold, as in steel mills or pickling rooms. Furthermore, such working conditions include occupations where light intensity, gloom or glare, fatigue the worker through eye strain.

#### INDIRECT CAUSES OF FATIGUE

The foregoing classification of the direct causes of fatigue is intended to be illustrative and not a complete list of factory operations having this undesirable result. There are other causes of fatigue, which, for lack of a better term, we characterize as indirect; these arise from such working conditions as are found in operations creating air dustiness,—that is, in abrasive manufacturing, grinding, polishing, and sand-blasting. Here fibroid changes in lung tissue occur, restricting the normal function of the lungs or making them more fertile soil for B. Tuberculosis. Similar operations creating fumes, gases, and poisons too numerous for illustra-

tion, break down cell life, create undue amounts of waste, and overcharge the processes of waste removal in such wise as to inhibit normal functioning. To these indirect causes of fatigue may be added inadequate and insanitary toilet and drinking facilities; the absence of rest room for women workers or rest periods for operatives engaged in heavy labor; unsympathetic management, unattractive or repulsive workrooms, accident hazards; congested occupancy of workrooms, which facilitates the spread of epidemic diseases; unscientific placement of employees. But perhaps as big a factor, if not the most important one contributing to industrial fatigue, is the absence of industrial hygiene and provisions for medical and surgical relief to provide for the physical welfare of employees, to note, reduce, or correct physical disabilities, or to treat minor ailments not sufficient to debar the worker from employment, yet capable of retarding maximum production.

#### FUNDAMENTALS OF A PLANT PROGRAM

These, as we have just said, are examples, only, of working conditions common in varying degrees to all industries, which fall within the groups of direct and indirect causes of fatigue, and which readily yield to a program, when the management is alive to the importance of the human factor in production.

If a plant program is to be adopted, three steps, at least, are essential. I have discussed these at other places, have seen them tried, and have yet to find them wanting. First, there should be a physical examination of all applicants for employment, in order that their physical capacity may be known by the employment director, this examination to be followed periodically by re-examinations and replacements according to the health of the worker. This physical examination is in addition to the usual training and experience examination. Second, there should be a physical examination of the jobs, to find just what mental and muscular ability is required for maximum efficiency in output. Third, there should be a physical examination of the plant, to discover the working conditions which may injure the health of the worker, increase unnecessary fatigue and reduce output.

From such plant self-knowledge and from the program which it suggests, humane working conditions and mutual profit accrue to employer and employee.

#### DISCUSSION

CHAIRMAN COPP: I am sure we are very greatly indebted to Mr. Newman for this very valuable address and I am sure you must have something that you would like to say or some questions that you would like to put to him.

I have asked Mr. Wilcox to say just a word to us about his interest in the Wisconsin shops and their standards.

Mr. F. M. WILCOX (Industrial Commissioner of Wisconsin): I am not a doctor and I am not a student of fatigue so I will have to speak as a layman.

The question of fatigue brings us to the question of what attention is being given to hours of service and to working conditions, and most all states have done something along this line. In Wisconsin we have made some progress. We have convinced ourselves that back of it all is this real question of fatigue, the real question of whether or not the amount of service that has been given on this particular day is such that this worker may return to his job on the next morning in as good a condition as he was the day before.

I think I am correct in saying that employers generally won't take very much stock in this matter of fatigue; they think it is a lot of bunk, and that only social uplifters are back of it.

Some years ago by arrangement with the Federal Health Service, Dr. Olesen came into Wisconsin, and we paved the way for him to make quite an extensive study of fatigue. I have never quite forgiven the department at Washington for not giving us the benefit of the studies that were made in this State, because unless we have something right here at home, something that is personal to our own employers so that we can teach other employers from that employer's experience, that is, just what the bad results are from long hours and poor working conditions, it is hard for us to get a better character of legislation than we have at present. You see I am thinking of it as a subject that ought to have a great deal more consideration than has been given to it.

We have had good response from employers in this State to our working orders, but whenever we do come in conflict with some of them, whenever they are disposed to increase the number of hours or to give working conditions which we think are unfit, we invariably meet the argument on their part that they worked longer hours when they were boys and girls, that it never hurt them to work in bad conditions, that they could work nights just as well as they could days, and all that sort of thing. Now, it appears to me that we must get around to the other side; we must from experience in our own plants convince the employer that he is the man who is losing as well as the worker by this excess of work and bad working conditions.

MR. WILL E. ROSE (Metropolitan Life Insurance Co., Chicago, Ill.): To my mind, this question of fatigue is one of the greatest, most vital things we have in industry today. In the last six months it has been my duty to pass through more than 1,500 industrial plants, to show motion pictures, and to address more than 177,000 industrial workers. Never once in my travels have I heard the question of fatigue brought up. Not once so far this week has any man in this building mentioned the subject, simply because it is not well enough known. It seems to me that it hasn't yet reached the point where industrial executives want to grasp it or where they realize that it must be grasped sooner or later.

Since a person can grasp things twenty-five times faster by visualization than by any other means, the motion picture, I believe, will have to play its part in this country in bringing about an interest in fatigue study. The United States Government has produced a great many pictures on health, on dust explosions, on agriculture, and on various other

subjects, and they have all done great work. I have projected upon the screen several government pictures to very illiterate audiences in the far South, and I have put my message over very nicely because they could visualize what I was trying to tell them on the screen.

I wish to ask Mr. Newman what would be the chance of the Government in the future taking up this question and producing a film which could be sent about the country to let the manufacturers see what this question of getting a rest is going to do not only to increase production but to make the worker healthier and more efficient.

MR. NEWMAN: I can't tell you what the Government will do. Congress appropriates a certain amount of money for the study of the diseases of man, and under that very general heading we have been studying industrial fatigue, but Congress would be very quick to resent the use of any of our funds appropriated for the study of diseases of man for the preparation of a film for the education of the people of the country. We can make our studies and publish our reports, but to promote the cause in which we are interested we haven't the funds and we will never get the funds until the general public interested in public health becomes sufficiently interested to see that money is appropriated for health work in industrial plants. Until that time I am afraid that our office can do nothing in the way of preparing a film.

CHAIRMAN COFF: Unfortunately for us, Mrs. Gilbreth, who is next on the program, is not able to be here. She has very kindly sent a brief paper. We are especially fortunate in having some one read it to us who is particularly interested in the subject of the paper. Miss Alice Smith, of A. George Schulz Company, Milwaukee, Wis., will read the paper submitted by Mrs. Gilbreth.

#### PRACTICAL METHODS OF REDUCING FATIGUE

FRANK B. GILBRETH, LL. D., MEM. S. I. E., MEM. A. S. M. E., AND LILLIAN GILBRETH, PH. D.

At the present stage in the progress of fatigue elimination, not much will be gained by disputes as to the relative efficiency of various methods and devices.

The important thing is to eliminate *at once* all unnecessary fatigue that can be located, and to insure that the worker is not fatigued by his day's work beyond the point where he can recuperate completely during a night's rest.

Those interested in the subject are acquainted with the necessity for making a fatigue survey to determine what is being done along these lines and what can profitably be done; with the benefits of a "museum" where fatigue eliminating devices from all sources may be collected through photographs, drawings, and preferably models; with the necessity of arranging all possible work so that it can be done part of the time standing and part of the time sitting; with the importance of supplying work chairs and rest chairs, fitting the special demands of the

work, and the needs for recuperation from it; and with the importance of rest periods.

Too much time has been spent lately in disputes over the necessity for and duration of rest periods. The scientific determination of the need for and the length of such periods is no work for an amateur. Best practice demands that such periods be introduced wherever there is a question as to the fatigue of the worker, with an understanding that the arrangement is temporary. Further investigations may show that the work provides sufficient rest periods because of unavoidable delays, or that a change in methods may make different rest periods desirable. No one has a right to discredit or discard rest periods after a half-hearted attempt to install them. Usually when changes are made, so many factors are involved that it is almost impossible to place the blame for a failure where it belongs, and too often it is attributed to the rest period, which has probably been introduced in spite of the opposition of some, who are only too glad to accent anything that may seem to discredit it.

The use of the Home Reading Box, the benefit of change in posture, the influence of lighting, heating, and other work conditions are well understood. These are all very practical aspects of the work. Equally practical, though perhaps not so well understood, is the new attitude toward work that is a part of fatigue elimination. Viewed from the fatigue study standpoint, which is closely related to the motion study standpoint, all work becomes interesting—becomes a worth-while subject to investigate. Unless already investigated and standardized through motion study, the work method under inspection is probably wrong, and offers a field for improvement.

The problem may be considered in various ways; for example, as one of: first, worker, second, surrounding conditions and tools, third, motions. Again, as a problem of decisions and motions. Each part of it may be considered as consisting of three types of motions: first, those almost beyond the capability of the one performing the work, but which may be learned by him, and which requires the best in him; second, those well within the grasp of the person doing the work, which he may easily reduce to habit and perform with ease and pleasure; third, those extremely simple for the one doing the work, which may well be passed over to some one of less experience, training, or capability.

Again, the work may be considered as consisting of cycles of motions, the motion cycle having sixteen elements in different combinations. These elements are: search, find, select, grasp, position, assemble, use, disassemble, or take apart, inspect, transport, loaded, pre-position for next operation, release load, transport empty, unavoidable delay, avoidable delay, and rest for overcoming fatigue. Again, the work consists of the motions, and the resulting fatigue—the problem being to accomplish the work with those motions which are produced with least fatigue.

Some of the investigations suggested by these methods of attack upon the problem require intensive training and special apparatus. Many, however, may be made without special training and with no apparatus,

through keen observation and interest in the subject. The fundamental idea is to *think* in elements of motions and the resulting fatigue, with the aim of devising the one best way to do the work. In order that this may be most profitable, a laboratory, or at least a laboratory trained worker, to measure and co-ordinate the findings of the thinkers will mean most economy of effort and most profitable and permanent results. Such laboratories and such workers are becoming more and more a part of industry. The supply will meet the demand, and will be forth-coming quickest when every one interested in fatigue goes through the preliminary stages of waste elimination for his own work processes, in the plant and out.

Investigations in the science of fatigue elimination are going on everywhere. The Society of Industrial Engineers has established an International Committee for the investigation of problems of eliminating unnecessary fatigue in the industries. This committee is collecting data on fatigue elimination in all countries and is glad to co-operate with all interested in the subject, to receive into its membership a representative of any body interested in the subject, and to place its findings at the disposal of every one. Data are being collected in the fields of psychology, physiology, psychiatry and the allied sciences. Thinkers in all countries are attacking the problem. We are bound to have the facts placed at our disposal. The important thing is to introduce broadcast the *practice* of studying actively with the aim of eliminating fatigue and of supplying fatigue eliminating methods and devices at the earliest possible moment.

If every member of the community would study his own activities for *one day*, and try to carry out the improvements that are bound to suggest themselves, no matter in what amateur fashion, the solution of the problem of eliminating unnecessary fatigue would be assured.

#### DISCUSSION

CHAIRMAN COPP: Among the very helpful things that have come to us who are interested in improving industrial conditions for workers from the Women's Bureau of the Department of Labor at Washington is a set of shop standards for women workers. As you know, Miss Mary Anderson is at the head of that Bureau, and it has lately become a bureau of the Department of Labor.

I have asked Miss Agnes Peterson who is here today and who is the Industrial Supervisor in that Bureau, to speak to us for a few minutes. I am sure she has a message from her Bureau and will have something to say about the development of their set of standards for women workers.

MISS AGNES PETERSON (Industrial Supervisor, Women's Bureau, U. S. Department of Labor, Washington, D. C.): I think both of these papers have brought home to us a realization of the great need of scientific study along these lines. I think it has also brought home the fact that there is much that the average layman and the average laywoman can do for the scientific study. Of course, we have to leave that to a special group of people who are equipped and qualified to do it, but in the fac-

tories the workers can contribute to it, the foreman, the plant superintendent, the owner, and even people outside of the plant can contribute by talking about standards that should exist in the plant. We can eliminate unnecessary fatigue by doing away with poor ventilation, poor lighting, poor heating, and insanitary working conditions.

In addition to that there are other things that can be done. Special attention should be paid to posture at work. There are thousands of people today who are standing constantly at work when they might just as well divide their time between standing and sitting. That can be done by having the work table about the height of the elbow and having adjustable chairs. These chairs should be supplied with a rest for the back so as to make it possible to lean back once in a while. I know that women find it a great deal more difficult to stand all day than men do.

Also, we can eliminate the fatigue in industry by providing a hot meal at noon, or the supper period if people work over that period, by providing a pleasant place to cook the meal and to eat it, by providing rest rooms and facilities for recreation, by stopping once in a while to sing a song or to move around, taking a rest during work hours in that way.

Fatigue can be reduced to a great extent by shortening the work day. A great many people object to that. A great many employers object to it, but I think that the fact that so many employers now are on record for a shorter work day in the interest of production gives us an argument. I am reminded of a company which manufactures lamps. They found they were turning out 25,000 lamps a week and they wanted to reduce that number because they had more lamps on hand than they wanted. They were afraid that they were going to be overstocked so they reduced their hours from fifty to forty-five a week. At the end of the first week they were still turning out 25,000 lamps; at the end of the second week they were turning out 25,000 lamps; at the end of the third week they were turning out 25,000 lamps, and they have remained on their forty-five hour week because they know now that they can turn out just as many lamps during forty-five hours a week as they could during fifty hours a week.

MR. H. O. BEYER (United Drug Company, Boston): Would you consider a machine running regularly, filling a certain number of packages a minute rhythm?

MR. NEWMAN: Rhythm work is largely a question of eliminating excess motion. One punch press might be working in rhythm and another might not. The only way you could tell would be to attach electric wires to the machine and take your dot and dash record. The method to attain rhythm in most operations is to have motion picture studies made of the operation and then reduce the unnecessary motion of your approximate rhythm. Some operations could never be reduced to a rhythm basis.

We have made a series of studies which we are now preparing for publication in which we show that rhythm can be obtained in a great many processes. Rhythm may be approximated but, of course, there are vast numbers of processes in which it can not be obtained.



MISS FRANCES PERKINS (New York State Industrial Commission): We are putting in a great many conveying processes, and I wonder if your study of rhythm has been used in that process.

MR. NEWMAN: We are trying to ascertain whether there is rhythm in certain operations and, if not, whether rhythm might be introduced.

ADJOURNMENT.

#### THURSDAY AFTERNOON SESSION

CHAIRMAN COPP: Before having our addresses this afternoon, we have a report from the nominating committee. Will the chairman of the nominating committee please report.

#### REPORT OF NOMINATING COMMITTEE

MISS SWETT: Your committee desires to report the following nominations: Chairman, Miss Tracy Copp, of Green Bay, Wis.; Vice-Chairman, Miss Nesta Edwards, Chicago; Secretary, Miss Alice Smith, Employment Manager, A. George Schulz Company, Milwaukee, Wis.

(The motion was made, seconded, and carried, that the report of the Nominating Committee be accepted and a ballot cast unanimously electing the nominees to office.)

CHAIRMAN COPP: With the introduction of women into new occupations during the last five years and with the increasing number of women in the usual occupations, we have found that the problem of the woman worker has become vital in all of the industrial aspects of the problems of today. However effective she may be as a worker and whatever the problems surrounding her employment may be, it is safe to say that no final and just solution of any industrial problem will be had without the consideration of the woman workers. I think that while we have the advantages of wider opportunities in industry, wider opportunities in professions, we shall have to face the responsibilities that go with these advantages. With the new aspect of industry today, where the workers are having more of the responsibility in determining the conditions under which their employment shall be had, we have found here and there advanced employers who have given to the rest of us very valuable experience. We have many of these employers in Wisconsin, and we are fortunate this afternoon in being able to hear from one. Mr. Nunn, of the Nunn, Bush, and Weldon Shoe Company is going to talk to us on the problems of the employer in relation to woman workers.

#### MANAGEMENT PROBLEMS RELATED TO THE EMPLOYMENT OF WOMEN

H. L. NUNN, FACTORY MANAGER, NUNN, BUSH, AND WELDON SHOE COMPANY, MILWAUKEE, WIS.

I don't know whether you will find any connection between the few words I am going to say this afternoon and safety work, but I feel that

the good feeling and harmony that we all desire so much in the factory have a very important part. When I was invited to address this session of the National Safety Council on the subject of management problems as related to employment of women, my first inclination was to decline, feeling that an assemblage of this kind would expect me to discuss it from a scientific standpoint and, probably, to produce an array of figures that would shed some light on many phases of managerial problems that come up to bother us, such as, for instance, the exact degree of fatigue occasioned by a certain number of hours' work, the efficiency of the eight-hour day as compared to the nine-hour day, or, perhaps, the most efficient day, subdivided into the various kinds of work. In the few words I am going to say, I shall dwell on the human side of this management problem, the advantage of appealing to the heart rather than to the head. I have seen many managers, men and women, take hold of work of this kind with the feeling that they have studied it a great deal and know a great deal about human nature and the scientific management of labor, and I always feel that persons of this kind had indeed better know a great deal about the subject, because a little learning is a dangerous thing and it would be very much better if they tackled the work with the feeling that they knew nothing about it. I do not want to inject into my talk any more of my personal experience than I feel is absolutely necessary to bring out the thought in my mind, but I am prompted to tell you of the first experience that I ever had in the managing of labor, and it was woman labor. As I look back on it, I feel very thankful that I entered the work with the feeling that I knew nothing about it and that if I were successful, it would be due largely to good luck.

This was in a fitting room of a large factory. Two hundred girls were employed in this department. I attribute the success I had to the fact that, as foreman, I put myself absolutely in the hands of those workers. I said to the girls, "My future is in your hands. If you want me to stay here, do your work well and obey the rules. If you want some one else, you can get him very quickly by shirking your work and disobeying the rules." If you will pardon this personal allusion to my own experience, in six weeks' time those girls had reduced the cost of that department fifty per cent. We had the cleanest, the most orderly department in the factory. It was recognized, and I was promoted to the superintendency of the factory within four months—all because I was able to get those girls to want to do what I wanted them to do. I don't care how much study, from a theoretical standpoint, of scientific management a person may have made, and I don't care how much they know about the job they are going to tackle, the hard management problem is to get the people to do what you want them to do, and when you get them to want to do what you want them to do, you have a safe and sound foundation on which to work.

It has always seemed to me a confession of weakness to hear a foreman say that this girl is lazy, shiftless, does not care whether she works or not, and that she seems to want to do as little work as possible and get as much money for it as she can. I have gone into factories in different

localities and through the various departments, and I will say to the foreman, "What kind of labor do you have in this community?" One will say, "They are no account, lazy, shiftless. I never saw such people—can't do anything with them." And then, I go to another factory in the same community and say, "What kind of labor have you here?" and he will say, "The very best in the world. These girls are faithful and loyal, and will do anything I ask them." Same community, but different managers. One manager has appealed to the heart and he has been successful. When a man or woman comes to me and says, "This girl is no account—I can't do anything with her," I always feel like saying, "Have you examined yourself. What is the matter with you?"

Of course, after this foundation, I feel that a manager must have high standards, but they are comparatively easy to maintain. If a manager's foundation is right, his department will be just as clean, and orderly as he feels that it should be, and his quality of work will be just as high as his standard. The rules will be obeyed to just the degree he feels they should be obeyed. I think it is a common mistake that many managers make, to feel there is a relation between kindness and laxness. They think that to be kind means to be lax. Of course, it is not kind to allow workers under your control to do as they please, any more than it is to allow children to do as they please. I think the greatest compliment a manager can receive is to be called kind and just. If he is going to make criticisms with a biting sarcasm and a show of bad temper, he is going to lose, but if he is fair, a woman's intuition, if nothing else, will tell her that he is fair and just, even though strict in his standard of conduct.

This about covers the thought that was in my mind, regarding the foundation for a successful manager. It is easy enough to get people who know what should be done, as I stated before, but the hard thing is to get them to want to do what you want them to do. When this problem is solved, the rest is easy and, in laying this foundation, I feel it is a foundation and it is only, after all, the spirit of the Golden Rule. We have laid a foundation that we can build on with every assurance of success.

#### DISCUSSION

CHAIRMAN COPP: I am sure that we are not going to let Mr. Nunn terminate his remarks so briefly. He has organized in his shop a very interesting form of joint control, and I am sure that many of us who are interested in that subject would be very glad to hear about it.

MISS ALICE SMITH (Employment Manager, A. George Schulz Company, Milwaukee, Wis.): It seems to me that the problem of women in industry should not be considered any longer as something different and apart from the employment of men in industry, leaving out of consideration, perhaps the administrative and executive positions, and those occupations which we all consider hazardous to women, on account of their sex. We can all grant, I am sure, that women should be allowed to enter occupations the same as men. The standard for factory equipment in industries where women are largely employed has, I think, as a rule,

been on a higher plane than those where men alone have been employed. We thought most of the employers of women had found it profitable to provide proper rest rooms, sanitary toilet facilities, a lunch room, and some means of recreation. It seems to me one of the problems that management faces is to equalize these standards for men and women by raising the standard for men. Now that women are entering into equality in the matter of suffrage, I think that we ought to forget that women are to be set aside in industry. That is, they must expect to be treated the same as the men. Then the problem becomes one of the employment of the adult in industry and what is proper and right for the adult worker. I should like to ask Mr. Nunn a question. Granting that women are easier to handle than men, what can we do to educate and train the women so they will begin to see things in the broad way that most of the men do? What have you found, Mr. Nunn, in your plan of organization? Are women taking hold of it as well, and are they as active as the men in your factory, and what can be done to make them active and make them take an interest in this problem, in making them realize their responsibility?

MR. NUNN: The difficulty that we have found in getting the women workers to take the same interest and the same part, which they have the right to do, in our organization, has been that in the shoe industry we have been partial to the younger women or the younger girls. These girls have the faculty of getting married very young. They do not really take their work seriously, because they feel it is a temporary job, only until next June, perhaps, and for this reason we have found it impossible to get the woman workers to take the same interest in the organization that the men do. Some of the older girls take some interest comparable to the interest the men take. We have the same difficulty with the younger boys, although not as much as we do with the girls. I should be very glad, indeed, to get an idea from this meeting how to improve that condition.

CHAIRMAN COPP: I have one or two ideas about the employment of women, as far as the present-day problem is concerned and I am wondering if they could stand the acid test of this audience. Is it not true that there was once a statement made about employment of women in industry, which was more or less to the effect that girls go to work for pin money? Is it not true that more and more women in industry have the same social status that men have? Is it not true that there are women who have to earn as well as men? Is it not true that the unmarried girl stays by the family longer than the unmarried boy, and is it not true that because of the natural timidity of women in going out and bargaining for new jobs, that although a woman may not be in industry for life, she stays in the job of her choice longer than a man does? Is it not perfectly good business to open up the job opportunities for women to a more or less unlimited extent, barring those clearly hazardous to her because she is a woman? Is it not good business to train her for anything she can do, even though she is not going to be with you as long as the men are? What do you think about that, Mr. Nunn?

MR. NUNN: I wish I could agree with you. We have so many positions I can think of where we would like to put women. They could do as well or better than men, but it takes too long to train them, and the risk of losing them, after going through the training period, is so great that we don't feel it is good business. I think as long as the girl stays unmarried your assertion is correct, that she sticks by the job perhaps better than a man.

MISS IDA MAY WILSON (Lowell, Mass.): I felt during Mr. Nunn's talk that my theory was in danger of being discredited. I think it is fair to look into the subject of theory. What is the value of theory except in common practice? The old question of the value of college education came up, what is education? Briefly, is it not the developing of what is within? If a person has a kind heart and good head, why not develop them? Modern psychology, I believe, has discarded the theory that woman has intuition above that of man. Reason has been proven to rule women, even as well as men. I want to agree heartily with the speaker in his statement that the spirit of a manager is reflected in the factory. Everyone in the factory will have the spirit of fair play eventually if that spirit is within the manager.

I am especially interested in the subject of employees' representation. I believe that is a basic thing in industrial relations. I should like to ask Mr. Nunn if there is such a thing as joint control in his factory. In other words, may they vote on what they will do; may they decide, or do they limit this voting to the question whether or not they will present plans to the management?

MR. NUNN: There is absolutely no limitation upon their activities. Each department elects a representative to the shop committee. The election is by the bench workers—no executive of any kind takes part in it and on this shop committee there is no executive, boss, or straw boss. It is entirely a body of bench workers. They have as chairman a man who is elected by the employees, either from inside or outside the factory, a full time man who does nothing else but look after the interests of the employees. He is called the business agent of the employees, and is paid by the association. There is a higher body than the shop committee, called the Joint Council; which is composed of eight people, four appointed by the shop committee and four by the management. The Joint Council you might call the Supreme Court. If the members can not agree the case is left to arbitration, but never yet has one case been arbitrated and the association is five years old. The shop committee can present any kind of plan, wages, hours, working conditions, anything it pleases, and act upon these things. The management has the right of appealing its decisions to the Joint Council. Since this has been in effect, there has been one appeal and that was simply referred back for investigation and, after the shop committee investigated, it re-considered its action. It is a plan that has been developed to its present potency through education. It has not come all at once, but has been of slow development, having started five years ago in a more limited way, but today the association has a very active influence on the management of the factory.

CHAIRMAN COPP: The interest of the state in employed women is determined not only by the type of legislation in the state, but by the appropriations that are made for the enforcement of that legislation, and by the type of people who are selected to carry on the enforcement. There is no state commission that is watched with any more interest by industrial students than the New York State Industrial Commission. We are extremely fortunate, I think, in having with us Miss Frances Perkins from this Commission. She will talk to us of the interest of the state in women workers. Miss Perkins.

### THE INTEREST OF THE STATE IN ITS INDUSTRIAL WOMAN WORKERS

MISS FRANCES PERKINS, COMMISSIONER, NEW YORK STATE INDUSTRIAL COMMISSION, NEW YORK CITY

The interest of the modern state in its women workers is two-fold, for there is first that old historic, traditional interest, which the state and community has always had in the women citizens, as the bearers of the life of the race, from generation unto generation, and the second interest which the modern state has achieved in its women workers is interest in their welfare and success, and the need of the modern state, of modern society, constantly to increase the number of its workers, constantly to develop the efficiency of its workers, and constantly to attract to the body of the working group more and more people, more and more efficient workers. This phase of the state's interest in its women workers was considerably emphasized, I think, by the war and the labor shortage that followed after the war. If I may say this without disparagement to the people of this nation, who perhaps are as chivalrous as the people of any other country, when the people of this nation woke up to the fact that American woman-power was economically important, the interest of the whole country in the success and welfare of its women workers was enormously enhanced, and there is in this a very real meaning for our modern industrial society. The entrance of women into industry has, of course, marked the end of the time when the average farmer's wife died or went insane at the age of forty, and three wives to one man was not odd in our American life.

The introduction of machinery has meant a great deal and women, in following the machinery out of their homes into the community factories, have been following a life which has led to a great form of civilization. Now, women can go out to work, can earn money, and have become economically important. Therefore, the state has recognized their importance to the community and issued orders to take care of them.

So, women are entering into industry today in an extraordinarily large number. A man close to the tabulation of this present census told me the other day that the census would show between ten and twelve million women employed in industry in the United States, an extraor-

dinarily large number. In one of our greatest cities in the State of New York, an industrial survey was made recently, and it is a fact that two-thirds of all the girls who graduate from the grammar schools in this town go directly into some factory or industrial employment, and this does not include those who go into commercial employment, but two-thirds of them go directly into productive industrial employment.

#### WOMAN'S STRATEGIC POSITION IN INDUSTRY

I want to call to your attention that while there have been women in factories ever since the beginning of the factory system, they were at first a small minority, then a larger minority, but the time has just begun to come when I think they may be the dominating group, not dominating because of force of numbers, but because they are the strategical workers in every work. We have come to a time when the necessities of the world are demanding an enormous increase in production. One hears that on every hand, from people who scoff at it and from people who believe it. I think common sense teaches it is true. More things must be made, if we are to repair the damage we have done. There must be an increase of production. The obvious way seems to me to be, first, to keep on with the labor saving machinery and utilization of waste, which we have developed so well for the last fifty years. By the way, it is interesting to know that a number of labor saving devices have been introduced quite suddenly in our American community, with the labor shortage and demand for increase of production. I am thinking of the automatic phones which may be put in the City of New York. The telephone company has had the patents for over twenty years, but has never used them because it did not pay to put them in. Labor was cheap enough, so there was no economic incentive for this.

The second method is the utilization of human energies and human labor-power in a better and more efficient way. That is, in the best way suited to producing the greatest results for the least expenditure of energy, and I believe the pressure of circumstances will bring about what is called the "efficiency card system" all over the country and we shall see that introduction made not with the opposition of labor, but with the co-operation of labor, because the force of circumstances will bring us to a position where labor will share equally in the profits and benefit, which may come with the introduction of such methods, and will not be left out in the cold as today.

The third obvious method, it seems to me, is to enlarge the body of our laborers, to bring more and more people into the group of productive workers. I personally feel that idleness is a curse, and it is just as much a curse to women as to men. There are still in this successful and prosperous country of ours many women completely idle and many more partly idle. It is the partly idle women I think we are going to draw on first, those who for part of their current time or a part of their lives are idle, women who are not productively and interestingly employed for the years before they marry, and certainly not in those useful and ma-

ture years, after forty or forty-five, when their children are grown and they are released from the economic and social responsibility of motherhood. I believe an effort is going to be made to draw into industry in some productive way those women now idle, either through a part of their lives or the whole.

Many women feel that their home responsibilities and duties occupy them for only a portion of the day and that they could work half of each day, and if we need labor badly enough, we will find a way of utilizing these women on half-time.

#### FACTORY ADAPTATIONS NEEDED

One of the reasons women do not stay long in a job is that the job is not interesting enough in the way of surroundings and conditions, for no woman today goes willingly and pleasantly and with anticipation to work in a factory. It is not a pleasant place to go, and I think even among men there is a general acceptance of the fact that a factory, like the old-fashioned polling place, is no place for women. The answer about the polling place has been to make it fit for women, and I feel that the answer about the factory is the same. The factory has been essentially a man's world—it was developed around the idea of man. The chief workers in the factory system have been men and the factory life has been adapted to the needs and necessities of men, not to the needs and necessities of women, in particular.

I think the time has come when we are going to have adaptations in factory life, which will make a factory a suitable and proper place for women. I have only to call your attention to one or two things to make you realize how obviously a factory is developed around the idea of a man's life and convenience. The very design of the machines, which men and women alike are asked to work upon is made by people who have in mind the anatomical construction of a man. You know that few machines were adapted to the anatomical development and build of a woman. I have often gone through factories and seen girls standing on little, light boxes, in order to reach a high level, but they had to stretch the arm way up and stand on a box to reach the level which was in fairly easy reach of the man of average height. There are all sorts of operations requiring horizontal reach, as well as vertical reach, in which a woman has not been taken into consideration when the machine itself was being designed, and I believe that problems of this sort have to be studied by engineers and machine designers and other competent persons before we are in position to say that our modern factory life is really adapted to women.

#### WOMAN WORKERS HAVE FEWER ACCIDENTS THAN MEN

The prevention of accidents to women must, of course, occupy the minds of the people who come to a meeting of this sort today. I wanted to give, if I could, this afternoon, a very brief discussion of a recent and almost completed investigation of compensation cases, in which



women were the complainants, in the State of New York. I am sorry to say the figures were not complete enough when I left New York, but I have picked out two or three of the striking things that have come out from that study, because of the fact that they might interest you, and suggest to some of you here methods which ought to be developed, or studies pursued in the interest of accident prevention to women. As a matter of fact, this study, as well as the other studies that have been made in the comparative accident rates among men and women, shows that women are an asset and not a liability. They are much less liable to accidents than men, and this appears to be true even when sufficient value and balance is given to the fact that women are not, for the most part, engaged in such hazardous employments as men. They are undoubtedly more careful. It may be true that they are slower, but at any rate they do not use the time of themselves and their fellow workers, who are disturbed when an accident happens.

An interesting thing comes out here, in regard to the accidents to women. As was to be expected, over half of the accidents to women come to those who are working machines of one kind or other, generally punch presses, looms, and sewing machines. Sewing machines caused the largest number, then punch presses, and then looms. The next large item in the source of accidents was the accident from stumbling and falling. Two hundred and seventy-five women were injured from stumbling and falling. In the total number of accidents to men and women, stumbling accidents do not appear to be important, but when you study women alone, they are very important and very serious. I don't know exactly what this indicates. Perhaps it indicates too much of a predilection for high heels, perhaps women don't balance themselves so well in unguarded and difficult places as men do. Perhaps it indicates that women have not had so much training in youth in fence climbing and tree climbing, etc., out of which boys get a very definite kind of muscular training, which makes it easy for them to control their muscles and keep their balance in all kinds of circumstances. Perhaps it indicates that they travel improperly on the stairs. I know in some of the factories when they put women to work during the year, one of the first things the company was asked to do was to put hand rails along the sides of the two or three steps that would lead from one level to another.

I feel, as a matter of fact, that we should all support our friends in the Y. W. C. A. in a campaign for low heels for the factory. I do think it is essential that we should use all the moral suasion and force we have to persuade them to forego, at least for work, the pleasure of stepping around daintily on high heels.

Injuries by hand tools are the third on the list. There are comparatively few of them, only forty-seven injuries from hand tools, but I want to call your attention to what may be an important, but probably an amusing accident. Thirty-three of these injuries came from the use of the needle, so in spite of all the domestic background, the needle still remains the most dangerous tool women can pick up.

## ACCIDENTS TO WOMAN WORKERS NOT SERIOUS

These things show, however, that for the most part the accidents to women are not serious accidents, that is, not resulting in total disability and amputation, which form so large a part of the compensation cases. Of the cases studied, only 776 received less than one hundred dollars in compensation, which means it was a non-serious injury with a short disability. Only 22 out of the whole received over a thousand dollars. In 83 per cent the disability came from an infection, that is, the original injury was a slight cut, laceration, or bruise, with an infection following, making a situation which resulted in fairly long disability.

One item which interested me considerably in this study was the item of wages. This study was made on the figures for the compensation cases for the year 1917. Out of the total, 862 were earning less than ten dollars a week and 493 earning less than six dollars a week. There seems to be a very large number of accidents among the low-paid workers. I have not considered this matter enough to hazard a guess as to just what this means, but I want to give it to you merely for what it is worth, as an indication. If we are going to adapt industry, not only must we take all the precautions we know of, but must make all the other adaptations, which will make industry interesting, pleasant, profitable, and suitable for women. I feel that we must look upon the problem this way, that some woman will be taken into the industry as a live wire who can be counted on to re-enforce the labor supply.

I don't believe it is necessary in a group like this to go into the advantages of the short work-day. They have been discussed, I believe, from every angle. Every group which deals with the work of women is committed to a short work-day for women. However, I think there are certain rearrangements in the hours which are going to be extremely important in the future and there is going to be a demand for them. In one factory in Rochester, owned by a woman, in which all but two are women, the watchman and traveling salesman, the owner made a proposition to her woman employees that they make a pledge to her to keep production up to normal on a five-day week basis and, if they would do so, she would order work stopped Friday night at six o'clock, and there should be no work on Saturday. This was an experiment on her part and she described it to me in a very feminine fashion and said, "I hate to work on Saturday myself and I think every woman does." She said, "I am a church woman and every woman wants one day a week to wash her hair and mend her clothes and all women hate to work on Saturday, so I thought I would speak to the girls and see if they would be sports enough to do it." She put it on a human basis. She was a woman with a small amount of capital and could not afford to shut down unless she could be sure of the product, which was necessary in order to keep up her profits.

## WHAT A WOMAN MANAGER ACCOMPLISHED

This plan has been in operation for over two years, and she tells me that not one week have they worked on Saturday. Not a single week has

the production not been normal or above, by Friday night. She had long before this introduced into the factory the system of production measurements, so she knows what her daily and weekly production ought to be. On Monday and Tuesday they watch particularly for the production, their object being to get extra production on Monday and Tuesday, so they can sort of take it easy the rest of the week and be sure to get the work done by Friday night. Whether it can be done in every factory or not, I don't know. However, it has been successful in this one.

I believe that kind of an adaptation of the hours of labor to a woman's needs would be an enormous drawing card. That combines with a lot of other things, for in this place when the girls marry they speak for their younger sisters, "I am going to be married in June, can Addie have my job?" The sister steps right in and the owner has no problem about the kind of girl she is going to get. It is an attractive place for women to work; they like it because their particular necessities are attended to. By the way, that is the place where there are rocking chairs to sit in. It is a garment factory and a large portion of the work is hand-work, and the girls who do the hand-sewing sit in little low rocking chairs. Every girl has her own chair with her name, which has been adjusted to her and is comfortable for the day's work. They have a phonograph and play it when they want to.

Another adaptation, also invented by the lady who owns the factory, is this: She did all the cutting and all the pressing and designing when she started, because she started with a very small capital, but out of her participation in the work have come many ideas. Well, she found the pressing particularly difficult, so she designed a seat for pressing. Some of us have been told by the owners of garment factories and efficiency engineers that nobody could sit down and press a garment, that you had to stand up, because the whole purpose of the thing was to get the weight of the body thrown on the iron through the arm. This lady has designed a method of pressing, whereby the ironing board is spread on a horse, which has two parallel bars, at the side. At the back of the bars is an ordinary board smoothed off and nailed at an angle, so the presser simply walks back into her little cage, sits a little bit the way women sit on the edge of the table when tired, just resting the end of her spine, to take the weight off her back and feet, and is able to put full pressure of her body on the iron and still have the support. That is merely an indication of the very intimate and special sort of adaptation, I believe, can be developed for women in industry. Of course, the improvements in sanitary conditions must come along if women are to go into industry in large numbers and go voluntarily and stay voluntarily. The improvement in lighting, in ventilation—all of these things, of course, are enormously important. The regulation of the industrial trades to women's health is a matter we have to go into with seriousness, if delicate girls are to go into the trades.

#### INDUSTRIAL POISONS AND FATIGUE

The subject of industrial poisons among women is something we know

little about. We know only one thing and that is that lead poisoning affects women more violently and acutely than men. About the other industrial poisons we know very little as to their relative effect on men and women. We know which trades women can enter without danger to themselves and without ruining their possibility of motherhood. We don't know the health hazards of the chemical industries, which are growing up all through this country. They are growing thick and fast in New York State. Then, there must be an infinite amount of painstaking design of machines, so they shall be adapted to the ability and strength and anatomy of women. We have on the statute books of most of our states, laws that seats shall be provided for women at their work, where practical, and it means almost nothing. As a matter of fact, it is frequently impossible for seats to be designed so a woman can sit down at her work, but there should be seats where she can rest occasionally.

The problem of fatigue was discussed so well in yesterday's paper that I feel it is only necessary to point out that if women are to come into industry in large numbers we must learn how to eliminate fatigue, so devastating to them as workers and individuals. The problems of women in relation to lifting is another matter very much in need of further study and investigation, if we are to know how to make some of our processes of industry suitable for women. The French have various regulations regarding the weight of a load a woman should lift. A woman can carry a heavy load if carried horizontally. The question is, can the same load be lifted from the floor to the ceiling? There must be regulation. Then, there are some kinds of jobs in which deftness is more necessary than strength and, as some of the foundries did during the war, it is sometimes necessary to employ women for deft jobs and men for heavy jobs. I believe all these adaptations are possible and can be made.

Then, there must be an understanding of the mental fatigue. Our industrial physicians have not even scratched the surface of industrial neurosis and psychosis. Here and there a man vaguely grasps the idea that there is something in this constant, monotonous work, done under conditions of noise and speed. There is something in that fear of the wolf at the door, which every worker for wages feels, if he loses his job. Certain items and elements of that sort enter very seriously into the growing tendency to neurasthenia, particularly among working women. If we can note the fact that this is a growing difficulty, we can also set our faculties to work to devise a way in which these things can be prevented. If we let that sort of thing go on for long, the nervous disorders may take effect in the most peculiar and curious forms of violence, leading to strikes, nervous breakdowns, irritation inside the factories, etc., but I believe we have in our command the scientific knowledge and good-will to make the studies necessary to adapt industry to women, and I believe the next twenty-five years will show the results of that study.

#### DISCUSSION

CHAIRMAN COPP: We shall be very glad to have a discussion now on this subject.

MR. JOHN P. GARDINER (Commissioner of Labor and Industry, Minnesota): The subject under discussion this afternoon is one in which I am very much interested, not only from the standpoint of an official of the state, but also from the standpoint of a private citizen.

What is meant by the words, "State and its interest in women industrial workers?" It may mean considerable and it may mean very little, depending entirely upon the attitude of the state, of the employers in the state, and of the industry itself, as well as the administrative forces of that state, who are in the state service to enforce the laws. It may be whole-hearted interest, and it depends upon individuals, as far as enforcement is concerned, how they approach this question. It also depends upon individuals, as far as law enforcement is concerned, how they approach the employer who is not educated, so to speak, on the requirements of laws on the statute books.

The employer that makes conditions pleasant and congenial in his plant for his women or men workers, because he absolutely believes in it and believes it is right and correct, from the standpoint of humanity, is the man that goes much further than the law requires, and I have a wholesome respect for this kind of employer. On the other hand, the employer that does the things simply because the law says he must and because the inspector that goes into the plant calls his attention to his neglect, does not go any further than the law requires, and you get very little co-operation from him. However, it is very gratifying to note the change of heart that has come over the employer of today, as compared with the employer in the past, and it has been remarkable in the last few years.

In a great many states women inspectors are a new thing. A few years ago, it was almost impossible, I believe, to count a dozen states that had bureaus or divisions of women that supervised the laws and looked after the enforcement of the laws that have to do with women in industry. I believe that while Minnesota was not the first state, it is one of the primary states, and we have now a bureau of women with four inspectors and a superintendent.

Every state, whether large or small, where there is industry which requires women workers, should have a woman representative in the labor department, because it stands to reason that there is no girl or woman in any industry who is going to confide in a man the way she would in a woman who comes to look over the plant. There are so many things they would like to say that would be embarrassing for them to say to a man, whereas they could confide in a woman and conditions could be remedied more satisfactorily. The question has been raised here about women going into industry, not particularly by choice or not because they wanted to, but it does not make any difference whether they are there by choice or by force of circumstances. The conditions are here. Women are in industry, and we should forget what has passed and gone—the future is ahead of us. None of us know what it has in store for us, but the present is here and we must meet conditions as we find them.

MISS NESTA C. EDWARDS: If women are going to succeed in industry,

they are going to succeed on their own merits and not because of men. We are going to succeed because we are fitted for the job and not because we are women. One of the main troubles I find is that too frequently women are too anxious to transform an industry in anywhere from three months to one year. We are too impatient—we see the great need of people in industry, and we simply wear ourselves out and every living soul that comes in contact with us in trying to get the thing we want across in an unreasonably short period of time.

We are also a bit sensitive. We say we are not, but we are. That is another great trouble—I don't like to admit it—but we are too often given to the weeps and go to pieces when we can't shove the thing across. The difference between men and women in industry, in executive positions, is that a man will fight to a finish, whereas a woman will too often quit the job before she is through. I am sick of women who want to get off the job because it is hard to get along with this person or that person.

We have to learn to play the game, if we are going to get out in industry as nurses, employment secretaries, or anything else. We have to play the game as men play it. We have to cover up our sensitive feelings, and not tell any fellow we are hurt until we get over it.

These are some of the characteristics you must have if you are going to get along. Women need pep, energy, and personality. Probably some of you will say, "I would not want the personality of some folks." I went to a big meeting two years ago and saw women coming and going and they would have made the finest lot for Mrs. Jarley's Wax Works that I ever saw. They walked in like wooden Indians, with no animation on their faces. I am not rapping college folks, but we have to get it out of our heads that a college education, or a nurse's training, or any other kind of training, is going to fit us for some specific job we want to do. It won't fit us, unless we have wit, character, stability, spontaneity, energy, and the ability to get along with other people. I don't mean you are not going to scrap—no one does that any more than I do—but you have to get along with other people, stop taking things as personal and, if a man raps your department, understand that he is not rapping you personally.

That is where we are falling down. We take too many things personally. Your education is simply an added tool in your work-kit and it might be necessary, but if you haven't got all the education you would like, if you have tremendous energy and God-given common sense, you have an even chance with any man in the world. If you have a good clear head, a strong will, plenty of energy, and the ability to get along with people, you are going to get along in the first aid department, in the employment department, or in the executive department.

ADJOURNMENT.

## Automotive Section

September 29 and 30, 1920

---

**JAMES J. LYNCH, Chairman**

Chevrolet Motor Company, New York City

**ROBERT A. SHAW, Vice-Chairman**

Department of Safety and Factory Hygiene, Ford Motor Company,  
Detroit, Mich.

**R. F. THALNER, Secretary**

Safety Engineer, Buick Motor Company, Flint, Mich.

---

### WEDNESDAY MORNING SESSION

**C**HAIRMAN Lynch called the meeting to order at 10:00 A. M.  
Mr. Robertson, Mr. Borson, and Mr. Clark were appointed to serve  
as a Nominating Committee.

CHAIRMAN LYNCH: Realizing the value of the discussion which follows  
these papers, I think that we will dispense with that part of the program  
which has to do with addresses by the officers of the Section and give as  
much time as possible to discussion. There is just this, however, which  
we would like to call to your attention.

Last year this Section took a decided stand against the six-foot stand-  
ard belt guard. We made considerable fuss about it, got ourselves on rec-  
ord, and finally ended the matter in a discussion in the Engineering  
Section. Our Mr. Somes, who is the member of the Engineering Section  
from the Automotive Section, objected to the standard when they tried  
to put it through and it was finally defeated.

I don't think that the six-foot belt guard will be made a standard, be-  
cause of the action and the temper of the Automotive Industry. It is  
now in the hands of the Compensation Rating Bureau in New York who  
are sponsors for the safety code on belt guards, and if they recommend the  
six-foot guard the Automotive Section can take further action to prevent  
this guard being made a national standard.

The second point is that a Bulletin Committee was appointed by the  
Chairman, for the purpose of securing material for safety bulletins for  
the Automotive Section. I believe the committee has secured material for  
some fourteen or fifteen bulletins within the last few months, and these

will be issued during the year by the National Safety Council. This is a report of the Bulletin Committee, submitted by Mr. Shaw, who acted as Chairman.

The first speaker of the morning is Mr. H. G. Somes, Electrical Engineer, Chevrolet Motor Company, Tarrytown, New York, who will speak on the subject of "Safety and Efficiency."

Mr. Somes is not a Safety Engineer. He is the Electrical Engineer of the Chevrolet Motor Company. Mr. Somes' job is to travel all over the country, installing new electric machinery.

I asked Mr. Somes to deliver this paper, because I thought that his point of view would be valuable to men in the safety line.

### SAFETY AND EFFICIENCY

H. G. SOMES, ELECTRICAL ENGINEER, CHEVROLET MOTOR COMPANY,  
TARRYTOWN, N. Y.

In beginning a discussion covering "Safety and Efficiency," it is necessary to accept a definition of these two words. Webster's Dictionary defines *Safety* as a condition or state of being safe; freedom from danger. As applied to accident prevention and our safety-first campaign, this condition can be called human safety.

Efficiency as applied to general conditions affecting the labor required in a plant could probably be defined as that condition wherein the maximum output of product would be obtained by the minimum of input human energy.

Human safety is desirable above all other conditions of operation. A machine can be re-designed; an industrial plant can be re-organized or the equipment therein be so changed about as to obtain greater efficiencies; but it is impossible to restore a man's efficiency after it has been seriously impaired, due to an accident. Hence, it is impossible from an engineering view-point to figure definitely in dollars and cents what a man's safety is worth. As a principle, it should stand above every other engineering factor.

To design a plant so as to obtain high efficiency together with maximum safety should be, and probably is, the ambition of every engineer employed in this class of work. Considering the phrase "maximum safety," I am tempted to describe what I would consider a plant having this condition. I would start first with a plant lay-out providing for ample illumination, both day and night, together with proper heating facilities and plenty of ventilation. Then the equipment lay-out should be so arranged as to enable easy access to the equipment with the stock required for manufacturing, and a safe and convenient method of transporting it to and from the plant.

It would be desirable to guard such moving apparatus as has been proven a hazard, and it is quite probable that special equipment would have to be obtained where safe and efficient equipment has not already been developed.



**Efficiency in this plant is not only desirable, but essential, inasmuch as a plant laid out where efficient operations were not obtained could not prove satisfactory; hence, we shall always be required in the design of a plant—even though our greatest desire is to obtain 100 per cent safety—to consider efficiency as a pre-requisite. But there are so many methods of improving the present safety, that it would not be essential that efficiencies be impaired or destroyed.**

I have been informed by safety men in the automotive industry and elsewhere, that the bulk of the accidents of severe nature, such as broken limbs, amputations of limbs, etc., are not as a rule caused by conditions within the normal operation of a plant. They are accidental and due to accidental causes. Many of these accidents would be very difficult to avert, as they seldom have any relation whatever to accidents happening at a prior date, and probably in the history of the plant would not happen again.

Illustrating this, the Buick Motor Company had an accident a short time ago where a man was taken suddenly very ill, while standing near a pile of sheet metal shrouds. He undoubtedly fainted; fell against the shrouds; his jugular vein was severed, and his head severely cut in a number of places. His life was very fortunately saved due to very prompt medical attention, but I submit that to safeguard this man would have been impossible.

So many conditions affect a man's safety in a plant that do not have any relation whatever to its operation. Some few of these conditions should be considered. A man stumbles and bruises his limb, infection sets in, he is laid up for a number of weeks, and possibly even months. Accidents of this nature are very frequent, and yet he may be employed in a model plant, where the aisles and runways are well-lighted, where ample ventilation is provided, and the plant has been designed for 100 per cent safety. A man's blood may be in bad condition, and the slightest little scratch is probably sufficient to set up an infection and blood poisoning. On the other hand, he might be employed in a place where ample lighting was not provided in and about the passageways. He stumbles over an iron casting or a piece of stock, and injures himself severely. This condition should be corrected by the management, and officials having jurisdiction over the plant should insist on its correction.

The condition which has impressed me so strongly is that the serious accidents normally happening in our plants are not those due to moving machinery, nor due to any condition which has been pre-determined and considered as a normal condition existing while a plant is in normal operation. I believe emphatically that the efficiency of a plant is not necessarily impaired by the improvement of safety. In fact, I believe the condition quite the reverse.

In lighting a plant to obtain conditions approximately those of daylight you not only safeguard the workmen against stumbling over pieces of stock, but you improve the general efficiency of the plant between 2 per cent to 5 per cent, depending on the nature of the product manufactured.

In providing an ample and satisfactory ventilation system, you im-

prove the workmen's efficiency by giving him fresh air to breathe and a more satisfactory working condition.

Where the plant has been designed to obtain high-class transportation facilities, you eliminate largely the unskilled laborer, who is more subject to accidents in an industrial plant than the higher, skilled types.

In fact, in almost every instance where you improve the conditions, you tend to decrease the number of serious accidents, which are as a rule, in the "freak" accident class, and you improve the general over all efficiency of the plant to a remarkable degree. The labor problem becomes simpler as the plant becomes more desirable to work in, and as the labor turnover decreases, the individual and over all efficiency increase. Hence, the plant efficiency is improved.

I have already stated that efficiency in a plant is a pre-requisite. This is undoubtedly a fact. If a plant is not efficient, it sooner or later must fail, unless it is so located by virtue of transportation facilities or competition as to be able to charge the consumer for its inefficiency.

Safety, however, is not only a pre-requisite, but an absolute necessity. Where the workmen employed are subjected to conditions which impair their health or subject them to severe risk, the best engineering talent obtainable should be put to work to reduce the hazard, and of course if possible, at the same time improve the efficiency; but, of first importance, to remove the hazard.

CHAIRMAN LYNCH: Is there any discussion, or are there any questions you would like to ask Mr. Somes?

#### DISCUSSION

MEMBER: Did I understand Mr. Somes to say he had found that the majority of the accidents that happen are sort of freak accidents?

MR. SOMES: The majority of accidents in the industries that I have investigated have not been under the normal conditions of the plant. For example, in the last two months, one man was killed in the factory yards by a switching engine. Two other men were severely injured by falling from a scaffold. Another man inadvertently stuck his hand in behind a milling cutter wheel to remove a piece of wire. The cutter was in operation. The wire had probably been there for some days or weeks. It would not have affected the operation of the machine at all. He had his hand severed at the wrist.

It is very difficult to prevent such accidents, for they have little if any relation to accidents which happened at a prior date, and probably would never happen again in that plant.

MR. LYNCH: The death on the railroad could have been averted if you had a derailer there.

MR. SOMES: It was neglect on somebody's part.

MR. R. A. SHAW (Ford Motor Co.): Was it the balcony that fell?

MR. SOMES: It was a scaffold. The workmen overloaded the scaffold. They did not do it deliberately, but thoughtlessly, and the scaffold finally broke down.

FREAK ACCIDENTS

MEMBER: You don't call that a freak accident? That was a violation of the safety rule, and of the general rules of safety, overloading a scaffold.

MR. SOMES: There was one place where it was difficult for the management and the supervision. Men were put on the job who were supposedly capable of determining when the scaffold was properly loaded. It was all right until the five men came to one point in conjunction with the load that had already been deposited there, and the scaffold collapsed and fell.

MEMBER: I would like to ask whether the supervision factor would not have averted all of these accidents.

MR. SOMES: Unquestionably a great many of these accidents could be provided for.

MEMBER: I believe that a great many of these injuries which we call freak accidents can be avoided by closer supervision on the part of some person, either the Safety Engineer, or those whom he elects to act in his stead. I believe that we are getting by with a great many so-called freak accidents which can be eradicated by closer supervision.

MR. SOMES: The thought in that connection is that the managements of the various plants take a greater interest in the accidents. Does a man that has an accident happen to him have the discipline that he requires after that? Is he brought before the management and severely censured for his errors or omissions? In many plants they pay no attention to it. They say "That was a foolish thing he did; it was his own fault, and he got his just deserts."

MEMBER: That is just the point that we Safety Engineers are trying to get before the managements, and get before the people—the 100 per cent factor; 100 per cent enthusiasm in safety work. It is going to take a long time to do that, but I believe there are enough men here, Safety Engineers, Managers, and Superintendents of Plants, who can bring this matter home. When we do that we are going to do away with a great many of these freak accidents. This is something that, in my opinion, you men want to take home with you today, to be sure and report or discipline any man who has a so-called freak accident.

I have had men say to me, "that fellow deserved all he got." Now, what can I say to him? I am not disciplining that man, but if I were in that plant I would discipline that man, if possible, by discharge. I would keep a record of him. That is what we want to do. You know the freak accident is pretty easily reported, but we have to discipline that man so it will be an example for the other fellow.

MR. HAWES (Michigan Mutual Liability Company): I have had occasion to study statistics and figures on fatal accidents, and have in mind five that came to my attention within the past forty-five days. In two cases it was very plain that the men who were killed took a careless chance.

Poor supervision contributed to the death of the other three men.

One case was the one which Mr. Somes mentioned; a railroad accident

in which a car was shunted down upon a man working about the yards at a time when ordinarily the switching was not done. This man passed behind a car that was standing still on the track. Another car was shunted down on this car, and as the man passed, the car that he was passing was struck by the car being shunted, and he was thrown under that car and killed.

Poor supervision on the part of the employees of the railroad company in that case apparently contributed to that man's death. Somebody should have gone on down into the yards and seen to it that the shunted car had the right of way without endangering life.

Mr. Lynch suggested that a derail in that case, protecting the car standing on the siding, would have prevented that accident.

The second accident was one where a man was killed when unloading a large stone from a car to a wagon. A mis-step; you can hardly blame the man. It is one of the things that is perhaps part of the game. A mis-step on the wagon caused him to lose his balance; he dropped the bar that he was using in lowering the stone down to the truck, and as he fell the stone rolled down on top of him. He died from his injury.

The third case was on a construction job. A concrete hopper was being attached to a concrete pouring trough. One gang of men started to erect the equipment. Then this gang was changed, another gang came on, and a different foreman was put in charge.

As I got the story, the hopper was temporarily fastened in position preparatory to rigging it up and making it secure. Then the first foreman went off the job, and the second foreman came on; looking up at the hopper he supposed that it was securely fastened. However, he did not go up and examine it. He started the skip going; concrete came into the hopper, and the man standing alongside was killed when the hopper peeled off from the side of the concrete tower, fell, and crushed him.

Now, perhaps the first foreman should have gone to the second foreman and told him the hopper was not secured. Perhaps the second foreman should have gone up there and looked at it before he ordered any concrete loaded into it.

Accidents of this character, I think, are freaks. That is, they come from most unforeseen sources.

I have followed accidents for ten years in various industries, including mining, chemical, and the ordinary manufacturing industries, and I know of many accidents that came from places where we least expected them.

I believe it would be a good idea for the Automotive Section to adopt a series of bulletins and call them Typical Accident Bulletins. Members would contribute information to a central committee of some sort, and that central committee would issue bulletins back to the various members of the Automotive Section. Each bulletin would describe a particular accident, give the probable cause, and if possible describe the remedy. Perhaps members of the Automotive Section would be asked to write back and offer suggestions for eliminating such accidents. There are many representatives here from various parts of the country. I am sure that we

would get a great deal of valuable information in that way, and that we would head off many serious accidents by having that information. As each bulletin came in you would go out and see if that condition existed in your plant. If so, you would immediately correct it. Information on freak accidents in other plants would help you prevent them happening in your plant.

CHAIRMAN LYNCH: The time is up for the discussion on this topic. We will now pass to the subject of Punch Press Operations.

### PUNCH PRESSES

AUGUST L. KAEMS, SAFETY ENGINEER, SIMMONS COMPANY, KENOSHA, WIS.

I don't know why they picked on me again to talk about punch presses. I know there are many of you here who heard me talk on several other occasions, and it is like eating good soup, if you get it three or four times a day, it gets stale.

I have always maintained that safety regarding the punch press should begin in the tool room. I am more convinced of that today than ever. Too little thought has been given to the subject by the designers and makers of tools. All they ever have in mind is to make a tool work, and I will say that is a real job in itself. But if we want to stop accidents on punch presses we will have to design our tools so that they are safe as well as efficient.

In my mind there are three things that must be thought of:

1. Getting the material in and out of the die.
2. Forming the material.
3. Unnecessary operations.

When we keep these things in mind when building our tools we will go a long ways in reducing the accidents on punch presses, which we all know are the most hazardous machines in the metal trades.

We all know why we get the accidents—because the operator has to place the material in the die and take it out with his hand. If we can overcome that we have the solution.

I maintain, and have proven, that you can slide and push material into the dies more accurately than you can set it in, due to the fact that the hand, after working continually for hours and hours, is not as accurate as the slide on which you push your material in.

I have brought with me today several sample dies which I am going to show so you can see how we have overcome our difficulties.

For instance, we have a closing job on a press that has only an inch and a half stroke. The man had to set the piece in with one hand and knock it out with the other. We all know that he should, in order to work safely, put it in with his fingers on the side, but if you or I were to work on that machine continually day after day, we would do exactly what that man did. We would put our fingers inside because it's easier. That is what caused the accident.

The stroke of the press was so short that we could not tilt it, so we

simply put a slide on the press, and now all the operator does is to set the piece on the slide and it goes into the die automatically.

The operator used to run 3,000 to 3,500 pieces a day. His average run is now 7,200 a day. It is the next thing to an automatic feed. The slide is all that does it. I sometimes watch him; he takes three or four pieces in his hand, slides them down, knocks them out, and keeps a-going. He works very fast, and he has no trouble. He is never thinking of what is going to happen to the parts, whether the work is accurately done.

Here was another job where we had several very serious accidents. The matter of putting it in was the trouble. A man working fast put his fingers inside, and was caught and lost three fingers last year.

The first thing we did was to put the stripper plate on the punch. But we found after it stripped, the piece would fall back directly into the hole. We had to find some way of taking care of that. First of all we built a slide. We found that we could slide the piece in. We had a perfect stripper, with the exception that the piece fell back into the hole. Then we got a piece of spring steel, and fastened it beside the press. When the piece was stripped off it fell onto the spring and bounded away. We increased the output of this job 150 per cent, and the reason we don't increase it more is due to the fact that the press does not run any faster. He is not interested in what the press does at the danger point.

We have made unnecessary the operation that has caused all the trouble—putting the material in the die.

I am showing you the different jobs proving that we have learned how to slide almost anything.

Here is another job that had six or seven different operations. The man had to set the pieces in by hand. He was working fast, and the scrap that he made during the day amounted to quite a bit. Since we provided him with a slide he has worked as long as two days and never made one piece of scrap. He is not interested in anything else excepting laying the pieces on the slide and down they go into the dies. We know absolutely that the pieces will slide more perfectly than he could set them by hand.

We had another job where we cut pieces in blank out of small scrap; the pieces were then fitted together in pairs. When we came along I found a man had to lay them in by hand, so I decided we would slide them in. The scrap was irregular and sometimes we had more metal on one side than on the other; for that reason they would not trim perfectly, and when they came together they sometimes did not fit.

So the first thing, a holler came along that the two pieces did not fit. We had to overcome that, and all we did was to put a pilot pin on the head of the punch, and as that goes down it strikes the hole and places it in perfect position. We have not the slightest trouble any more, and you can imagine how it increased our production.

Now, I will show you how we have overcome a really difficult problem of pushing things into the die. It is not hard at all if you take a piece that is square or has a square bottom and straight sides. That is easy enough to push into the die, but we have here a piece that is round at

the bottom. It is a re-drawn job. I decided we would push that into the die. They said, "Well, that is all right, but only a crazy man would undertake that."

We made a tray in which the pieces should stand, but we found that the pieces varied in size and just as soon as you pushed, one or more would fall over.

We tried another scheme, and that did not work. We finally hit upon a scheme that worked out. We made our tray wider, put an extra piece on the side of it, put a pressure spring in beside that, just to hold it up, and it worked out perfectly. This is a re-drawn job, and you can see that if we can push one of these things we can push almost anything.

Here is a similar job, a very large piece to be drawn. All a man has to do is to place the pieces in the tray and push ahead. He never gets near the danger zone, in fact he does not think of it any more at all. You can see for yourself how easy it is, how it eases a man's mind when he doesn't have to think of the part where the danger always existed. We are not afraid any more of putting green men on this kind of job; formerly we had to pick our very best men to do that kind of work. This work is on big punches where if a man got under the punch he was apt to lose his hand, instead of some of his fingers.

We have another job where a man had to place washer heads into the die by hand. When I first saw that job running I said "Stop it." They said, "We need those washers and need them badly." "Well," I said, "stop it."

I sent the dies up to the tool room in the afternoon at three o'clock and at five they were back on the job. Now we don't worry about that job any more. A man stands up to the machine and slides in the pieces. It was once the most hazardous job we had. Now when we get a new man that has not had much experience on punch presses, we put him on this job, because we know he will not be hurt. You can see how easily lots of these things that looked as though they were very hazardous can be overcome.

Not let's see what we can do about forming material.

Here is a job that we turn up and use on a bed. When I came there the work had to be laid into the die. The operator's fingers were always in the danger zone. I simply turned the job upside down and made a slide for it. When that was done they put a green hand on it who had never run a press. I said "Why don't you put a man on there who has run a press before, and give it a fair trial?" They said, "Well, we are short-handed, and we need our best men for other jobs."

The first day this green man worked on this job he did as much work as the old hand had done, and on the third day he had increased the production 55 per cent. All he had to do was to place each piece on the slide and let go of it. He could not go wrong.

The trouble is that when you tell the tool maker to change the die, he has big things in his head. He can't see the small things that we are trying to bring to him.

We had another job where the pieces went down a slide. That was all

right as long as the tools got proper attention. But after the tool was worn a little bit, the pieces got large and stuck, or perhaps they would go in sideways; they had a large amount of spoiled material. The operator thought of an easier way, so instead of sliding the piece, he would lay it in. He forgot there was a slide there, and I didn't blame him. The trouble now was that his fingers came underneath the punch at every operation. We turned the job upside down and put it on an inclined press, and arranged a new slide. It now goes in perfectly every time and we don't have many spoiled pieces. The stripper works splendidly; the piece is stripped off and (because the press is inclined) falls away from the machine.

Here was another job that had to be placed in the die by hand. We turned the dies upside down, arranged a slide, and succeeded in eliminating one entire operation.

We had another job that took four operations, and on each one it was necessary to set the piece over a peg. We turned the job around, made a slide and eliminated three of the four operations.

Mr. Hawkins, who does my work, said we have never fallen down on a job. I will say that we have slipped several times, but we have never fallen down. It takes a little mechanical thought and a little ingenuity to overcome these difficulties.

Those of you who were in Chicago and heard me talk about some of this remember that I said at that time we had a job we were going to shoot into the die. We had a lot of trouble with re-drawn work, trying to make it stand up. We tried a few little stunts, and finally succeeded. That is what we are doing now, shooting pieces through a tube, and they go into the dies perfectly.

We have to contend with many things. The first one is the head of the department, who does not take time to think. He has been going on in his own way for years, and doesn't want anybody to come along and disturb him. We also have to contend with the operator himself.

The man who was working on one particular machine had every kind of an excuse for not using a slide. He laid down on the job, tried to knock out production on it, and did everything possible to knock it, until one day we had to step up and tell him that there was another man out at the gate who wanted to take his place. Since that time he has been working right and his production has not fallen down one particle.

You have to experiment with these things, and it takes patience and all that. And yet there is not one of these things I have shown you that does not look simple. But it takes time. It takes much longer than I first anticipated. We have two hundred dies fixed up and my friend, Mr. Swann, says that we are doing wonders. He thinks that in about three years we will be somewhere, and not any sooner.

MR. SHAW: How many ideas did you have before you really succeeded in shooting pieces through a tube?

MR. KAEMS: I think about three. This was our first thought, a tube, but we wanted to try the other things first because they did not look quite so complicated.



I want to tell you that we don't make blue prints or anything like that, because in the first place we don't know what we want. It has to be worked out by experiment. If I asked the Drafting Department to make me a blue print, we might go ahead and finish up a job, get it on the press, and then find that it won't work.

When we run a job we try to have the foremen plan the work ahead so we know what they are going to do next week. They bring out their dies ahead of time and give us a chance to look them over and see what we can do. Some foremen co-operate; others do not. We can't help going up in the air sometimes, but we ought not to do it. You know the average foreman has usually more work than he can actually attend to. Everything is turned over to him, and he is responsible to the heads of the departments. He is between the devil and the deep sea, and to be perfectly frank, he has my sympathies.

When we find a die that should be attended to, we don't make a blue print, but we get a piece of tin and bend it up into shape. We try this and keep on changing its shape, its height, its distance from the die, etc., until it works. Then we run out 20,000 to 50,000 pieces as a final test. When that is done, the slide is made of heavier material and attached permanently to the die.

I am just showing you the big possibilities of this thing. It is no harder for you than for us. When you once start you will be surprised how easily one thing will follow another.

A man lost a finger some time ago. I talked for eight months of setting that job upside down, and they had every conceivable kind of an excuse not to do it. When we finally fixed it up we succeeded in eliminating several operations as well as reducing the danger of accidents, and then every one said, "What fools we have been."

Don't think for a single minute it is an easy matter to convince old timers in this work. If you did a thing for twenty years one way, and then have to turn yourselves around all at once, you would kick too. The time is coming, though, when punch press work in our plant will be just as safe as any job we have. I guess you will agree that if we have made forming safe, we can make other operations safe, for we all know that forming is one of the hardest things there is.

#### DISCUSSION

MR. J. E. SCHELL (Cleveland Metal Products Co., Cleveland, Ohio): I would like to ask Mr. Kaems how he handles the blanking operation.

MR. KAEMS: The blanking operation ought to be one of the easiest things to take care of. We make a basket guard for them. We blank right through. Of course, our blanking work is very small. Nine-tenths of our work is forming.

MEMBER: How do you handle the draw-press blanks?

MR. KAEMS: We have an automatic feeder for them on most of our presses. One man runs two presses, so that is as near as he gets to them.

MEMBER: Some work is not suited for an automatic feed and you may

not turn out enough work to make an automatic feed worth while. We have a blank and draw system. That gets away from the necessity of the operator putting his hand under the die.

MEMBER: I came here from Cleveland for the sole purpose of learning something about punch press work. We are running something like five hundred presses, and are one of the pioneers in the safe-guarding of presses. I think that we ought to devote a little more time to this particular hazard.

MR. KAEMS: I believe that all of us ought to bring in our ideas, no matter how few they are, and exchange ideas with one another. That is the only way to learn. My firm is very good. The president and vice-president are the broadest-minded men there are. They say we have nothing to hide. We are willing to help any one along in this work. If we can help others we ought to do it. While your work may be different from ours, yet you can apply these principles. I have never yet seen a plant with a punch press that could not do something along this line.

MR. H. H. COLBY (Waterloo Gas Engine Co., Waterloo, Iowa): I would like to ask if you have any ideas on the larger punch press work, like auto sizes, bodies, floors, etc.

MR. KAEMS: We don't do big work, but Mr. Shaw knows of work where they push big presses. I believe that comparatively few accidents happen on the big presses. The bulk of all punch press accidents are on fast presses that go along like a shot.

MR. H. H. COLBY (Waterloo Gas Engine Co., Waterloo, Iowa) I would like to ask Mr. Kaems if he thinks the method of sliding can be used on thin metal, such as copper asbestos gaskets.

MR. KAEMS: I don't see why not.

MR. COLBY: There is no weight to carry it.

MR. KAEMS: Put a little air behind it to help it. Aluminum is lighter still. Help it along.

MR. KAHN: I just wanted to ask if the punch presses on which he had the slides are guarded on the sides and rears.

MR. KAEMS: No, we have not had time enough for that. We want to get the material in and out of the press without having a man lose his hands. We recently had an accident where a man reached around a piece that we had put in front of the die. If anything goes wrong he has to go behind it. Suppose we close up the sides and the piece sticks in there. Wouldn't we have to take off the side to get it out? What good would it do if he didn't use something besides his fingers to get it out with? He will not take the time to reach for the pick, and in shifting his position he usually takes his foot off the press, and the result is that he loses his fingers. It is a matter of discipline for the man. If he is told once or twice he must not lose his fingers, and he still does it, he should be discharged.

Our foremen and superintendents are weak sisters in that line. If I had a man who wouldn't do the work that way I would discharge him if he was the best man I had. I would break in another man, and know that he was trained right. We have got to take a stand on that.

A plant at North Milwaukee some years ago was having a great deal of trouble. I went in there, and we got started in pretty good shape, and that was one of the things I drove into the superintendent, if he got a man that would not do as he told him, discharge him. He lost the best man he had. We had to break in a new man. But the other man came back to the plant. He knew that was the safest plant to work in. He realized we were looking out for his welfare, and he wanted to come back to that place.

MR. SHAW: I have a few photographs I will put along with Mr. Kaems' display. We are using shoots extensively. We have one on a wood-working sander. All the man does is to put the pieces in the hopper. Mr. Kaems' idea can be applied to many different operations.

MR. MADDEN: We use 18-gauge metal. The first operation makes a couple of half-inch square holes in the piece. On the second operation several smaller holes have to be put in, and you use the square holes to center by.

MR. KAEMS: I would make a slide that you could pull out and push in. Pull the slide out, set the piece on it, and push it in.

#### AN ENGINEERING, TOOL MAKING, AND MECHANICAL PROPOSITION

MR. ANDERSON: This talk simply emphasizes this fact. This is an engineering, tool-making, and mechanical proposition, and if we, as manufacturers, insist upon our tools being made properly and equipped properly we have solved this problem. I have been very much pleased and edified by this talk. Every one of the tools demonstrated by Mr. Kaems was incomplete when placed in operation, and that if we manufacturers insist upon the machinery being properly designed and made, we will eliminate a large part of our trouble, and at the same time a large part of this additional expense to which we are put in perfecting the machinery.

The National Safety Council has recommended that instruction should be given in every manual training, technical, and engineering school to teach the principles of safeguarding machinery and of accident prevention in general. Everything done by us as individuals to promote this excellent work will bring results later on because the students of today become the executives, machine builders, and shop men of tomorrow.

One of the first things I did, when I went into this work years ago, was to go to our purchasing department and the master mechanic, and tell them we would not accept a piece of machinery in that plant unless it was properly safe-guarded and equipped when it was bought.

It was a revolution. But we didn't get far with it. Why? Because there was such a demand from other people and ourselves for machinery that we took anything we could get, equipped or not.

When we could not get our machinery equipped with these devices, the only thing we could do—at that time I was connected with the Ford Motor Company—was to establish the safety department, of which Mr. Shaw is the head, and forbid the installation of a machine, even though the Purchasing Department had bought it, and our Maintenance Department had brought it into the plant, until it was properly safeguarded. I assume Mr. Shaw is still doing that.

MEMBER: I might say, in answer to the gentlemen's question about placing a piece under the guide, or in the guide; it has to be located. One of our foremen designed a fixture that slides out, the work is placed on it, and it slides in. It works automatically. That is even better than pulling it out.

CHAIRMAN LYNCH: We have with us Dr. E. George Payne, of St. Louis, the man who has done so much for safety education in the public schools. He would like to make a brief address before we have the next number.

(Dr. Payne delivered an address along the lines of his speech before the Education Section, p. 200—which is printed separately as Part II—and address to the Public Safety Section, p. 377, printed separately as Part VI.)

CHAIRMAN LYNCH: We will now have the paper on "Fire Drills, Fire Alarm and Drill Signal Systems." This is something that has not been touched upon in past years, and I think it is of interest to every one of us. Mr. G. E. Sanford, of the General Electric Company, Lynn, Mass.

## FIRE DRILLS AND FIRE ALARM AND DRILL SIGNAL SYSTEMS

G. E. SANFORD, GENERAL ELECTRIC COMPANY, LYNN, MASS.

In considering the subject of fire drills and fire alarm and drill signal systems it must be assumed that you represent industries, some of which occupy one or more buildings, and some of which occupy only a portion of a single building. The employer with a whole building under his control can easily develop a drill system, but it is also highly advisable for the man who has a small factory in a portion of a building only to be able properly to drill his employees to leave without confusion, in case of emergency, as he has no way of controlling the situation in the other parts of the same building.

### SIGNAL SYSTEMS

With these two factors in mind it is necessary to consider more than one type of signalling system. The system best adapted to the building occupied by more than one manufacturer is often used by the General Electric Company in large buildings, but it is complicated and in some places too elaborate considering the fire hazard and the building construction. For example, a one-floor factory building, particularly a machine shop or foundry, is very easy to leave at time of emergency and although a fire signal system is desirable, fire exit drills seem to me to be unnecessary, especially where the bulk of the employees are males.

The practice commonly used where a manufacturer occupies the entire building is a signal which sounds throughout the entire building and all employees of the building leave at once. Where more than one manufacturer occupies the same building, such a signal while highly desirable in the case of fire is not desirable in case of fire-exit drills, as no individual manufacturer would sound the fire signal without incurring the enmity of other occupants of the building and if all of the manufacturers

occupying the building agreed upon some one time to hold the drill, the chances are that the bulk of the employees would know ahead of time that a drill was to be given at such and such a time. Furthermore where the responsibility is divided the fire drill is very liable to become slighted.

The General Electric Company have had a signal system in use in their plant at Newark, N. J., for the past few years and which has proven so satisfactory that it is being adopted in other plants of the Company. This signal system is there used in a plant of about five buildings, but is equally adapted to a building containing a number of factories, as it will allow any manufacturer to drill his people without disturbing any others, but in the case of actual fire will sound complete alarm throughout the building. This signal system was developed by engineers of the General Electric Company in conjunction with engineers of two fire alarm signal system companies. This system has a box on each floor of each building. The first figure of the number indicates the building number, the second number indicates the floor, No. 1 being the first or ground floor, No. 2 the second, and so on up, using the figure next higher than the highest floor of any building in the plant as the basement number. In a large building where more than one box per floor is desired, the first figure of the box number should be in the same relative position on each floor of the building.

In addition to the usual connections with factory whistle, if there is one, there should be a sufficient number of electro-mechanical gongs, so that a gong may be located at or near each box. Other gongs not located at the boxes are desirable in places where there is any extremely noisy machinery which would drown the sound of the gong at the box. The boxes on this system have inside a set of buttons with a sliding arm. When box door is closed, the sliding arm is on the alarm button only. If arm is on any other button, the closing of the door will automatically throw it on to the alarm button. For drill purposes when the box is opened, the arm may be moved to one of the other buttons as desired on that particular drill.

The wiring connections allow the striking on the gongs, blowing of the whistle, and recording on the register the number of the box pulled for fire. A box pulled for brigade drill is repeated on the whistle only; a box pulled for employees' drill is repeated on all the gongs of the system, but not on the whistle. A box pulled for local floor drill sounds only the gong in the immediate vicinity of that particular box.

The reliability of this system is, that if floor drill is being held and a fire breaks out during such drill, the pulling of another box for fire would cause its number to be blown on the whistle and sounded on all the gongs, except the one being used for local floor drill. If a drill is being held with all gongs in use, the pulling of another box for fire will interrupt the drill box on all gongs and sound the fire number. If the whistle is being blown for brigade drill, no other box will come in until after the brigade signal is sounded four times, after which the box pulled for fire will cut in and sound its number four times on all gongs and whistle. In case two boxes were pulled for fire at the same instant, the internal operation

of this particular case would be that both boxes would start together and work in unison until the smallest digit number wheel holds the line open longer than the other. This causes the largest digit number box to drop out without confusion; then when the control box finishes its four rounds, the other box will in turn signal its four rounds.

#### DRILLS

The system to be followed in drilling employees out from any building follows in general the same plan; although in some particular instances it is necessary to add to or subtract from the average plan. On the sounding of the alarm signal, employees should first shut off the power from their machines and those who are seated should rise and push their chairs underneath or close to the benches. This last is a very important point as it at once leaves side aisle clear for passageways (firemen entering). Lines should be formed in the nearest main or side aisle and should march under the direction of leaders to a designated exit. Each side aisle should have its leader in addition to those for room in general. A marching signal for a room can well be given by the man in charge of drills on that floor, using a loud sounding whistle. One of the policemen's type is recommended.

While the line is forming certain men employees should be assigned to stations on stairways to keep the line orderly, also to assist any girl who might fall. Other employees either men or women should be assigned to the task of closing windows, opening main power switches and turning off gas from ovens or heaters. Those employees as soon as their individual tasks are done should fall into the line passing out. It is highly advisable for every individual who has any task whatsoever in connection with the drill other than marching out on command, to be provided with an understudy. Each understudy should be thoroughly competent to handle his or her part of the drill in the absence of the regular employee whose duty it is to assume this work.

I would recommend that employees be frequently given what is known by us as a local floor drill or assembly, the idea being for them to form in column the same as if passing out for a fire and then at the signal from the leaders go back to work. The signal in each room is the same for floor drill as for fire, and by pre-arrangement with leaders, the employees can be sent back to work without loss of more than a minute's time.

A plant should not get in the habit of holding fire drills in the middle of the forenoon or in the middle of the afternoon, but they should be held at widely different periods of the day, as the operatives will soon become accustomed to drills at specified times and if an alarm came in at any other time, might have a tendency to throw the room into confusion under the impression that there was actual danger of fire. I visited one factory some few months ago where I was told that the fire drills were always held at four o'clock in the afternoon. Such practice ought not to be allowed. Every fire drill should be treated the same as if there were actual fire conditions present, and I would strongly recommend that the

time of the drill be changed in every instance. Drills might be held occasionally five minutes after employees come in to work, or five minutes before closing time. Furthermore, when a drill alarm is pulled, the fewest number of persons possible should know that the drill is to be held.

(Lantern slides were then shown, with explanatory remarks by Mr. Sanford, in which the following additional suggestions were made):

It is desirable a good many times to have doors in your factory that you don't want to have the employees passing through, although in cases of emergency it is highly desirable to have the door opening in the shortest possible time. In such cases, we place a key to the door inside a glass covered box and use an emergency sign on the door showing that it can be opened in a very few seconds, if necessary, to allow passing in case of fire or any other emergency.

One person should be assigned in each department to visit the women's rest and toilet rooms to see that persons there are also notified of fire alarms, and it is called "fire alarm" in all cases and not "drill."

On the signal for going out in any one direction, certain employees hold open any double swinging doors which may be necessary to pass through. After passing through the doors, those holding the doors open fall into line.

The stair towers provide a double hand-rail and are wide enough to allow four persons to pass down abreast. In the multi-story buildings, one file coming out goes to one side of the stairway and the file coming from the floor below goes to the other and the two of them practically parallel each other without confusion. The girls next to the hand-rail are required to keep hold of the rail and be ready to take care of the girls next to them in case of any slip.

#### DRILL THE FIRE BRIGADE

The training of the fire brigade is one thing that is advisable. Carrying hose up the ladder, the correct method for carrying a nozzle is over the back of the shoulder. Another thing, too, on training fire brigades: I believe in sending a brigade over a ladder every time it is called out. I visited a plant not long ago, in looking up these various practices of brigade drill, where they very proudly told me that their fire brigade had won all the championships around there for fast work in laying hose. I told them I would like to see them lay the hose in the second story window. They put up the ladder; the man leading carried the nozzle in the proper position, but his foot slipped three times. The man behind him went up holding a loop of hose straight up over his shoulder with one hand and having only one hand for the ladder rungs, so it is advisable to give them plenty of ladder practice.

The General Electric buildings frequently have different roof levels and in such cases we use a particular ladder which is about halfway between an ordinary ladder and step-ladder, for the convenience of the firemen in going over from one roof to another.

In case the clothing of the occupants should happen to catch fire, we

have heavy woolen blankets, ordinary army blankets, which are located in departments where the hazard of catching the clothing is more or less possible. These are kept in containers or sometimes in wooden boxes with paper or glass ends.

At the end of the fire drill, each drill foreman is required to make out his report, giving the number of employees present, time for dismissal, number of exits used, time of drill, and time of recall. In one case it took 195 employees two minutes and twenty-five seconds; I don't know why it took so long, unless it was the considerable number of floors. I am not familiar with that building, but I saw a drill at one of the General Electric Lamp Factories last week, in which 635 employees, mostly women, were taken out of three floors in two minutes and forty-one seconds. That came without any warning whatsoever. They were not even thinking of a drill.

There may be some doubt in the minds of some people as to whether or not fire drills amount to enough in the long run to repay the employer for the loss of time in the holding of such drills. In this connection I wish to quote from a Newark, N. J., newspaper in reference to a statement by a woman employee of a factory in that city which had been destroyed by fire with loss of eleven lives.

"It was the worst fire I ever saw. It did not seem to be a minute after the fire bell rang before a cloud of black, stifling smoke spread over one end of the top floor. I heard the tapping of the bell and immediately started for the exit. Before taking this job, I worked for eight or nine years with the Edison Lamp Works of the General Electric Company. They have the best kind of protection for their employees, and fire drills there are so rigidly carried out that to hesitate a moment when you hear the gong, even if you know it is only a drill, is almost as much as your job is worth.

"At the button factory, I was one of the aisle leaders. When the gong struck, I had to drop everything on the instant and take my place at the head of the line. Before I reached the door, I saw the dense pall of smoke and the next moment tongues of flame began to shoot through it. Every girl, however, kept her place in line, and not one of them lost her head as we tore down the stairs."

The example of bravery and coolness in the face of danger set by this young woman saved a dozen lives. With the first clang of the fire gong, she instinctively dropped her work, called to the other girls to follow, and went immediately to the nearest exit. Thanks to the years of rigid training in fire drills received in the Lamp Works, she knew just what to do when the alarm sounded, and so her own life and the lives of her companion workers were saved.

At the inquest, half a dozen employees testified that no fire drills had been held for over a year. On this point the superintendent and the girls differed, but the testimony tended to show that even if the drills were held, they were conducted at such widely-separated intervals and so carelessly, that they made no lasting impression on the employees. When the fire confronted them, they were utterly helpless; panic seized them



and they jumped from windows or ran hither and thither without knowing why. If those who were trapped by the flames at the other end of the third floor had had the benefit of fire drills, they would have instinctively sought the stairs at the first alarm and so escaped safely as did the others on the same floor who were lead only by one girl who had received her training in the General Electric Company's factory.

In the General Electric Company's plant at Schenectady, New York, there is a large building, three floors in height with a fourth floor for about one-fourth the length of the building. This fourth floor had an exit in a stair tower at one corner on the end of the building; the other a fire emergency exit consisting of a door opening from the other side of the room out on to the roof of the main building across which it was necessary to walk for 300 or 400 feet to a stairway near an elevator penthouse on the side of the building. The bulk of the employees on this upper floor were women. During working hours a few months ago a heavy wind storm blew in the end wall of this upper floor and blew out the side wall, leaving the stairway inaccessible. A fire drill signal was sounded, the girls in that room formed in line, marched out across that open roof despite the wind, and down to the stairway in perfect order.

It may be stated by persons objecting to taking the time for practicing fire drill that the chance of a fire in a factory is very remote. Let us hope so, but if we can be the means of saving lives, not only in our own factories but in others through the training received by our former employees, I believe it is money well invested.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

**T**HE Second Session of the Automotive Section was called to order at 9:55 a. m., Thursday, September 29, by Mr. James J. Lynch, Chairman.

**CHAIRMAN LYNCH:** Yesterday we discontinued our session as it was getting rather late, without any discussion on the last paper. If there is any one here who would like to say a few words about "Fire Drills and Fire Alarm and Drill Signal Systems" we will be glad to hear from them.

#### DISCUSSION

**MR. R. C. RUCKELDT** (Fire Chief, Eastman Kodak Co., Rochester, N. Y.): The speaker yesterday remarked that in one room where there were a great number of men employed, they had a signal notifying them of danger, but they had no drills. My experience of twenty-one years in the New York City Fire Department has led me to think that men burn just as readily as women do, sometimes a little faster.

The subject of fire drills is something that should be taken up at this Congress. We speak of the dangers of machinery, guarding, all that sort of thing. One of our greatest dangers is from explosions and fires. I have had some experience with the Eastman Kodak Company, where they

employ close to eight thousand people, two thousand five hundred of whom are women, and they have a very fine fire drill.

I strongly recommend that the signal system be kept as simple as possible. In sending in the signal, some one remarked that they blew the number of the building, the floor, and the district. Escape from fire is often a matter of seconds, and we have established a simple signal system. We have only three districts, and we blow no floors. Our districts are numbered two, three and four. Number one is omitted purposely, for if you get a single stroke, it is apt to be confusing.

In my opinion, it is certainly ridiculous to drill one floor in a building, and let the rest of the people stay in there.

During fire drills, people should pass out of the building quietly with no talking. Insist upon this point, for conversation prevents concentration. Where employees concentrate upon the fire drill you are going to meet with great success.

The speaker told us that a three-story and basement building, with four hundred employees, was emptied in two minutes forty-one seconds. We have a building with eleven hundred ninety people, and the last occupant of the building touched the ground in just two minutes, eleven seconds, which I feel is due almost entirely to the simple signal system.

CHAIRMAN LYNCH: We will have to give fire drills a little more time on our program in the future. The next speaker on our program is Mr. H. L. Gaddis, Service Manager, Great Lakes Engineering Works, Detroit, Michigan. Mr. Gaddis is the president of the Detroit Local Council.

### TRACING THE REAL CAUSES OF ACCIDENTS

H. L. GADDIS, SERVICE MANAGER, GREAT LAKES ENGINEERING WORKS,  
DETROIT, MICH.

A good many years ago, I think in 1912 or 1913, at either the first or second annual Congress of the National Safety Council, I heard a gentleman who was a safety engineer talking of an accident that had occurred in one of the big rubber plants at Akron. When I heard that word "Safety Engineer," I said, "What new species of animal is that?" Efficiency Engineer was just coming upon the horizon. Today he is to put it lightly, much more numerous. But the safety engineer was then a new term, and I wondered what could be the connection. The story I heard was this. A man had been working on a big rubber roller, a very large cylinder. He had been working on the same roller for many years. During the first half hour of work one morning he pushed the rubber into the rolls and pushed his fingers in. That far so good. It was an accident that quite frequently happened, although it had never previously happened to this particular man. The instinctive action when you feel your fingers caught is to reach over and grab with your hand and give it a pull. For some unknown reason, unknown at that time, the brain acted slowly and instead of the instinctive reaction which pulled out the hand, both hands were caught in this slowly revolving mill and before the mill could be

stopped the man had lost both arms. That was before the days of the quick-stop tread pedal and all that sort of thing.

At that time I had been working for the Chicago Board of Health on factory inspection and tuberculosis work, but it set me thinking what was the real cause of that failure of the man's habitual mental processes to work at that moment? Some time later I went to Akron and found out that that splendid company which, even then, was doing good work, recognized that that accident was due to what we today may label, for lack of a better name, "Social Causes."

The detail was that the man's wife had been expecting a baby and that the man had been going through a very nervous period, had been up all night the night before, and it resolved itself eventually into a case of what we now call mental fatigue.

When the war started it was my good fortune to have some men consider that I could be of use in the work of producing ships, not as a skilled production man as so many of you men are, but as a man who had had some little experience in creating enthusiasm among employees and general good feeling all around. When I stand here and face the intelligent body of men who are gathered here today it makes me feel that everybody is playing the big safety game, and that everybody is interested in it. But I regret to say that not everybody is interested in it. I have been with a ship-building company where the general manager was not interested in safety work, and I regret to say that two and one-half years have accomplished but little.

I have heard so many times in the past two and one-half years that damnable phrase, "Oh, that is the penalty of industry," that I have almost come to believe it. But I don't, and I won't; I don't believe that there is any such penalty of industry as is being paid today in many companies.

For many years I made it a point to visit hospitals at night in those quiet hours after I had been to some comfortable theater or something of that sort, just stopping in on the way home for half an hour's talk with Johnnie Slavinski who was hurt a few days ago; a talk with the man who is lying there with a burned leg—knowing how they appreciate it. And when they come back to work what human yeast cakes they are to help you spread the spirit of safety in that plant, provided you do it because you want to, and because you like to! You are not paid for that overtime, but it pays you big dividends in the end. I have talked with, I won't say thousands, but with several hundreds certainly, of men, and invariably I have asked the question, "How did it happen? What made you do it?" And we safety engineers today, if we get that habit will find we are not such big guys as we had imagined; for we will learn that so many of the accidents could have been prevented so easily.

It is certainly true that at least 75 per cent of all accidents can be eliminated. In fact I know that in some plants much more than 75 per cent of accidents have been eliminated. I know of one wonderful institution in Detroit employing over fifty thousand men that year by year is striving for a non-fatal accident record, and it is going to get it very

shortly, because year by year it creeps nearer to it. But it takes work, it takes intelligence, it takes brains on the part of their safety man and his staff, and absolute support on the part of the workmen.

#### MADE STUDY OF 1,000 ACCIDENTS

I have just completed a study of 1,000 accidents that have occurred during the last year; 1,000 cards picked by a clerk at random from a much greater number. I find that many men are injured as the result of their own actions. And in such cases I have absolved the employer of all blame. The man who works on a drill press for years and some day with a gloved hand takes hold of the drill or the chuck before it stops and the result is that the tendons are all pulled out from the arm down—I saw it not two weeks ago, and have talked with that man, and his only answer as to why he did it is to say, in a helpless, pitiful way, "Lord knows I don't know." Those things have to be labeled the man's own action.

Many accidents result from the other employee's actions or neglect. The kind of industry I have been connected with is one where there is a great deal of "Pigeon flying;" that is, the routing of material necessitates men moving in small groups carrying material from place to place. Often one man of a group fails to do his part, and that frequently results in an injury to a man through no fault of his own. If a workman lays down a tool on an elevated platform and that tool falls and cracks another man on the skull, that is an accident beyond the cracked skull man's ability to control. The number of accidents from this cause is very high.

Accidents involving mechanical failure are also beyond the workman's control. I think instantly of a rough spoken man who was called our Master Rigger. It was his business to see that the boilers were lifted up over the side of the ship by the shear legs and lowered safely in the hold. Whenever there was a heavy piece of moving to do such as lifting a boat out of the water and putting it safely on the blocks, it was Jimmy Dawson who was right there. But one day Dawson was standing in the bend of a cable; a tug was pulling on the cable. It went around a sheave on the capstan block and the cable snapped and both of Dawson's legs were cut off; he died soon afterwards from loss of blood. Was it Dawson's fault that he stood in the bend of the cable? Was it neglect on some one's part that the cable wasn't strong enough to stand the strain that was put upon it? Was the Captain of the tug to be blamed when he was trying to pull the boat off the beach for exerting all the strength he could put on it? It is a hard thing to say where to place the blame for such an accident. That accident resulted in the death of two other men besides Dawson.

A few months before that, and included in this list "Mechanical Failure Beyond the Injured Man's Control," a tank used in welding was lying on the steel deck. This was in February, so it was not a question of heat from the sun. But the tank suddenly exploded, four men were blown into Eternity, and our dispensary was filled with men who had been burned and injured. The violence of that explosion was such that the half-inch plates on the boat deck were blown down, leaving a hole fully

five feet across. That is an accident for which it is very hard to determine the real immediate cause, but it was learned at a later date that the foreign laborer whose duty it was to fill those tanks had failed to report, or the foreman had failed to see, that the glass was off the indicator dial and that several screws had slipped and permitted the face of the dial to slide around.

Many accidents result from ignorance—"had not been told." The blame for these accidents can be traced directly back to your own organization, to you safety men, and to the spirit of the plant. The spirit of the plant has much to do with the successful safety work. If the spirit of safety prevails in your plant, not just the sign-reading or the sign-posting spirit of safety, but if you have men in your employ who believe in you, who believe in your safety work, sufficiently to say to the new man, "Cut that stuff out; that doesn't go around here," you have gotten somewhere. But if it is the spirit of the game to sidestep and duck under and only play safety when the boss is looking, you haven't gotten very far.

Nearly all of the eye accidents are preventable. Of course there is the question of fog, the question of haze, and occasionally some of you have gone to your superintendent or your master mechanic and you have said, "I have to have help; you will have to fire so and so as an example if he don't wear his goggles," and right there is where your *cruz credentia* comes—does he back you or does he not? If he doesn't, your position in that company is going to be increasingly difficult. If he does, you will prosper and succeed, and your plant will become one over which the spirit of safety prevails.

Look more carefully into your real causes of accidents. Don't be too quick to use the word "Carelessness." Don't be too quick to say, like Topsy, "Things just happen." If you will trace them back with a heart behind your tracing, you will find there is still much for us to do.

CHAIRMAN LYNCH: We will now hear the report of the Nominating Committee, Mr. Robinson, Chairman.

#### REPORT OF NOMINATING COMMITTEE

MR. ROBINSON: Your Nominating Committee would respectfully report as follows: We feel that the usual custom should be followed in advancing the Vice Chairman to the Chairmanship of this Section for the coming year, unless there is some special reason why that should not be done, and it therefore affords the committee great pleasure to recommend the election of Mr. Robert A. Shay of the Ford Motor Co. as Chairman for the next year. This is, we think, signally fitting, in view of the great interest of the Ford Motor Company in accident prevention. Of course you all understand that besides being Chairman of our Section the Chairman is a member of the General Executive Committee of the Council, and as a member of the Executive Committee of the Council which has been discussing these matters, and are trying so to steer the different sections, that in the election of your officers men will be elected whose companies are sufficiently in sympathy with the movement to be willing

to permit them to attend the monthly Executive Committee meetings. I regret to say that a great many of our companies, some of our own division as well as other companies, haven't yet caught the safety-first spirit, at least, to the extent of not criticizing or even refusing, in some instances, to permit employees to attend these meetings, and permit men who have been put on the Board and the Executive Committee to go on account of the expense involved, so that in recommending these men we have had that in mind.

Those of you who were here yesterday were undoubtedly very much edified by the address of Mr. August L. Kaems of the Simmons Mfg. Co. of Kenosha. It was very interesting and instructive, and in making up our recommendations we desired to tie in more closely, if we could, with so-called automotive section some of the allied industries like the industry that he represents, the machine shop industry, the motor industries that are not directly automotive, and at the same time to tie in a man who would probably be willing another year to be Chairman who would boost the Council, so we recommend Mr. Kaems as Vice-Chairman. Your Committee also felt that it was unwise in the Division to change Secretaries from year to year, but that if we had a capable Secretary who was willing to act from year to year that we should continue that office, make it more or less of a permanent office, so you would all know why the office was where it was, you could always communicate with it and could always depend upon what work there was in the arrangement of the program and everything of that kind being properly taken care of. So your committee would recommend the continuance of Mr. R. T. Thalner as Secretary. He is with the Buick Motor Company and says that he is perfectly willing to give the necessary time and work to running that office for another year, if it is your pleasure.

(On motion the report of the Nominating Committee was accepted and Chairman Lynch introduced the officers.)

MR. THALNER: I move that we extend a vote of thanks to Mr. Lynch for his careful attention to the Automotive Section during the past year. (Unanimously carried by rising vote.)

CHAIRMAN LYNCH: That is gang rule. (Laughter).

Gentlemen, we have a very interesting speaker in Mr. Victor T. Noonan on "Human Relations and Accident Prevention." I take great pleasure in introducing Mr. Noonan.

## HUMAN RELATIONS AND ACCIDENT PREVENTION

VICTOR T. NOONAN, DIRECTOR, OHIO ACCIDENT PREVENTION BUREAU,  
COLUMBUS, OHIO

A few days ago a well-known broker in New York City was asked to serve on a jury. Two young boys were on trial for stealing, and as the trial was about to open this well-known broker got up and asked the Judge to relieve him from his duty; the Judge asked him why. He said, "Your Honor, the real criminal is not here." The Judge asked, "What do you mean? Who is the real criminal?" And the broker replied, "It

may be that these boys did take the money with their hands, but they are not the real criminals; the real criminal is not here; the real criminal is society." Get the point! The real responsibility for both industrial and public accidents is society, for civilization is judged by its regard for humanity, and you can put a price on your civilization today by the kind of regard that you find for humanity around you.

What is society, and who is society? Not all the people of the country, as you may think. Not all the people in your city, nor all in your plant, nor all in Milwaukee. You are society, you, individually, and me. You are responsible and so am I, and that leads to this other question on responsibility. Not long ago a mother lost her only child in an accident. He was killed, a little tot, one of the fifteen thousand children killed last year in public accidents, and this mother was broken hearted, and she said to me, "Mr. Noonan is that all? Has my child whose life was taken any appeal anywhere? We hear of human beings going to the courts to start damage suits or claims for injury, but what about the life that is taken? What about that little soul, that little child of mine, is its voice silenced forever?" And it set me thinking, and in my imagination instantly somewhere I saw a great Tribunal, and I saw all those fifteen thousand children before it, and I saw every man whose life had been crushed out through no fault of his own, and every worker, every woman whose life had been crushed out through no fault of her own—saw them before that Tribunal. I saw the child step out before that Throne and say, "God, here is my pleading broken heart; here is my life, quenched, the life that you gave me, the life that I was entitled to live, the life that I might have made of service to humanity and those who loved me,—taken from me, through no rules of Thy Providence, and through no fault of mine." And there steps up also the man, the father whose life has been taken, who has been snatched from the children that need him, and from the wife that he should be with to support, and he says, "God,"—and here I will go a step farther than Mr. Gaddis; I can pick up the thread of his message,—"they say it was the roller or the buzz saw or the dynamite or the machinery, the statistical reports give us mechanical causes, God, but Great God in Heaven, it was not machinery that took my life, it was human indifference, it was human neglect, it was because my foreman did not warn me, and instruct me; it was because there was no personal interest in this work in the plant that I worked in; it was because,"—as Mr. Gaddis has pointed out—"the management had no living, human heart, but had a heart of cold stone." And then, men, you wonder why you have accidents and strikes and discontent and unrest, and men half-heartedly doing their jobs, watching the clock from seven in the morning until four or five, counting the minutes and the hours until the time gets around when they can get away from that atmosphere.

And in that Tribunal don't think for a moment that the cry of the child and the cry of that man is unheard, for, that Providence that cares for the birds and steers them on the turbulent seas when they are far from land, that guides them to the deck of a ship where they may find food and shelter, that Providence that clothes the lilies of the field,—

don't for a moment think that that Providence is letting all this human sorrow go on day after day without arranging the day for the final reckoning, and for placing the responsibility, as I have pointed out a moment ago, on society, on the manager, on the President, on the Shop Superintendent, on the foreman, on the worker himself, and on you individually.

Some few years ago I was conducting a week's safety campaign in a certain city in Ohio. I went through all the factories talking to the workmen and one evening I had a meeting of all the manufacturers, about two hundred of them, from fifty factories. Of these fifty factories, I had noticed there were fourteen in which there were no mechanical guards, no first-aid, one plant had no decent drinking water, no sanitary fountains, and in one of them the toilets were unspeakable. Here was a beautiful community with nice homes and somehow I felt that the fourteen employers were not maliciously guilty, nor were they wilfully guilty. I felt that if I could state the case in the right way, they would do their duty. So as I stood up before these 150 or 200 manufacturers I said, "Gentlemen, I am going to paint a picture for you. I don't want to hurt your feelings: I am perfectly sincere; I want to help you." And I described the fourteen factories in such a way that no one man could recognize his neighbor's plant. "Now," I said, "let us leave these fourteen plants and enter the fourteen homes of the individual employers. Here is a man who owns a fine house. I find in that house a fine first-aid cabinet in the bathroom, and a fine bathroom, with a row of clean white towels, all the conveniences for guests. The owner has a bull dog, and when the bull dog in the darkness of the night runs into the neighbor's cat and has his face scratched, they take the bull dog in and give him a little first aid and put him on the family cushion next to the radiator, and the next afternoon you will see the fat, sleek bull dog riding around in a limousine." "And," I said, "I will go a step farther. Sunday morning I will follow other employers of this type. The man who has the wood-working plant goes to the Catholic Church. He is in the first pew and passes the collection plate. Another man is at the Presbyterian Church, another at the Baptist Church, and they are all in the front pews."

The point that I want to bring out here, and that I brought out to those men, is this, that they all have the same message, no matter what church they went to. What was the message? The message of Christian justice. I hear them preaching the Golden Rule around here in the various Section meetings. Let us be perfectly candid, and get away from that slogan "The Golden Rule." Let us call it by the right name, "Christian Justice." "Do unto others as you would have others do unto you."

Now here is the best part. At the end, as I was going out of that hall, I felt that some of these manufacturers might want to show me the door. Not at all. They took me by the hand and I felt that some of the men who squeezed my hand were some of the men that I tried to reach. Two weeks later the Secretary of the Chamber of Commerce wrote me a letter in which he said that a drug store in that city had sold out all of its first-aid equipment. Why? Because one man stood up in a manly, courageous, honest, sincere way and delivered that message to those men. They



were not wilfully responsible. They had forgotten. They didn't think, and when it was put to them right they went out and did their duty.

I had an experience with a very cold-blooded manufacturer last week in another city, a man who doesn't see the human side, the Christian aspect, the man who sees just machinery and human beings are part of the plant. I didn't believe that I could reach him, but thought I would take a chance, and so I wrote him a letter. Now here is a lesson for you, men. Don't hesitate to get sentimental when you have to deal with a cold-blooded executive. He is cold-blooded only on the surface. Right down behind all this rock and coldness there is beating a human heart just like yours and all that heart needs is to be reached. There was one paragraph in my letter to this man in which I said, "My ten or twelve years experience in accident prevention work has convinced me that there is a miracle in accident prevention. It has also convinced me there is an angel of human safety, and this angel of safety knocks at the doors of industrial establishments and organizations and factories; yes, it knocks at the doors of factory executives and shop superintendents and foremen and workmen, even as it is knocking at your heart now." I went on to say, "I regret to have to tell you that the angel of safety so often knocks at the door"—I didn't say "of your heart" or "your plant,"—"and it is turned away." He got the letter on Monday morning of this week, and on Tuesday morning I looked for either of two things. I looked either for him to ignore the letter altogether or else to write me a letter and say, "Mr. Noonan, you have insinuated that I am not interested, that I will not permit the Spirit of Safety to enter my plant." Neither of these things happened. In his cold way,—but the heart was beginning to break open,—he said, "I want to compliment you on your enthusiasm." Ah, his heart had been reached; this man who had never complimented anybody on safety wrote me in a letter. "I want to compliment you on your enthusiasm, and I will do what you have recommended."

I would have failed had I stopped at the door of his plant and not tried to get at his heart.

Now that leads me to another point. We hear much of engineering efficiency, of mechanical safeguards, we hear much, of safety education, we hear much of posting bulletins on the bulletin board; we hear a great deal of talk about accident prevention. You can talk and plot and plan, you can install all the safety devices and safeguards you want in your plant, you can get it all down on paper as a good many plants have it—on paper only. You can make drawings and blue prints of your safety work, you can post all kinds of signals and warnings and you can make a lot of noise about your accident prevention work, but your accidents are still going on. Why? What is wrong? You have covered the mechanical machine in your plant. You have reached that. You have marked it and painted it and located its latitude and longitude, and you take excellent care of it from day to day, but the human machine remains untouched. You can reach the mechanical, but you cannot put your fingers on the brain, sight, sense, touch, or any other part of the invisible human machine, with these various mechanical contrivances. But here, is my

word of encouragement for you. With your voice and with your heart you can reach his heart, and when I speak of his heart I speak of the boss, the president, vice-president, general manager, factory superintendent, foreman or the workman, and I care not how cold-blooded or indifferent he may be I care not if he doesn't speak English, I care not if he is a bolshevist or an anarchist,—give him to me and I will reach his heart, and you can reach it just as easy as I can if you will only try. There is the great prescription that I am giving to industrial plants. The safety engineers and the mechanical men guard the machine. But there is need for my remedies, too. I am giving them to everybody that I go to and I care not whether it be the biggest man in the plant or the humblest, there is a remedy. Gentlemen, get in here and reach his heart and watch results. Having reached his heart, the pathway of accident prevention, the glorious, noble pathway of accident prevention lies before you, not a pathway, but a great harvest field, waiting for your untiring effort, waiting for your personal interest, waiting for your enthusiasm,—oh, I would go further and say, "waiting for the love of your heart." And why not put the love of your heart into this work? If you were walking beside the river and your neighbor was drowning, human love would come to the rescue then. your clothes would be stripped, you would forget the sacrifice you were going to make and you would go into the deep water after him. You would make the great sacrifice of which none is greater, nor is there any love greater than that of a man willing to give his life for that of his neighbor. Put the same spirit into the work of your plants, watch the results, watch the miracles that will happen, not six months later, but the day after.

Can I give you an example? Yes. I was called to a shipyard in the East employing 15,000 workers where the men were not wearing goggles. The management asked me how long it would take to get them to wear goggles, would it take nine months? I replied, "They will begin to wear them and co-operate right after I start working." "Why," he said, "that is impossible, what are you going to do?" I said, "Call all the construction men out in the yard." "Oh," he said, "they are the worst gang in the shipyard." "Never mind," I said "let me get to them." I talked to those men about eye accidents and I concluded by saying, "Men, they tell me you won't do it, but I believe you will. I have confidence in you and I am asking you, for your own sake, and the sake of the mother who bore you, who gave you your eyes, to wear your goggles like men, go back on the job this afternoon and show this management what you can do." There are men listening to me now who have seen the same results elsewhere. Two hundred and eighty men applied for goggles immediately after the meeting; five hundred during the next four days, and the company had to order seven thousand new pairs in the following 5 months. There was no compulsion, no club, there were no notices; nothing but the honest appeal and the affection and love and sincerity and enthusiasm of one human being who was interested in his fellow citizens enough to get up manfully before them and beg them to do their duty.

There is the way for you, Gentlemen, there is the pathway for the

safety engineer, yes, and for every official connected with this work, it lies before you; take an interest greater than you take in baseball, greater than you take in the results of the World's Series; a greater interest than you take in production; an unselfish interest, there must be no blarney, bluster, or bluff. If there is any blarney or bluff about the safety work—and unfortunately it gets in, we have some bluffers in the game, their hearts are not right, theirs is "lip service," as Mr. Gaddis calls it,—it will soon reveal itself and there will be nothing left but a skeleton. Go into it with your heart, throw your full soul into it. If I can get this big body of men here today to go back with this modest message of mine, so full of affection for the work that you are doing, and of the possibilities that you have before you, you will be surprised, as sure as I stand here today, at the wonderful results that you will get.

Now to conclude; what is life for, after all? What are we living for? Isn't it to make life less difficult for each other? There is the sum and substance of it; to make life less difficult for each other, or to put it as Lincoln put it,—I spoke of this pathway of accident prevention, the heart, from your heart to his heart,—Lincoln pictures that pathway; he said on one occasion, "When I am laid away, when I am dead, let it be said of me that wherever I traveled on the pathway of life and I found thistles growing, I picked them and planted roses in their place."

Oh, Gentlemen, each of you come from a great, big factory. I see it, in imagination. I see your respective positions there, safety engineers or doctors or shop superintendents or whatever you may be,—I see the great buildings, back of the buildings I see the wonderful human organization, the men and women who are working there; working, not for the dollar alone, for, oh, their hearts hunger for encouragement for an uplifting word, for a cheerful "Good morning," for a pat on the back; and when you do go into safety work pray for them tell them about it, publish it, don't always be criticizing. There in your respective establishments is the pathway that Lincoln pictures, full of thistles. Was there ever a time in our history when our country needed some thistles pulled as it does today. Go back on your jobs and start pulling the thistles. The machinery will take care of itself. The mechanical safeguards will do their jobs well, they will do what you have assigned them to do. The uncertain, mysterious, wavering, human machine that you will always have with you, needs your thought. You can only keep in touch with him through the way of the human heart, from your heart to his heart, there is the pathway, start in and pluck those thistles of indifference and neglect and selfishness, those thistles that are causing discontent, that are making men weary and discouraged, that do cause accidents,—pluck them, and in their place plant the roses of human love, personal interest, unselfishness. Give me the unselfish safety engineer who is not working purely for his salary, who is working because he loves the game, because he loves human life, and because he wants to save life; that man is the angel in human safety of whom I spoke. We have those angels, not only personified in our safety engineers, the unselfish safety engineers, but we have them in good employers, superintendents, fore-

men, and the good workers and I have gotten many an inspiration from coming in contact with angels in human form, the good men, who like Lincoln, are pulling the thistles day after day and planting the roses. Picture the Great Lincoln pulling the thistles,—if that sentiment was good enough for him, it is good enough for me. I know it is going to be good enough for you, and I know that you will go away from this meeting remembering this message of mine, because it comes from my heart to your heart.

CHAIRMAN LYNCH: The next number on the program is the subject of "Millwrights."

### MILLWRIGHTS

GEORGE W. BOWIE, SAFETY ENGINEER, AMERICAN CAR AND FOUNDRY COMPANY, DETROIT, MICH.

When I sat down to construct an image in my mind, of a millwright, I visualized two types of the genus millwright. I saw one who was simply our well-known type that has always been looked upon with respect as a worker in wood, iron, concrete, and could manipulate all kinds of machinery. The other type of millwright, who also is a useful worker, is only too common today. He lacks education and early training, but has managed to be employed as a millwright, largely on his reputation as a handy man, or he claims he was born into this world with a predisposition to be a natural mechanic—no doubt, some employment managers, if here, recognize the type I allude to. But this last type we will consider later.

But the real genuine millwrights who have existed in the past, still exist in the present, and will and should exist for all time, is what we shall now consider.

#### DEFINITION OF MILLWRIGHT

Webster defines the word as "one who builds mills"; by giving such a definition only superficial thought it seems unimportant, but is it unimportant? "One who builds mills"—let us analyze that definition. If you are going to build a mill: First, you would consider location for water power, if steam, of coal supply, and its commercial relation as to railroad facilities. Second, would come the excavation and foundations; third, the erection of the buildings and their industrial or economic relation one to the other. The buildings being complete, water supply and sewerage facilities would be considered, not forgetting that so far all this has been done in accordance with the science of sanitation. Fourth, by a pre-arranged plan comes the installing of the plant machinery, shafting, countershafts, pulleys, hangers, sprinkler system, etc. The millwright you can see still has an eye of great width of vision for safety, be it fire or mechanical or personal hazards, for surely a man who builds a mill or factory which illustrates his ability, versatility, and industry, will not leave it to the elements of chance, and its workers to the hazards of machinery nor the weakness of human nature, which may cause accidents

through carelessness, awkwardness, stupidity, or ignorance of each or every worker. Lastly, he then completes his work for the time being by installing safety signs to start the education and complete the efficiency of each and every worker.

I have seen and also know of numerous instances where millwrights have done such work and did it well for they measured up to Webster's definition.

We will now consider the ordinary millwright such as we are acquainted with today.

Who is the safety man's best friend in a factory or an industry? The millwright. Is he not the one who takes the dimensions or data required for the installation of the guards, and assists you as to the best method of having those guards meet the purpose for which they are intended? Does he not make guard rails and belt guards either himself or by someone of the many departments under his control? Is he not the one who orders all belting put in running order, just so, that shafting will remain in proper alignment, and that all pulleys are properly balanced to prevent hangers and couplings from vibration and breakage?

Does not the millwright as a rule keep you posted as to dangerous conditions? It has been my experience that he does. In these modern times you will find that the term millwright means master mechanic, superintendent or supervisor of maintenance. Take any of these titles singly or in combination and you still retain Webster's definition—"One who builds mills". The word mills is a generic term, and can apply to factories or industries and the working versatility of a millwright or master mechanic entails a broader education than such plain men are credited with.

In our first illustration of the capabilities of "one who builds mills" we find him engaged in the locating of an industry. I am not trying to represent such a person as being a super-man; in locating, he exhibits shrewdness and a realization of the necessities of a business man; in excavating and foundations, he must possess the knowledge of an estimator, and for foundations, the skill of an engineer; for the erection of the buildings and mill construction, he certainly can claim to be something of an architect; for the installation of machinery, and frequently due to his ability as a draftsman, he should deserve the title of mechanical engineer. Why not? To accomplish all those things he must have an extensive knowledge of arithmetic, geometry, strength of materials, and various other formulæ and science that enter into millwrighting, or building of mills. In fact, a millwright can according to his capabilities and education be a very important mechanical engineer.

They say the old time millwright has passed. I don't believe it. At the present time he exists in another guise, under such terms as we have already quoted. Such is the age of evolution.

If we could turn back the pages of time beginning at the flood perhaps we could find a millwright or two at the building of the Ark; probably the Ark was the first ship that was ever built and, no doubt, Noah had to consult his artisans and consider the buoyancy of the Ark, its

shape, the matter of ventilation, light, also the seams being caulked to keep it dry. I hardly think that men in those days were devoted solely to one craft or trade—that came later with guilds and unionism. They were probably accustomed to the general use of tools.

I don't know whether any one here has ever heard the story of King Solomon's smith. It is told as follows:

STORY OF KING SOLOMON'S SMITH

"And it came to pass when Solomon, the son of David, had finished the Temple of Jerusalem, that he called unto him the chief architects, the head of artificers, and cunning workers in silver and in gold, and in wood, and in ivory, and in stone—yea, all who had aided in rearing the Temple of the Lord; and he said unto them, 'Sit ye down at my table; I have prepared a feast for all my chief workers and cunning artificers. Stretch forth your hands, eat, drink, and be merry. Is not the laborer worthy of his hire? Is not the skillful artificer deserving of honor? Muzzle not the ox that treadeth out the corn.'"

"And when Solomon and the chief workmen were seated, there came one who knocked loudly at the door and even forced himself into the banquet hall. Then Solomon was wroth and said, 'Who and what manner of man art thou?' and the man answered and said, 'When men wish to honor me, they call me Son of the Forge, but when they desire to mock me, they call me Black-smith; and seeing that the toil of working in the fire covers me with sweat and smut, the latter name, O King, is not inapt and, in truth, thy servant desires no better.' 'But,' said Solomon, 'Why come ye thus rudely and unbidden to the feast where none save the chief of the workmen of the temple are invited?' 'Please ye, my Lord, I came rudely,' replied the man, 'because thy servants obliged me to force my way, but I came not unbidden. Was it not proclaimed that the Chief Workmen of the Temple were invited to dine with the King of Israel?'

"Then he who carved the cherubim said 'This fellow is no sculptor' and he who inlaid the roof with pure gold said 'Neither is he a worker in fine metals,' and he who raised the walls said, 'He is not a cutter of stone,' and he who made the roof cried out, 'He is not cunning in cedar wood; neither knoweth the mystery of uniting pieces of strange timber together.' Then said Solomon, 'What hast thou to say, Son of the Forge, why I should not order thee to be plucked by the beard, scourged with a scourge, and stoned to death with stones.'

"But the Son of the Forge was in no sort dismayed, but advancing to the table, snatched up and swallowed a cup of wine, and said, 'O King, live for ever! These men have said truly, I am not one of them; I am their superior, and they are all my servants.' To the carver of stone, he said, 'Who made the tools with which you carve?' and he said, 'The smith', and to the chief of the masons, 'Who made the chisels with which the stones of the Temple were squared?' and he said, 'The smith', and to the chief of the workers in wood, 'Who made the tools with which you hewed the trees in Lebanon and formed them into the pillars and roof

of the Temple?" and he answered, "The smith." To the artificer in gold and ivory, "Who makes the instruments by which you work beautiful things for my Lord, the King?" and he said, "The smith." "Enough, enough, good fellow," said Solomon, "Thou hast proven that I invited thee, and that thou art all men's father in art. Go wash the smut of the forge from thy face and come and sit at my right hand. The chiefs of my workmen are but men; *Thou art more.*"

#### THE MILLWRIGHT USEFUL TO EVERYBODY

You take the ordinary or garden variety of millwright, at times he is not particularly attractive in appearance on account of the dirty nature of his work, but like King Solomon's smith, he is useful to everybody. Even if you want a goat you can always put it on to the millwright if there is any doubt as to who should be blamed for something that is wrong and creates an accident.

But I wish to tell all safety men here that in a workshop or a large factory, it is a good policy to cultivate the friendship of the millwrights. They are mighty handy in fire protection, none better for the protection of life and limb. They can be made into high-grade safety scouts and agents. Instructions and lectures given to a millwright gang will prevent many an accident. Have all of them wear safety badges. The fact that millwrights are mostly free-lances in a factory enables them to discover many a possible condition which entails accidents and disaster in a plant. By all means, men, cultivate acquaintance with the millwright. If you have any technical safety literature, get him to read it. You can make him not one of the most valuable safety assistants in a plant, but the *most valuable*. His technical knowledge is indispensable to you in your business. What you don't know about overhead machinery, such as shafting, hangers, coupling, pulleys, countershafts, belt shifters, belting, cranes, rotten window sash with glass falling out—his work takes him where he can see hazardous conditions that others overlook. Sometimes a foreman who is interested principally in production will oppose immediate repairs and take a chance, not on his own life, but that of his workmen. There is a homicidal tendency on the part of many foremen to delay, hinder, and actually conceal from the safety man actual conditions, so that with a millwright co-operating with the safety department, not only your accident list, but your disaster list can be kept to the minimum.

I am not against the foremen, because I yet believe that the foundation of safety and shop efficiency still remains in their hands, provided they realize the importance of their position. The millwrights are really to blame for many accidents and while they may not suffer themselves, still, in this industrial orgy for haste and speed in getting millwright work completed in a shop, the millwright is only human and he will leave unfastened material overhead, such as pieces of wood, bolts, nuts, wrenches, just to remind you of the millwright. For this reason, I myself have followed the policy of speaking periodically to the millwrights in a body, also to cranemen—hookers-on, or any particular gang that

seems to be getting lax in observing safety methods, or shows an increase of accidents connected with their group.

Do not for a moment entertain the idea that safety committees cover such lapses that cause accidents; direct-action safety work by the safety inspector or engineer is the best method of reaching each group, and never neglect to have their foremen present at those group meetings.

I might say that the policy of all corporations and employers today is for safety and efficiency and that a president and his executives who may formulate a policy on behalf of production, efficiency, or safety, that that policy of theirs is a dead issue unless they get safety inspectors and foremen especially to inject into their men safety ideas just as rapidly as they can production ideas. If a foreman wishes to be a success, he will always tell his men the best way, the safest way to do his work. When the man is brought into the shop and given his machine or job, that is the time for foremen to make the company's policy a live issue and an effective one.

#### DIRECT-ACTION SAFETY WORK

Direct-action safety methods are I believe more effective than depending on the influence of committees entirely. By direct-action methods I mean pointing out from time to time the inherent danger attached to certain lines of work.

Millwrights will leave overhead debris, tools, nails, nuts, scantling, cleats with projecting nails, which, no doubt, increase the accident list. They should be told by a safety inspector as well as by their foremen that they have more opportunities to advance safety and reduce accident frequency than most men in a plant and that they should replace safeguards and not leave loose material overhead where it may fall on some one.

Traveling crane operators and hook-ons (the men who wrap the work with chain slings) create dissension and accidents if they do not cooperate. Hook-ons are inclined to double the load without taking time to put on a heavier sling or chain, or their method of slinging is defective. The crane operator realizes that he is at a disadvantage, being up so high and riveting hammers making so much noise cause his protests to be ignored, and takes a chance once too often.

Hook-ons place their slings wrong or twist the links or make loops in the chains and insert a piece of wood so that slings can be shortened. All of those are dangerous practices, and continued indulgence results in a disaster some day.

Chippers, grinders, molders pouring off neglect to wear goggles. All groups of workers have evident hazards that can be drawn to their attention by direct-action safety work, telling such groups of their particular hazards, and *how to avoid them*. I have found this method more effective than bulletins, rule books, or safety committees, because all of us have reached a point now in our career of Safety where managers and workers accept safety ideas as an important and necessary part of our life.



## MAINTENANCE GANG MAY BE EFFECTIVE ORGANIZATION FOR SAFETY

A maintenance gang, be it large or small, in an industry or a factory, can be built up to be one of the most effective organizations for safety purposes that a factory can have for a very good reason, many of our so-called trade hazards originate with the carelessness of millwrights and electricians. Educate those millwrights and electricians to be safety agents, and you remove root and branch those trade hazards that swell the accident list from day to day.

With the millwrights and other maintenance workers backing up the efforts of the Safety Department and as free lance workers whose tentacles of observation reach every part of a plant, you can get more reports, and accurate ones at that, of conditions that exist in places and under conditions that committees would never observe and do not have the opportunity to see. When a Safety Inspector can get to the root of accident frequency, either arising from shop methods, conditions of buildings, defective machinery, or operating groups, he can as a rule apply a remedy, more especially when he has so many units of safety working every hour of every day to make a workshop safe.

MR. HAWES: Mr. Chairman; I move the appointment of a Committee on Statistics in the Automotive Section for the purpose of collecting information regarding accidents so they may be analyzed and the real causes determined, and the information given back to the members of the Automotive Section by annual or quarterly reports.

(The motion was seconded and carried.)

MR. COLBY: Might I suggest that we ought to put in fire hazards, too? This convention has not said anything about prevention of fires, and that is one of our greatest accident causes, and if we can get at the root of that we will have eliminated a great deal of hazard.

MR. HAWES: I feel that the matter of fire prevention is very essential to life saving, but it is thoroughly threshed out annually by the National Fire Protection Association, of which I am a member; threshed out very thoroughly by men of experience in fire prevention methods. I suggest that we get that information at our Annual Congress by asking for a paper from some member of the National Fire Protection Association. Such a paper should deal with safety of employees in relation to fire prevention.

MR. F. X. WELLS (Packard Motor Car Co., Detroit, Mich.): I would like to suggest that the findings of the Committee on Statistics be turned over to the Bulletin Committee, so they can compile bulletins on the different hazards as they develop.

MEMBER: A good many Safety Engineers here don't have the fire; others do; a good many are handling both. It seems this matter could be extended to cover fire, and be of mutual interest to both. It is just as easy to report a bad fire, not only bad fires, but fires that could have been stopped if handled in time by the Fire Department.

CHAIRMAN LYNCH: Supposing we leave the matter of fire prevention to the Committee to do with as they see fit.

## COMMITTEE ON STATISTICS

Mr. Hawes, Mr. Blank, and Mr. Keefer are appointed to act on the Committee on Statistics.

Mr. Briggs, Willys-Overland Co., will act as Chairman of the Bulletin Committee, the other members to be appointed later.

MR. J. E. SCHELL (Cleveland Motor Products Co., Cleveland, Ohio): I understood at the Cleveland meeting, that we were going to devote one entire meeting of this section to punch press discussion and I am very much disappointed to come here and not discuss the punch press hazard any longer than we did. I would like to make a motion, if it is in order, that we devote one entire meeting to punch press hazards at the next annual convention.

(Seconded.)

MR. BLANK: I also feel that we have not had enough time for punch presses, but I don't know whether the subject warrants a whole meeting's discussion.

MEMBER: In the Burroughs Adding Machine Booth they have a positive non-repeater device on the tripping part of their apparatus. I think we ought to bring such things into the meeting.

MR. SCHELL: We don't have time to do that. Yesterday I had the floor for only about two minutes and didn't get a chance to speak again. I have been around presses for twenty-one years, and I know the work we have done to get away from injuries on the presses. It is an exhaustive study.

CHAIRMAN LYNCH: Will you write me a list of suggested subjects for discussion at the Congress next year?

MR. SCHELL: I will do that.

CHAIRMAN LYNCH: Thank you. Next year I hope we will have two papers a day, and sessions on three days.

ADJOURNED.

## Cement Session

ROUND TABLE

September 29 and 30, 1920

---

H. G. JACOBSEN, Chairman

Manager, Bureau of Accident Prevention and Insurance, Portland Cement Association, Chicago, Ill.

---

### WEDNESDAY MORNING SESSION

**T**HE first session of the Cement Section was called to order at 9:45 a. m., Wednesday, September 29, by H. G. Jacobsen, Chairman.

**THE CHAIRMAN:** From the safety standpoint, the last two years have been the most difficult years we have ever experienced on account of uncertain labor conditions and unsettled conditions in general, conditions which naturally tend to increase accidents. It is therefore a great satisfaction to be able to record that we have just about held our own during these two years. As far as accident frequency and severity are concerned, we are just about where we were at the beginning of the period.

I believe we are going into a good deal better period soon. We can look forward to more stable conditions in every way, and if we now can maintain the organization that we have built up during the past, we have an excellent foundation for doing good work in the future. Let us not disband the organization because times get better but maintain and possibly increase it.

Since the beginning of the year we have experienced an abnormal number of accidents in practically all plants. There must be a reason for it. Let us see if we can find a solution. I believe this condition exists not only in the cement industry but in general in all industries in the country.

Fatal accidents have increased abnormally since the beginning of the year—out of proportion to anything on record even during the war period.

Our statistics of accidents for 1919 show a small increase over 1918. It must not be taken for granted, however, that this holds good for all plants. Many have shown a decrease but we still have plants that have such an abnormal number of accidents that the average is high. Some

plants have cut their accidents and days lost in half but our average has not been reduced. It is the plants responsible for this that we must reach because they are the ones that detract from our good work. If we can apply a little pressure on those fellows, I believe we can get them to see the light.

For instance, the average days lost per one hundred thousand man hours in 1919 was 69.2, and the highest rate for any one plant was 227.5. This is abnormally high.

You all know that two things must be considered in accident prevention work: (1) Personnel activities, and (2) Mechanical Equipment.

In my opinion the personnel activities are of greatest importance. I would rather see a plant do nothing along the mechanical line and put all the force on the personnel work if they had that choice.

We have no papers prepared for today's session and we therefore have an opportunity to talk freely and get down to the finer points.

#### PERSONNEL ACTIVITIES AND THEIR RELATION TO SAFETY WORK

The first subject is personnel activities and their relation to safety work. I should like to hear from Mr. Josse.

J. C. JOSSE (Continental): I have had some experience with both the guarding and the educational work. While we do reduce accidents, without a doubt, by intelligent guarding of the machines, still we only get about twenty-five per cent efficiency without educational instruction. That has been our experience.

I have tried to make a careful study of our plant and I have found that in no case of severe accident was it to an old employee but to an employee who had been with us less than a month. I attribute it to the condition of labor at the present time.

Training or education is absolutely necessary if we are going to get anywhere with the employees that come to us from the other plants. If an employee hasn't had safety training in another plant and comes to you, within a very short time he gets hurt because he is a stranger to everything around the plant—he does things which older employees have been trained not to do.

H. A. REXINGER (Lehigh): We have been doing safety work for many years and we have been trying to instruct all our men in safe practices. The accidents which we have had have been mainly to men who are new in the industry.

I am firmly of the opinion that the foreman is the man we must train first. You have to get him to back you up. If he is not with you, you will have no supervision or help in your departments. If you can get the foremen to realize that they are just as much responsible for the safety of the men in their departments as they are for production, you are going to get somewhere. Our experience has led us to compose our committees entirely of foremen, master mechanics, chief electricians, and men of that sort.

No man is put to work until he has been shown just what he has to

do, how to do it, what is dangerous and what is safe. We get new men in the rush periods and in times of labor shortage and that is the source of trouble. We place a man in a certain department; all goes well for a time until he is temporarily transferred to another department to fill a vacancy. The man probably doesn't have enough instruction in that department and he gets hurt. I know of one or two cases where men were severely hurt because they were transferred from one department to another. I should like to know what other companies have been doing in circulating their men. We don't have any regular schools. We have our safety meetings and our talks right along. We also have a bulletin service continuously and the superintendents and safety inspectors inspect the plants.

Our general committees are divided into three subcommittees: First Aid, Fire, and Sanitation. Each committee has its various duties to perform. The Sanitation Committees looks after the bath houses, toilets, and the homes of the men. The Fire Committee is responsible for the fire protection of the plant. They make careful inspection of the fire apparatus and chemical extinguishers. The First Aid Committee looks after the accidents and when an accident occurs they keep track of the man and see that he returns to work as soon as possible.

The General Committee consisting of the superintendent, master mechanic, chief electrician and foremen investigates all accidents and decides on all recommendations made by men for improvement or guarding machinery, etc.

#### LENGTH OF EMPLOYMENT

**THE CHAIRMAN:** The question is whether the new or old employees are more susceptible to accidents. May we hear from somebody else on that particular point? See if we cannot reach some conclusions on that.

**GEORGE ROSS (Missouri):** We recently had a couple of very serious accidents. One was a young man—I don't think he was over twenty. He lost a hand. Another man was covered up in a cement bin. Those men had only been in our employ about a month.

**THE CHAIRMAN:** The general opinion seems to be that new men are more susceptible to accidents than older ones.

**MILTON G. PECK (Pittsburgh Plate Glass Co.):** I should like to ask Mr. Reninger if when the man is transferred to another department he really is transferred until he is pretty well established in his work?

**MR. RENINGER:** A laborer may be taken to another department to clean up for a day and then sent back to his regular work. There is no reason why he should not be taught the second job as well as the first. Ordinarily he would be if he was there for any length of time.

**MR. JOSSE:** It frequently occurs that you need a man for an hour or two and you take him from one department to another.

**THE CHAIRMAN:** That is probably the most dangerous proposition we have.

**MR. PECK:** I wanted to see if you hitched up your employment and personnel activities in your department in starting them in.

MR. RENINGER: Yes, we do.

C. A. TATUM (Texas Employers Insurance Association): If you don't have a good utility crew you will have accidents.

#### NEW MEN AND OLDEST MEN HAVE MOST ACCIDENTS

In a recent analysis we found the greatest number of accidents occurring to the new men and the oldest men. A large percentage of fatalities come from old men. "Familiarity breeds contempt" and when they are long on a job they get accustomed to things and become set in their ways.

We have many bad accidents and a good run of fatalities from general labor. Once I had a utility crew in which the men were the best men on the job. They were used in general labor work. They were the most valuable bunch of men we had. If you pick up a miscellaneous bunch of men and put them on the dangerous jobs about which they know nothing you can expect accidents. Work of this kind placed in charge of a foreman capable of carrying out instructions with a picked crew who obey orders, would be a great saving to any company. It doesn't matter if it costs twice as much—they will do three times as much work.

Two fatalities which occurred recently were due to the men being placed on an unusual job. I believe we do not pay close enough attention to miscellaneous labor. If we did we would have less accidents.

THE CHAIRMAN: Mr. Tatum is in the same position I am. He has an opportunity to look into a number of accidents and has given you some of the conclusions I have reached.

Our statistics do not show that the new employees are abnormally susceptible to accidents. I will quote some figures that will bear out that statement. Let us first consider how many men there are in our plants who have been employed more than one year. What percentage?

MR. JOSSE: Eight-five per cent in my plant.

MR. ROSS: I would say between 60 and 65 per cent.

MR. RENINGER: I would say sixty per cent.

THE CHAIRMAN: You will see that it is a little over fifty per cent in the average. We will now look at the fatal accidents which occurred last year. We had thirty-nine all told. Twenty-two of them or 56 per cent were with employees who had been working more than one year.

Of permanent disabilities we had sixty-seven. Thirty-six of the men or 54 per cent had been employed more than one year.

Now in days lost. We had a total of 33,638 days lost. Out of which 16,023 or 47 per cent were lost to men employed more than one year. I don't think we can say the new employees to any appreciable extent are more prone to being injured than old employees. It is just this point—do we think so or do we know?

#### ACCIDENT RECORDS SHOULD SHOW WHICH CLASS HAVE MOST ACCIDENTS

Each company should have their accident records in such shape that they will show conclusively whether the new or old employees are more productive of accidents. Then we have something to work on. With ref-

erence to returning to work: A man is old when he is fifty in so far as the doctor is concerned. If he is injured he will be off longer than a young fellow, especially if he has a fracture. If an old man has a fractured limb he will invariably be off one-third or one-half time more than a young man.

MR. JOSSE: I don't know whether that is due to the company. The man gets half pay in most plants as compensation, maybe two-thirds.

THE CHAIRMAN: The question is not when he comes back but when he is cured. He can stay as long as he wants to—he doesn't have to come back at all. If you have a man who has an accident your doctor can in the majority of cases determine when he is cured and then stop compensation.

#### PERSONAL CONTACT

MR. TATUM: A man comes into your community. He is a stranger. You give him a job. All he has is that job and his family. He spends his time during working hours in your place and then goes home and minds his own business. He is a good man and has the makings of a better one. Difficulties and sickness come on and they are in trouble. Who under heaven can he go to excepting the people on whose payroll he is, because he knows nobody else. He is maintaining your property. He owes you something more than the labor he gives you and you owe him something more than the check you pay him.

THE CHAIRMAN: I don't see how you are ever going to keep your organization together and working smoothly unless you come in personal contact with the men. There is nothing like getting into actual contact with the men—they are all human. If we can help out the employees, there is no question but that we are going to get far better response to everything and have safety and efficiency in our plants.

#### VISITING NURSES

H. A. RENINGER: The placing of a visiting nurse at each of our plants is going to help us more than anything else to keep the men on the job and take care of their little troubles and worries. We have a first aid hospital in each plant. She will be there to take care of any dressing necessary and any man coming in in the morning asking her to stop at his house because the wife or baby is sick will be able to do his work without worrying. In a cement plant with but three or four hundred men it may seem like a large expense for the company, but to my mind it would more than pay for itself.

CARL B. AUER (Westinghouse Electric & Mfg. Co.): In our small plants we call on the available surgeons. The nurse comes down in the morning or afternoon. If the business warrants she will be there all day. If the business further warrants a surgeon will go there. We certainly feel that it pays.

Last month we had a strapping fellow apply for work and the surgeon said, "There is nothing the matter with him but a hernia. We can fix him up."

"I should like to get it cured but I have no money," he said.

"Can't you scrape up two dollars a day for board for two weeks—\$28.00 in all?" I asked him.

"I would go if I had money."

"We will give you the money and you pay us back as opportunity offers if we give you a job."

He went to the hospital that night and was operated upon the next day. I have heard from two sources already what he has been saying about the Westinghouse Company. We couldn't match it in all the paid newspaper advertisements in this country. He had never run across an employer who would do a thing like that for a totally unknown man. We couldn't pry that fellow away from us with a crowbar.

GORDON C. HUTT (Universal): We have had a nurse for a year and one-half. We have only a small plant of 350 men. She makes calls and gives first aid in the dispensary. She also takes care of making up all the reports in that particular department. We keep her busy in that way and it has done much good in our plant. If a man is off, the foreman reports whether he is sick or not. That eliminates loafing.

MR. RENINGER: Does she also take care of families?

MR. HUTT: Yes. There was a question when we first employed her whether the employees wouldn't like her service but we have not had any trouble in that respect. Families have asked for her a good many times and we let her stay from a day to a week, sometimes two weeks. If she cannot stay she tries to get someone for them.

M. M. HENNESSY (Corn Products Refining Co.): We had quite an experiment with visiting nurses. We had two of them in addition to three first aid nurses on eight hour shifts. We put one on two years ago and we found that she needed assistance. We also provided an automobile to visit people. She was on the job and followed up calls and wherever we found there was sickness in the family we sent her out. We found



This attractive plant hospital, built of cement, realizes all the essential requirements of first-class hospital construction—sanitation, fire, safety, permanence



that the foreigners were suspicious of the visiting nurse. If we had a man in a rooming house it was hard for the nurse to get in and see him. So last year we gave up the idea of visiting nurses. It was not a success.

Our visiting nurse came to us highly recommended, but was a dismal failure for us and we never went back to the proposition again. You must get the right kind of a woman. We haven't found one yet.

MR. TATUM: The success of the nurse is found in the personality of the woman.

#### FIRST AID

THE CHAIRMAN: What I had in mind about first aid as put down on the program was the equipment and instructions necessary at the plant proper to take care of the injuries as they occur. I wanted some discussion on what is necessary at a plant to take care of your accidents. I recently had occasion to visit a plant in the Middle West. In fact we had a safety meeting in that plant, and a number of representatives from various other plants were present. While the meeting was in progress a man was killed out in the plant. He went into a bin and was overcome with gases. They got him out and he was breathing for about ten minutes. He died because nobody knew anything about resuscitation.

Mr. Josse brought a man back to life two years ago after working on him for one hour and ten minutes. He had received an electric shock. He would have died if some one hadn't known how to bring him back.



When an accident happens at the plant where these men are employed, they know what to do—they have been trained in first aid by the company doctor.

**MR. AGEL:** I might say we do not rely too much on the first aid kits but we have to have them. There is too much of a tendency for the first aid kits to be used when they shouldn't be. Our plant is so big, however, that we cannot ask a man to go to the first aid department for every little cut, so we have gotten up what we think is a proper equipment. We have placed it in locked boxes, the keys being in the foreman's possession. A note on the outside of the box tells where the key can be found. On the inside of the box is a list of the contents which list is varnished so it cannot become soiled. We also have a certain number of blank accident report cards in a little container inside the box and every time the box is used the card is filled out and sent to the first aid department so that we can keep an eye on the party for whom the contents of the box was used, principally looking out for infection.

Every week one of our surgeons makes the rounds checking up the contents of each box. He counts the number of missing cards and checks up with our file in the office. At the same time he makes a physical inspection of our lodging houses and dormitories.

Our surgeon starts in at department "A" and inspects the men and during the year covers every department from "A" to "Z". We have done that for three years and propose keeping it up. The departments are subdivided into sections having classes in first aid and resuscitation. These classes, usually composed of a dozen men, are presided over by a surgeon. We use the prone pressure method in preference to any mechanical device. If you have a mechanical device, it is too remote when it is wanted. We have a sufficient number of men trained so that we don't need to lose a moment.

Notwithstanding the fact that we are so well equipped, we have had two fatal accidents. One man was killed on as low as 110 volts and resuscitation was of no avail. He was a powerful man but had overstrained himself in college in athletics. He got a little shock and the other men began kidding him. He suddenly toppled over, blood coming out of his nose.

The other case was that of a man sitting all night long on a board with a current of 220 volts passing through him. How it happened we do not know. That low voltage wouldn't have killed the man had we gotten to him soon enough.

**MR. ROSS:** The first lesson we teach to our employees is artificial respiration. The electricians, and I should say twenty-five per cent of the other employees, are familiar with the method. We have a regular class when our new committee is appointed and also between times so that they don't forget it.

**R. M. JEFFRIES (Bureau of Safety, Chicago):** We find that it is necessary to continuously practice first aid. We have the Peoples Gas and Edison Company and several industrial properties in the United States under our supervision and we keep after them. When we visit the plants the first thing we do is to demonstrate the prone pressure method.

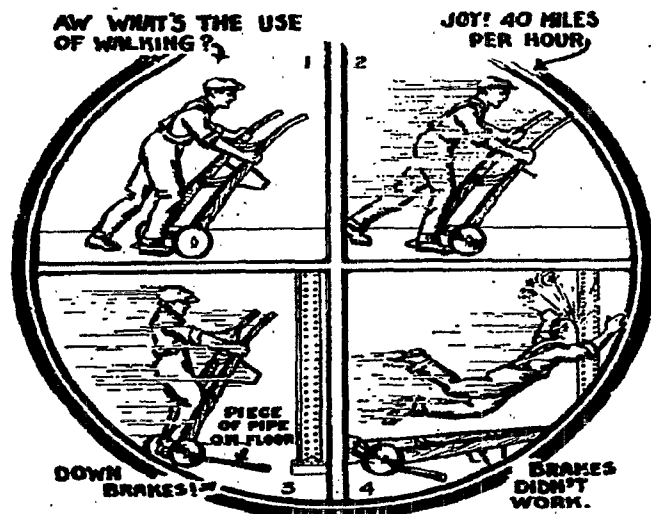
**MR. REXINGER:** The doctors train a certain number of men at each of our plants.

MR. JEFFRIES: We have eliminated all mechanical devices.

MR. TATUM: We had a man killed by one of those mechanical devices and it also put out the eye of the man who was working on him. Some liquid used in the device burned the operator's eye.

MR. RENINGER: I think every one here has a first aid dispensary. Ours are entirely satisfactory and will answer any purpose except for operations. Our object is to get a man fixed up quickly and immediately sent to the hospital.

MR. AUEL: Several years ago I spoke in Detroit before the Detroit-Edison Co.'s employees. They took me through their plant and I noticed every fire extinguisher was labeled with red tags warning men against getting in contact with the contents of the extinguishers. They



It is the human element of the negative, risk taking kind, that accident prevention work aims to eliminate.

told me they had a fellow whose clothes caught on fire from an electrical burn and he was drenched with the stuff. The fire was put out and he commenced to improve at the hospital but in a few days he became worse and died. I have been unable to find anybody who can explain that to me but I got back to our plant and had tags put on our fire extinguishers warning them against it.

MR. RENINGER: We had trouble with that. A fellow emptied the liquid on a man; a rash came out, and he had that rash for two weeks. ✓

#### HUMAN ELEMENT FACTOR

THE CHAIRMAN: I should like to have heard a little more about the question of the human element as a factor in accidents. Of course, we

must consider the factor of carelessness, but I think very often we have accidents charged to carelessness that are just as much due to ignorance of operating methods and actual dangers that the men don't know anything about. We have many accident reports coming in clearly illustrating that a man did something he didn't know anything about. For instance, starting and stopping electrical equipment. Sometimes we have a man attempting to do that, probably on a high powered machine, and sooner or later he gets burned or burns out the switch. We have men dressing belts in the wrong place. Whether that is carelessness or ignorance remains to be proven. Probably the man has never been told how to dress the belt. If he dresses near a pulley, before he knows anything about it, he gets caught.

FRANK MOTTE (Marquette): Don't you think carelessness is more prevalent among old employees than new men?

#### BULLETIN BOARDS

THE CHAIRMAN: Yes. I believe the question of safety depends to a large extent upon the intelligent use of bulletin boards. If you can get the



Safety can best be promoted and accidents eliminated by appealing to the positive side of the human element—consideration for the welfare of others.

right kind of a board you will get good results. The easiest way is to buy bulletins for a few dollars a year and paste them up as they come. However, I don't consider that much of a bulletin board as a medium for accident prevention. If you make your own bulletins, which you all can do, you will get splendid results. There is no human being that is so

gears and pinions are guarded and substantial railings are installed about the engines. Steam pipes are insulated and boxed-in wherever they are exposed to possible contact with the workmen. The pitmen are warned to stay clear of the machine when it revolves and no person is allowed to stand in the path of the drag line cable, as occasionally the operator allows slack, which when taken up causes a sudden jerk, the force of which could injure a man severely. As another safety measure, the workmen are cautioned never to stand with their feet on the timbers upon which the rollers move. One serious accident was due to a pitman resting his foot upon one of the timbers and apparently not watching the movement of the machine. A roller passed over his foot, crushing it so badly that amputation was necessary. The dragline operator, before moving his machine receives word from the pit boss that all is clear and upon this signal he moves. The accidents in dragline stripping were due to hazards which can only be reduced by teaching the men to be careful. The comparatively low percentage of injuries in dragline excavator stripping would indicate that the hazards are less with this method of stripping than with steam shovels.

The drilling at the Hannibal quarry consists of well drilling, a small amount of tripod drilling and hammer drilling for block hole blasting. Nearly all of the accidents due to drilling for the two years ending Jan. 1, 1920, were due to well drilling. These total 16% of the entire number of injuries in the quarry. A greater part of the injuries were inflicted while the injured were aiding in the moving of heavy well drills. The surface of the quarry at Hannibal is very rough and irregular. Often it is necessary to move the drills up and down steep and rough inclines. To do this block and tackle are used with a stationary block secured to a strong cable which in turn is securely fastened to a heavy bar set in a hole drilled by a hammer drill; or the cable may be secured to some other convenient and substantial object. The movable block is usually secured to the back of the drill wagon by a strong chain. All chains, ropes, and other fastenings are carefully examined by the foreman in charge before the drill is moved. When moving over steep grades, a man should be stationed on both sides of the drill with good blocks to "chalk" the wheels in case the fastenings or ropes should give away. It is usually necessary to have two to six men, (the number of men depending on the nature of the quarry surface) at the tongue of the wagon to prevent side lashing when steering its course. These men are in constant danger of the drill breaking loose and should be safe-guarded with every possible means. One serious, though not fatal, accident was caused by the breaking of the hook in the end of the chain which secured the block to the drill. The men who should have been on hand to block the wheels were not there. This accident illustrates the importance of careful inspection of chains and the necessity of teaching safety to foremen and men.

A number of injuries in well drilling are brought about by the careless handling of the heavy tools necessary for the work. The workmen should be cautioned to take care not only of themselves but of the other men on the job. Nothing but the constant preaching of safety can eliminate the danger. The machinery in all well drills should be properly guarded,

especially the bull wheel gear, as it is often necessary for the driller to stand close to this part of certain type machines when throwing the rope on the spudding sheave. All machines are inspected and the guards must be kept in place and in good repair.

In tripod drilling at the Hannibal quarry the hazards are very few, as these drills are used only on the stripping. Care should be taken when handling the heavy weights used on the tripods—they must be secure on the legs when the drill is operated. It is often the custom of the driller to tilt his machine back in order to get it clear of a drill bit which may be stuck in the hole. We have had instances where the man tilted the machine so far back that it fell over upon him. When moving the heavy type drills sufficient help should be given the drillers. In quarries when tripod drills are used at the face for under-cutting, care should be taken to have the face thoroughly free from loose rock and the drill foreman should at all times see that his men have safe working conditions. When blowing out the cuttings and water, the driller or workman performing this task should see that no person is directly in front of the hole as the material is often thrown a considerable distance and with force sufficient to severely injure, if not destroy the sight of the person struck.

The work of the hammer drillers is one of the most hazardous occupations in the Hannibal quarry, although the small percentage of injuries to men in this line of work would not indicate so. The duties of these men not only require them to drill at the face, but they must also attend to cleaning up of the face, making it safe for loading by barring down all loose rock. It is the custom, and in fact a rule of the foreman in charge of the hammer drillers to stand on the quarry floor, or other location where he can see every movement of his men and every movement of the rock near them. He sees that no man gets in a position below another one or in a position where he may be in the path of the rock he dislodges or other rocks above. The foreman sees that his men do not stand on dangerous loose rocks or ledges. No man should be allowed to work on a quarry face without a responsible person directing from a point where all work can be seen.

With reference to the one fatal accident in this line of work, the employee had been in the services of the Company for about two years and was following his regular occupation at the time. This man was instructed to drill the large rocks set aside by the steam shovel, against the back and along the side of the track. He was cautioned in regard to a loose rock which was extending out from a ledge approximately 30 ft. above the quarry floor and 20 ft. beyond the rocks to be drilled. However, he took it upon himself to climb on the ledge and bar the rock down, although he was entirely out of danger where he was instructed to drill. After reaching the top of the ledge, he evidently stepped on some loose material, which dislodged and carried him down. Witnesses said that he landed feet foremost but lost his balance and fell backward. Several rocks weighing from 50 to 100 lbs., which had followed his descent, struck him on the head and body inflicting fatal injuries.

Men are picked out with the greatest possible care for the hazardous occupation of hammer drilling. They are constantly cautioned regarding

the ever existing hazards for we realize what serious accidents result from carelessness in drilling a block hole in a large rock—which may not be too well anchored—or from barring down loose rock.

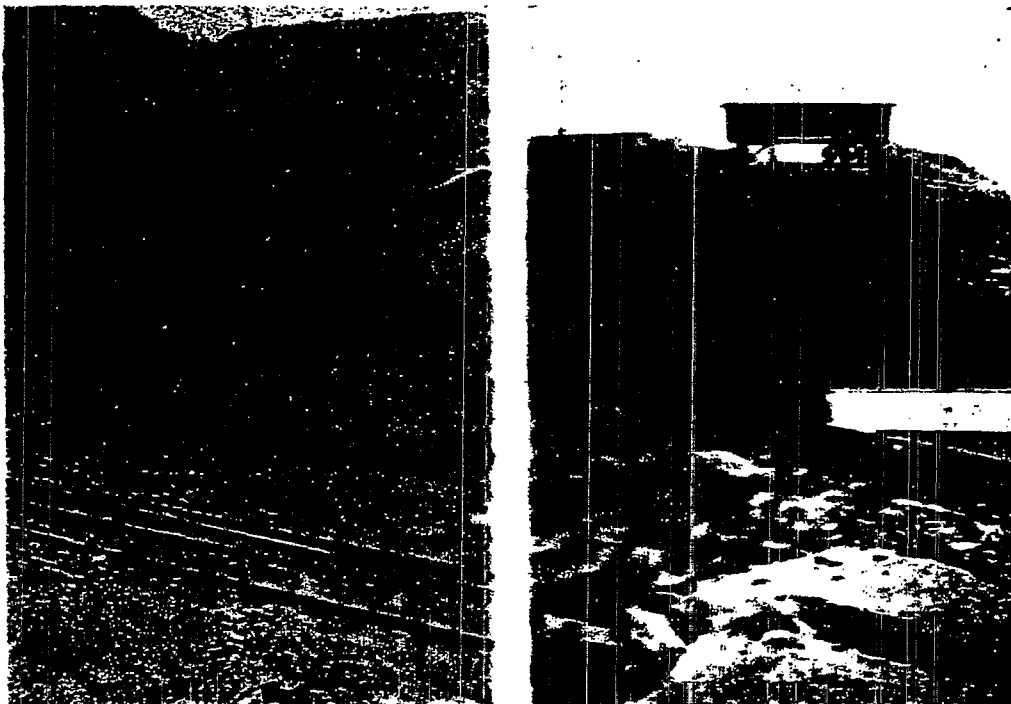
#### BLASTING

I am not going to discuss in detail the care and use of dynamite, which was so completely presented by Dr. Snelling of the Trojan Powder Company and discussed at the 1919 Safety Congress.

The proper storing, handling, thawing of explosives and preparation of blasts, as well as construction of building and barricades is thoroughly covered by manufacturers and government regulations. Periodic inspections of magazine and thawer and a written report covering their condition are made. We fully realize the importance of following every detail and make every effort to instill in our men the thought that explosives are dangerous and must be carefully handled. We strongly recommend shelters for workmen built of railroad ties, walled in with flat rock and located in convenient places to protect the men from flying rock. Only one accident has been caused by flying rock during the past five years in the Hannibal quarries and this was not serious. The injured man was standing a short distance from a shelter which was more than 1000 ft. from the rocks being blasted. A small fragment struck him on the head, painfully, though not seriously, injuring him. I bring this case to your attention to show that fragments of rock may be thrown a great distance and even though men may stand within several hundred feet of a blast, a number of times without injury, they are taking unnecessary risk, when they do not use the shelters provided.

#### LOADING

The greatest percentage of injuries, 37% in all, during the years 1918 and 1919 in our quarries was indirectly and directly due to steam shovel loading. Of this 55% was during loading operation and 45% during the course of repairs. Particular attention has been given to the guarding of gears and moving parts of the machinery on the steam shovels. The guards with which the shovels are regularly equipped by the manufacturer have been supplemented by toe guards near the crank pins on the main engine. The shovels have also been equipped with side running board railings and hand railings on the boom ladder and around the crane-man's platform. The importance of keeping all guards and railings in place and in good condition has been continually instilled in the thoughts of the shovel men. A guard in poor repair or a railing of insufficient strength to serve its purpose, is worse than none. There are some guards on shovels that are declared to be "nuisances" by the shovelmen but a shovel runner who has been trained to the safety idea will put up with the nuisance rather than run the risk of having his machine be the cause of a serious injury. Guards should be made so that the machinery is easily accessible. They should be substantially installed, but in such a manner that they can be quickly and easily removed for repairs. The runways on shovels and other places should be kept clear of ice, snow, tools or other objects. *The steam shovel engineer is held responsible for the safety of his*



View of quarry before and after installation of safety stairway.

timbers set in the concrete. At the foot of the slope a suitable offset is made in which the "rope" man can stand out of danger. On the head frame a safety device, commonly called a "dog," is installed. This device is between the rails about ten feet below the hoisting rope sheave and serves to hold the car from running back down the slope in case it breaks loose when hoisted too high. As another safety measure we are installing lugs on the drawbars of the cars which will catch on lugs bolted to the draft beams in case the draw bar bolt breaks.

An electric bell signal is used which may be operated from either the bottom or top of the incline and an auxiliary telephone system is also installed for emergency uses. By having the signals so that they may be operated from the top of the incline the man at the top can signal to stop the car in case of trouble. There is a suitable walkway with a hand railing at one side of the slope and, needless to say, no one is allowed to ride up and down on the cars.

Only 5 per cent of the total number of injuries for the years 1918 and 1919 occurred at the primary crusher; these were due to repairs. The crusher is a 36 by 60-inch Fairmount Roll type. At the top of the hopper



is a platform which is surrounded by a railing on three sides, the fourth side being left open for dumping. Two gates are installed at the end railings to allow men to descend into the hopper when necessary. A strong safety belt is attached near each gate and no man is allowed to go into the hopper when the roll is in motion without the belt. An air-lift hook, which is operated from the dumping platform is used for breaking occasional chokes. This hook can nearly always be placed under the rocks from the platform over the crusher, but occasionally it is necessary for a man to descend into the hopper to place it. It is a strict rule that no cars shall be left standing over the hopper without the side dump chains being secured when it is necessary for a man to descend into it. There must be no rocks resting upon the doors or in other dangerous positions.

The operation of the primary crusher is not continuous, that is, it is started and stopped periodically for every five cars, or 100 tons of rock brought to it. Before starting the roll a loud whistle signal is given and time allowed for any person working about the crusher to get in the clear. There is also a whistle signal operated by the dumper to indicate to the men handling the car chain fasteners that the car is empty and ready to be fastened. Several cases of mashed fingers were caused by the men believing that the car was empty and attempting to fasten the chains when the dumper again tilted it. No similar accident has occurred since the installation of the whistle signal. In the ACCIDENT PREVENTION BULLETIN of the Portland Cement Association for March and April this year, there is a comprehensive article on the dangers of gyratory crushers. While the remarks specifically refer to gyratory crushers, pretty much the same applies to jaw and roll crushers. If you would avoid the chance of a serious accident, don't let the workmen stand on a stone at the mouth of the crusher in operation. Provide strong safety belts and see that they are used.

Among the miscellaneous hazards of the quarry are those incidental to the use of teams and carts. Men handling teams should be taught the importance of avoiding unnecessary risks. There was one accident to a teamster at the Atlas quarries at Hannibal which resulted in a fatal injury. The injured man had been in the employ of the Company for several years as a teamster. He was hauling a tank of water to the drills and was riding on the top of the wagon tank. The wire broke, letting the barrel fall and strike the horses. The injured man was drawn under the wheels of the wagon which passed over his legs, fracturing both. He died several days later. The teamster should have seen that his load was securely lashed in place.

On the bulletin boards in the Change House, Repair Shanty and Clock House are posted bulletins describing methods of resuscitation for heat and sunstroke. The quarry foreman should be very familiar with these methods, as men often give first aid for sunstroke to a victim of heat prostration and vice versa. The men demand ice water but every effort is made to make them realize the danger of drinking too much. Clean water barrels with locked lids and a faucet near the bottom are provided in convenient places.

Quarry superintendents and foremen have been continually taught through magazines, papers and safety meetings of the hazards of explosives and they are continually being told, and they themselves tell their men, of the necessity of properly handling high explosives. I do not believe that one bit less attention should be paid to this hazard but I do believe that we should pay more attention to eliminating the hazards so far as possible which cause the other 98% of the injuries of the quarry workmen. Most of these injuries can only be eliminated by properly educating the foremen and bosses who will in turn look after their men. Notices and bulletins are good but the influence is not nearly as great as a good strong word from the foreman. We realize that every quarry has its own problems but in general there is a great similarity in the work of the whole industry. If every manager, superintendent or foreman will instruct the employees in the work of safety and demonstrate to them that he is concerned in their interest and welfare he will get full returns, not only in a reduction in the hazards and number of accidents but in a greater efficiency in the operation of the quarries.

THE CHAIRMAN: Gentlemen, I think you will all agree with me that this is a most excellent paper on quarry work. It has touched upon a number of things which we never before have taken up for discussion. In discussing quarry hazards we have generally concerned ourselves too much with explosives. One thing that stands in front of you every time you think of a quarry is the dynamite. The average layman thinks you kill a man every day by explosives.

The majority of our quarry accidents are not due to explosives; they are due to things, such as stones falling from the banks, men working on the steam shovels, neglecting to seek shelter, switching cars, riding on the cars, etc. I have jotted down a few of the main points in Mr. Boucher's paper that we very well could take up for discussion. If you have others which may come to your mind, bring them up. Mr. Boucher's first point was flying rocks. What experience have you had with flying rocks during blasting?

#### QUARRY SHELTER HOUSES.

MR. JOSSE: We had a colored man recently who thought he was in the clear and really was in the clear to all intents and purposes but a flying rock hit a railroad track, bounced over and hit the other track and glanced over and hit the man. It is what you might call a "carom" in billiards. That goes to show that if the men would use the shelter house they would be much safer than hiding behind a pile of ties or something of that kind. He was behind a pile of ties.

MR. RENINGER: We had a case at one of our plants. A pop shot was set off and a stone about as big as a hen's egg hit a colored man on the skull and stunned him. He was rushed to the hospital and was all right in a few days.

THE CHAIRMAN: We have a number of accidents from flying rocks—far too many, it seems to me. The men don't seem to use the shelter houses. You would think they would but they are liable to crawl in

under the shovel or behind a car and in many places they just go a little off to one side. They do that hundreds of times and get away with it until they do it once too often. At one of our plants two years ago we had nine men hit from one blast. None of them happened to be hurt badly but we could just as well have had nine men killed—it was just a question of where the stones hit them.

I think we ought to settle down to this point that we ought to have some real shelter houses built. They are the only things to use. Of course when you have the shelter houses the next thing to do is to get the men to use them. You have got to have many houses for the sake of convenience.

MR. RENINGER: We find a section of an old stack turned into a shelter house is the best thing if a cone roof is fitted to it. You can tilt it over on its side, and roll it around your quarry. It is all old material—old boiler plates.

THE CHAIRMAN: You cannot move your shelter houses. Mr. Boucher?

MR. BOUCHER: No, we build them out of old ties just as we advance along. We build a shelter house capable of holding as high as thirty men.

#### QUARRY LOADING

THE CHAIRMAN: Mr. Boucher said that thirty-seven per cent of the accidents were due to steam shovel loading. We have a number of hazards on the steam shovel. There are many ways in which one may be hurt. Some of the worst accidents that I recall last year were on the steam shovels and they happened to be of similar nature. One of them was fatal. A man went up on the boom and wanted to tighten up the bearing on the gear. Of course the shovel wasn't in operation but the dipper hadn't been run down. He stuck his head through the gear and as he did that the dipper slipped and the gear cut off his head. We had exactly the same thing happen at another plant. A man did the same thing only he happened to get away without being killed.

MR. JOSSE: We had nearly the same thing happen. The shovel runner and the train man went to put a new bolt in the boom. While at work steam escaped from the cylinders of the engine and it just barely moved. One man had his arm on the gear and it pinched him but he jerked himself away. In bringing his arm out of the gear he hit the other man and knocked him off the boom. This man fell about eighteen feet right on the rock below.

R. E. HOFFMAN (Atlas). I should like to ask Mr. Josse whether the steam shovel is equipped with the hand rail on the side of the boom?

MR. JOSSE: Yes, but the man was on the opposite side of the rail.

MR. HOFFMAN: At Hannibal we have a ruling that when working on a boom engine, or any other engine, the steam valve on the main line should be closed and of course the pet cocks should be open. In that way the leakage of steam and the gradual building up cannot occur and the engine will not turn.

A man lost a finger six or seven years ago on one of the old machines

and since that time we have had that ruling in effect. I don't believe we have had any accidents of that nature since.

MR. JOSSE: I think one point Mr. Boucher made is excellent, namely, that the steam shovel runners should be responsible for the safety of the men in the pit. As a rule you will find that the quarry boss will resent the steam shovel runner having any authority in the quarry but the quarry boss is seldom around the shovel.

#### HAULING AND SWITCHING

THE CHAIRMAN: If there is nothing more to be said about steam shovels, we will go to the next subject—hauling, including switching, etc. That is our biggest trouble, greater than explosives. We have had several accidents from the use of poor sprags. The men use anything from a piece of stone to old gas pipes. I wonder if any of you have any particular device designed. Have you a spragging device like an axe with a handle on it?

JOHN FITZPATRICK (Marquette): We have handles two feet long on the sprags now.

THE CHAIRMAN: I think a number of accidents will be prevented by placing a handle on the sprags? Do you have such sprags at your plant, Mr. Hoffman?

MR. HOFFMAN: We have more occasion to sprag cars at our shale mine than at any other place. You should not put blocks under the wheels by hand. For our special cars we developed an iron sprag with an iron handle. It is a little cumbersome but a man steps along the rail and lets it down. A sprag must be safe to handle, that is all there is to it.

THE CHAIRMAN: Another thing that Mr. Boucher mentioned is switching. If you have a string of cars, where does the switchman ride?

MR. BOUCHER: On the last car, directly on the last truck. He rides in a place where there is no danger if he falls.

MR. JOSSE: No, he isn't all right. The only fatality this year at our plant occurred from riding on the last car. The man was hanging on with one hand and was flagging his engineer with the other. They were backing and had about eight feet to go. How anybody could slip under that car I don't know.

THE CHAIRMAN: He was in front in as much as the string of cars was being backed.

MR. JOSSE: Yes, in that way he was in front.

MR. HOFFMAN: Was he bumped off?

MR. JOSSE: No, the car wasn't moving half a mile an hour; it was almost at a standstill and I was within four feet of it.

MR. HOFFMAN: I should like to ask Mr. Josse if this man had had training in switching?

MR. JOSSE: He came down from your quarry, Mr. Hoffman, and I believe had been at your quarry for a year as switchman.

MR. HOFFMAN: He was an errand boy at our quarry. That is the point I want to bring out.

J. C. JOSSE: I am glad to know that, Mr. Hoffman. I was informed that he had been switching for a year or more.

THE CHAIRMAN: Mr. Josse, who hired that man?

MR. JOSSE: The quarry foreman.

THE CHAIRMAN: We should endeavor to get the right man for the right job. I think when we can get to the point where we can get a real employment department installed at every plant, that can look into the experience of the men and decide whether a young man, as in this case, is fit to do switching or similar dangerous work, then we will get some results. It is a mistake to let the foremen hire their own men.

MR. RENINGER: Do you register your men?

MR. JOSSE: No, not up to the present time.

MR. RENINGER: When the compensation law was adopted in Pennsylvania we started to register everybody. We get the man's date of birth and other information. When he answers these questions and signs the card he states that he understands what he is signing and accepts the compensation laws and that he will obey the rules of the company.

GEORGE A. LAWNICZEK (La Salle): With reference to having a man ride on a car: We don't allow a man to ride on the car—he has to ride in it.

MR. HOFFMAN: I have nothing to suggest on that car proposition—it seems to be necessary for the switchman to ride on the last car or maybe on the first car. We simply provide a step on which he cannot exactly stand but he can rest both feet and sit on the arch bulbs of the truck, grasping the hand holds. The original hand holds were removed because the switchmen didn't like the position. They picked out the place where they wanted them and we have had no accidents from falls since. We have had an accident from coupling.

MR. BOUTCHER: We consider switching at our plant to be hazardous labor—the men should be experienced.

MR. HOFFMAN: We place them among the highest paid men we have.

#### COUPLING CARS

THE CHAIRMAN: Suppose we next consider the question of coupling cars. We have had a number of accidents from that source. Do you have any trouble with that, Mr. Josse?

MR. JOSSE: We have never had an accident due to coupling cars. Our cars are all coupled empty and they are not coupled again until they come back from the crusher unloaded.

THE CHAIRMAN: Now we come to the incline. I had occasion to visit a plant several years ago where they had three quarries. They all had inclines and it is quite a walk up to one of them on a mountain side. I saw the men riding on the cars on the incline. I said to the superintendent: "You are going to have trouble here sometime if you don't forbid riding the cars."

Last year I got a report from this plant showing that a car got away, killed one and laid three or four of the men up for half a year. We have injuries on inclines in several other ways. People walk up and

down the incline and get caught between the cars or are hit by cars as they come down. They get hit by the cable when they take out the slack, etc. The hazards on inclines are numerous.

#### OTHER QUARRY HAZARDS

Mr. Boucher mentions the crusher operators wearing safety belts. We don't have many accidents due to men being caught in crushers. They are few and far between but we manage to get one or two each year.

MR. RENINGER: Do you have accidents with gyratory crushers?

THE CHAIRMAN: Yes, we have had men killed by being caught in gyratory crushers.

MR. JOSSE: I don't think a man ought to be allowed to go into a gyratory crusher without a belt on. Of course they do it. They are just like the men in the cement bins—they will do it if you don't watch them. I know of specific cases where they put the belt on when they go into the bin and take it off just the minute they get in there.

CHAIRMAN JACOBSEN: Mr. Boucher also spoke of the charts showing resuscitation from sun stroke and heat prostration. In the summer time it often is extremely hot in the quarries and when heat prostration takes place you should know how to handle such cases. It is important for the men to know what is sun stroke and what is heat prostration because the treatment is somewhat varied and if you give the man the wrong treatment you will do more harm than good.

We shall now pass on to our next subject: Electrical Hazards in Cement Plants.

#### ELECTRICAL HAZARDS IN CEMENT PLANTS

BY A. F. DIEDRICH, CHIEF ELECTRICIAN, MISSOURI PORTLAND CEMENT CO.,  
ST. LOUIS, MO.

Electric hazards are always more or less numerous around any industrial plant. Until recent years the average cement plant overlooked altogether the dangers to the employees from unsafe electrical equipment. Poor switches and motor starting apparatus, bad insulation, fuses, poor safe guards, inexperience and carelessness contribute to the dangers from electrical equipment. Also ignorance in rendering first aid to our injured from an electrical hazard is not taking the proper precaution for the workman's safety.

All switches should be of an enclosed type approved by the underwriters, and the starting apparatus should be especially adapted for the cement plant, of few working parts and accessible to regular inspections. Fuses enclosed in cartridges should be used and located in the line wherever possible to give relief from any excessive strain due to overload or direct "short." Wire insulation should be good and all wires should be strung on insulated supports clear of any buildings or trees and the like. High tension lines, lightning arresters, busses and the like should be guarded from the inquisitive by fencing with a locked doorway. Trans-

formers, motor frames, switch boxes, starter boxes, conduit, metal railings, frames at panels and the like should be grounded. With the best of safety guards, the inexperienced should not "monkey with the juice."

Fewer accidents are likely to happen in the power house or in the sub-station than in any other departments of a cement plant. As a rule this part of the equipment is good; put up in a convenient, workman-like and safe manner, and, the percentage of employees at this department is small. Lack of guard railings or of fences, uninsulated feeders, unguarded busses, ungrounded frames and unworkman-like installations contribute to the dangers in a cement plant as well as anywhere else. Once an inexperienced electrical worker wandered behind a certain sub-station switchboard under the course of construction, with a pair of test lamps and by trying the lamps on one of the switches drew an arc which set fire to his clothing, resulting in his death. This man was inexperienced and his duties did not require him to tamper with the equipment. Had a fence, as described, been up with a locked gate, the place would have been inaccessible to him, not to mention the poor practice of using unenclosed test lamps. Also, had the terminals been insulated, the idea of putting the lamps to them would not have occurred to him. At another time an inexperienced electrical meter tester and adjuster was working behind a switchboard connected up with 440V. instead of, as he thought, 110V. The two lines of different voltages were on the same panel but not labeled and the man was careless in not tracing out his connections. Carelessness resulted in two months in the hospital for him, suffering from severe burns. Another instance of an inexperienced man working behind a switchboard coming in contact with feeders from the main bus, from which it was necessary for another to break loose his hold, points to the necessity of insulating switchboard feeders and bus bars. In the past all such equipment lay exposed and even now some of us do not realize the dangers from such a source until some rattle-brain, careless or inexperienced person pays for some other person's neglect. Lightning contributes to the dangers at the power house switchboard or at the sub-station. Danger from lightning can be reduced to a minimum by the installation of lightning arresters on all feeders, besides establishing a rule for the switchboard operator to cut the power when electrical storms are in the immediate vicinity.

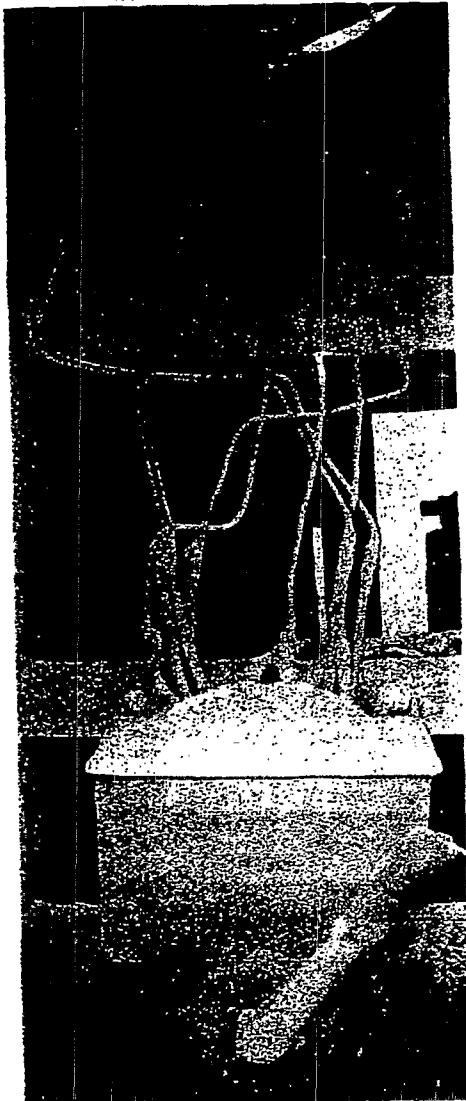
A circuit of heavy capacity should never be opened or closed by the operation of a knife switch. On such a circuit the knife switch should be for the purpose of a safety cut-out only. Even so, some one may be mistaken in the switch he undertakes to operate with the chances of serious personal injuries to himself and others. For this reason the knife switch should be of the approved safety type enclosed in a locked cabinet operated by a handle through the cover and plainly marked to indicate the circuit it is on. The exposed type of knife switch is often seen, fastened to a board about the height of a man's head with no markings to identify it with any special circuit. All the electrical "danger" and "beware" signs will not correct the mistake of operating the wrong switch. The habit is sometimes formed of depending on the starter in

keeping a circuit open. This is a bad practice since the starting equipment will not work perfectly forever. To reduce further a source of

danger the starter should be very simple to operate, to inspect, and to repair; the cut-out switch being open during inspections and repairs.

Copper wire fuses should be replaced by the safety cartridge fuse effectively enclosing the flash from a blown fuse. It has been, and is today a common practice in some cases to provide a coil of wire of certain gauge to a mill man for the purpose of replacing his own fuses blown from overload. Others will say the job looks easy and will undertake the same thing perhaps with disastrous results to himself by the act, not to mention another source of danger in the gauge or wire he attempts the job with. Even with the cartridge fuse, replacements should be made by the electrical department, instead of by anybody who thinks he can slip it over on the electrician by stealing a supply of cartridges for his own use on some particular machine. It is not always safe to make replacements, though an enclosed fuse be used, as in the case on a line of heavy capacity, where the circuit is otherwise closed.

One may see cables strung over wooden beams or lying on roof trusses, pipes, rubbing against buildings and strung through trees. They are sometimes located close to ladders, or stairways, over walkways and in other places easily accidentally touched. The insulating covering may be good when new, but ordinary covering will become ineffective in time. Recently two cement mill repairmen miraculously escaped death when they touched a wet 440 V. cable within their reach to see what would happen.



With poor electrical installations serious accidents are inevitable.

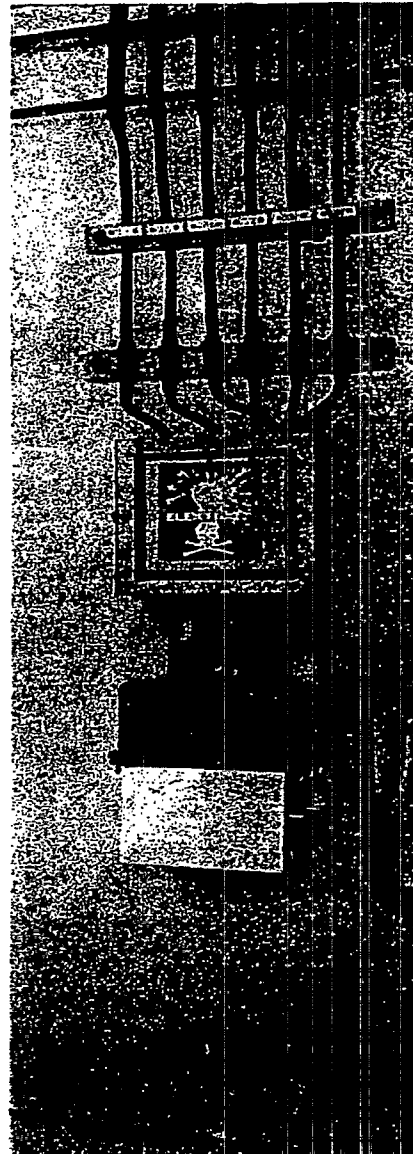


They found out. The careless practice of stringing a line over the ground for temporary use, such as happens in the quarry or for a temporarily located motor, should be avoided. Premature explosions of dynamite have been caused by such practice. To protect feeders within reach, run them through conduit, otherwise some sharp edged piece of metal in the hands of some workman may cut through to the copper.

The drop light or extension cord carrying 110 V. has proven fatal. High voltage is not necessary to kill some men. Insulation worn from extension cords for electric hand tool operation is often seen about the plant. The workman using such a cord runs the chance of a severe shock or a burn and through poor insulation on high tension lines he may receive a jolt from the higher tension. Poor insulation is a fire hazard as well as dangerous to men.

Heavy "grounds" have proven fatal. In one instance the victim had grasped a starter handle preparatory to starting a motor. Grounds will occur regardless of the best precaution against them, and measures to guard against serious results should be taken. Ground connections from the equipment, as a safety measure, may become loosened or otherwise destroyed without effecting any operation. An effective, simple device may be installed in the vicinity of a switchboard for the detection of grounds, and showing a ground puts it up to the electrical department to locate the source. In the case of wire splicing, the wireman should take the precaution of insulating himself from the ground and from every other conductor of electricity such as tanks, columns, iron ladders and the like.

With all the precautions possible in the electrical equipment, there will still be accidents from this source,



Good electrical installations prevent accidents and personal injury.

hence the necessity for teaching a good percentage of the men first aid methods. In the case of unconsciousness from electrical shock the victim may die before the doctor could arrive, but may have a good chance to live if his fellow workers have been taught a method of resuscitation such as the Schaffer—also called the prone pressure—method. The essential features of this method are easy to learn and easy to remember. The work should begin at once with the patient lying on the stomach, his face turned to one side and arms extended beyond his head. The operator kneels, facing the head, preferably straddling the body, places hands so the little fingers curve over the twelfth ribs, hands well away from the spine; in which position the operator compresses the parts by throwing the weight of his body forward, after which he suddenly removes the pressure. Duration of operation should be at the rate of from 12 to 15 times per minute.

**THE CHAIRMAN:** The subject is now open for discussion. I hope some time to see all switches inclosed with proper metal boxes in such manner that they cannot be operated with the door open. We have a number of accidents due to inexperienced men trying to handle electrical switches which they don't know anything about.

Mr. Diedrich also mentioned the question of putting signs on switches and still somebody will throw the switch. We had a man killed two weeks ago that way. The report said there was a sign on the switch and still a man went to work and threw the switch and killed a repairman. That is where the safety lock comes in.

**MR. HOFFMAN:** I think Mr. Diedrich's paper is a good paper. It is a rather difficult subject. There is no question about the fact that when a good line switch, absolutely safe, is developed and placed on the market there will be a big sale for it. There is no question that the companies are working hard on a switch of that kind to reduce the number of accidents.

One of the things to discuss here is the point Mr. Diedrich brings out regarding some enthusiastic man who wants to keep things going and put one over on the electricians and do the thing himself. We have a job requiring a heavy Duplex cable and of course there are kinks in the cable and we have short circuits and things like that and they will repair them in spite of anything you can do because they are working in locations more or less to themselves and they are "hurry up" jobs which may save a day or so. When the electrician finds that the job has been attended to he doesn't like it. It isn't a safe practice. We have men who have been shocked but not seriously. Mr. Diedrich said it doesn't necessarily follow that a certain voltage will kill men. Some man can handle a high voltage and never know anything about it a few minutes afterwards, then again another man will be killed with 250 or 300 volts, and for that reason you have to be very careful with your electrical equipment to be sure no chances are taken and also caution men along that line. I think we need to do more missionary work.

**CHAIRMAN JACOBSEN:** That is what is necessary. It is all a question of training.

If there is no further discussion the sessions of the Cement Section will stand adjourned.

ADJOURNMENT.

## Chemical Section

September 29 and 30, 1920

---

**IRA V. KEPNER, Chairman**

Safety Director, Pennsylvania Salt Manufacturing Company,  
Philadelphia, Pa.

**S. H. KERSHAW, Vice-Chairman**

Hercules Powder Company, Wilmington, Del.

**H. F. DOEPKE, Secretary**

Safety Engineer, National Aniline and Chemical Company, Buffalo, N. Y.

---

### WEDNESDAY MORNING SESSION

**T**HE session was called to order at 9:50 A. M. by the Chairman, Mr. Ira V. Kepner.

#### REPORT OF CHAIRMAN

As soon as possible after the Congress last year at Cleveland, the chairmen of the various committees were appointed and the detail work of the Section was entered into with enthusiasm. Mr. S. H. Kershaw, of the Hercules Powder Company, Wilmington, Delaware, was elected Vice-Chairman of the Section, and Mr. Henry F. Doepke, of the National Aniline and Chemical Company, Buffalo, New York, was elected Secretary. Mr. E. H. Fiesinger, of the Solvay Process Company, was appointed Chairman of the Membership Committee, and Mr. L. A. DeBlois, of the E. I. du Pont de Nemours and Company, Wilmington, Delaware, was appointed Chairman of the Program Committee, and Mr. W. D. Keefer, Safety Engineer, the National Safety Council, appointed as Chairman of the Bulletin Committee.

Your Chairman, in common with the Officers of the Chemical Section, has made an honest effort properly to perform the duties of his office. Three meetings of the Officials of the Chemical Section have been held during the course of the year, and our Section has been in intimate touch with the affairs of the National Safety Council.

Your Chairman has attended a number of the meetings of the Executive Committee of the National Safety Council, of which I am a member by virtue of my Chairmanship of this Section and I want to take this oc-

casation to advise you that never has a body of men worked harder and in more perfect harmony for a common cause than the Executive Committee of the National Safety Council. The men of that Committee do not consider themselves or their individual interests when developing some great idea for Safety—such as launching the "National Safety News", public safety drives, No-accident weeks, or organizing local councils in many of the larger cities. With such men at the head of the National Safety Council, it will prosper, the NATIONAL SAFETY NEWS will prosper, and the Chemical Section will prosper. They must, because they are right.

The Membership Committee, with the aid of the National Safety Council Headquarters, and the officers of the Chemical Section, have carried on an active membership campaign during the past year. Numerous letters have been sent out in connection with membership drives, with a certain amount of success, but far greater results can be obtained if our members would point out to their friends, eligible for membership, the benefits, not only moral but financial, to be derived therefrom. However, our membership this year, on August 1, was 136 companies and individuals—of which 34 were new members this year. Out of the total we now have 76 members and individuals who are chemical manufacturers.

The Bulletin Committee have also been on the job and members of the Chemical Section have received a number of bulletins particularly designed to call attention to various hazards of the Chemical Industry—together with the "Weekly News Letter" from the National Safety Council—and recently the NATIONAL SAFETY NEWS, that wonderful little news magazine on Safety, as well as various general bulletins covering many phases of accident prevention work. However, new material is needed all the time, and if the interested members will send in to the National Safety Council, or to the Chairman of this Section, any photograph covering safe practices or showing causes of accidents, especially in the chemical industry, they will greatly assist in the work of getting out new bulletins.

Your Program Committee started work on the 1920 program, shortly after the last Annual Congress. Questionnaires were sent out to members of our Section, for the purpose of learning the three most common types of accidents caused by conditions peculiar to their individual plants, also asking the members for general suggestions as to how the Chemical Section, or the National Safety Council, could best serve their needs. Most of the questionnaires were filled out and returned, in due time, with the desired information—these were a great help to the Chairman of the Program Committee, as they gave him a line on the topics most interesting to the members of the Section.

During the year a number of member companies and individuals have sent in requests for help in special safety problems. Your officers and the Staff of the National Safety Council, at Chicago, have freely assisted in helping to solve these problems; and at this time I wish to express my thanks and appreciation to the entire Headquarters Staff, and especially to Mr. C. W. Price, General Manager, Mr. S. J. Williams, Secretary, and to Mr. W. D. Keefer, Safety Engineer, for services rendered to the Chemical Section and to its members. To the newcomer in our Section I might

state that the National Safety Council is a clearing house for information, and our Section to which you belong is the clearing house for the information most desired by those in the chemical industry. If you have problems ask for our help, we may have just the information you desire—if not the National Safety Council is in a remarkably fortunate position to help you.

In conclusion I wish to extend my thanks and appreciation to the officers and chairmen of committees, for their support and advice and for the work they have done for the Chemical Section in their respective positions. I bespeak for your new officers not alone good will, but earnest work, and ask each individual member to help, for without your help your officers' best efforts will avail but little. What our Section will accomplish during the coming year depends entirely on the help given by each and every individual. The chemical industry is one of the largest, wealthiest, and most influential industries in this country, and the Chemical Section of the National Safety Council should, therefore, take a correspondingly important place in the Council. Our work and our life is yearly becoming more technical and general information must be supplemented with specific knowledge in order that it may be practically applied. Compensation laws, insurance ratings, and general safety propaganda have made it plain to us that safety pays, both for employer and employees. Much has been done, but much remains to do, so let us look forward with firm determination to make the coming year a banner year in the prevention of accidents in the chemical industry; and let every one of us present today make a resolution to secure at least one new member during the year—enthusiasm will develop which will soon place the Chemical Section in the position of importance in the Council which it should occupy. We can do it if we present a united front in a mighty effort to conquer the many problems which are to come. So let us have a "long pull and a strong pull" and pull all together with that end in view.

The old Roman proverb says: "If each one gives a thread, the net-work will be closed"; and if each will do a little bit to make our section a success, we will have one of the best and largest sections of the National Safety Council.

Let us enter into this meeting with enthusiasm and in a mood not only to give what information and ideas we possess but to receive the ideas and experiences of others with open minds. We all have our problems, and this is the place to discuss them. If we can just get that get-together feeling it will bring out the best thoughts that are in us, and we will leave this Congress with the feeling that we are taking home the data and information for which we came.

Mr. Kershaw is the first speaker on the program, but, inasmuch as Mr. Fiesinger has to give another talk elsewhere this morning we are going to let him talk first. His subject is "The Safety Education of the Foreigner". No doubt this has been one of the greatest problems that we have had in the chemical industry. It seems that the foreigners rather like to work in chemical plants, for they seem to flock to them, and after one gets in he very often sends for some of his relatives in the old

country. In the chemical plants with which I am connected, it is quite common to have several relatives working side by side. If it is because they like it or cannot get work elsewhere, I do not know, but it does seem that after they become more educated they go to the steel mills and other like places. However, some of our foreigners have been with our company for many years and have grown old in our service. They have become good American citizens and have brought their children up in the chemical industry. The chemical manufacturers in the East get a great many foreigners who have just landed in this country, and each plant has its own problems in handling them. I do not know of any one who can talk on this topic any better than Mr. Fiesinger.

### THE SAFETY EDUCATION OF THE FOREIGNER—A PROBLEM FOR THE CHEMICAL INDUSTRY

E. H. FIESINGER, SAFETY ENGINEER, SOLVAY PROCESS COMPANY,  
SYRACUSE, N. Y.

This is not only a problem for the chemical industry, but for all industries.

In the fall of 1918 as our safety work was developing, we decided to take up the teaching of English for the foreign-born employees. We went to the local board of education and asked them to secure instructors for us. The first year the school was a pronounced success, so last year we took the problem up again when there were 750 foreign-born employees in our plant, and 320 of them attended our school.

The school is supported by the company, the company furnishing school-room, books, and all the other things necessary for the schoolroom, and the teachers are furnished by the local board of education. In our school last year we had one teacher who devoted her entire time to our school, re-grading the men, going into the industry and developing her lessons from the material in the shops. In other words, giving the foreigner his immediate needs.

The classes were held on the men's time entirely. We have eight hour shifts and also day work at the plant. The shift working from 12 midnight until 8 in the morning go to school at 8:15. They go to the cafeteria and get their breakfast, and they remain in school until 9:30 in the morning after a night's work, and it is surprising that the attendance at this morning class has been better than any class we have had in the school. The men working the 8 to 4 shift go to school at 4:15, and the men working the other shift at 2:45.

The question has always been discussed at Americanization meetings as to whether this teaching should be compulsory or voluntary, and to my mind it should be voluntary. Let the initiative come from the man himself and he will develop.

The results of the school have been that in our election for safety committee men this past year, of the seventeen foreign-born employees serving on that committee, fourteen attended the school. We give them in-

struction in safety—very short, snappy lessons—and also on their working conditions throughout the plant.

Like safety, you have to sell the idea to the foremen. They are taking a very active interest in the work this year, and in one department having 143 employees the foreman has had 72 men enrolled in the school. If you can sell the foreman he will sell the men.

The results have been very gratifying.

My time is limited, but if there are any questions you would like to ask I shall be glad to answer them.

CHAIRMAN KEPNER: I dare say you all have this problem, the same as the Solvay Process Company has. If any of you have had any experiences along this line, let us hear what you are doing.

#### DISCUSSION

MEMBER: I should like to know what is the dominating nationality of the foreigners at your plant?

MR. FIESINGER: The greater number are Italians and Austrians. We had eleven nationalities in the class. We group them all together.

MEMBER: Does the company pay all the expenses?

MR. FIESINGER: With the exception of the time in attending the school. The teachers are paid by the board of education.

MEMBER: Do you furnish the lunches?

MR. FIESINGER: We furnish the breakfast for the night shift.

MEMBER: What percentage of the men that started finished the session?

MR. FIESINGER: We had about a 60 per cent attendance last year. During the "flu" epidemic and the severe winter, it dropped down considerably, but we maintained an average attendance of 60 per cent through the year.

MEMBER: Do you graduate the men?

MR. FIESINGER: They are graded as beginners, intermediate, and advanced classes. The advanced class is nothing more than a citizenship class. In the school last year we had 75 men that applied for their first papers and 40 became citizens. At graduation they each receive a small certificate, which is recognized by the judge and they are given citizenship papers.

MEMBER: Do your men live near the plant?

MR. FIESINGER: Not in all cases. Some live within a radius of half a mile and it takes others about three-quarters of an hour to get home from the plant.

MEMBER: Is the membership of your classes largely made up of unmarried men or married?

MR. FIESINGER: Unmarried, I should say.

MEMBER: Is the school conducted inside the plant or outside?

MR. FIESINGER: It is right across the street from the plant.

MEMBER: What sort of instruction is given to the beginners the first year?



MR. FIESINGER: Just a very simple instruction. Teaching them to write is the first thing.

MEMBER: Since you put this system into effect, have you noticed any reduction in accidents or improvement in discipline that could be attributed to the instruction?

MR. FIESINGER: Nothing as to accidents. The men being elected on the Safety Committee is an indication that they are taking an interest in the work.

MEMBER: Experience leads you to believe that it is a vitally important factor in accident reduction?

MR. FIESINGER: Yes.

MEMBER: I should like to ask how you take care of the men who are foreign-born and do not speak the English language. Do you put foreigners in charge of them?

MR. FIESINGER: In the common laboring class they have a foreign-born boss.

CHAIRMAN KEPNER: Will those of you who ask questions please give your names so that the minutes may be properly recorded.

#### AMERICANIZATION WORK

MR. M. F. CRASS (Chairman Accident Comm., Grasselli Chemical Co., Cleveland, Ohio): We have been doing Americanization work in our large Cleveland works for the past three years. We undertook the first class before the war started and we were very enthusiastic about it. The thing was sold to our president and he told us to go to any extent in order to make the classes a success.

The work is promoted by the city board of education, as has been outlined, and they furnish the necessary instructors, as many as we require. We equipped a large room in our own plant with blackboards and all other necessary paraphernalia, and the men are very comfortable. So we felt we did everything we could to promote it as far as the physical arrangements were concerned.

We canvassed the plant. In fact, we canvassed it three or four times during the term and the most we were able to get was about thirty men out of a total of about five or six hundred. One reason for this was a large number of the dominant laboring element in our plant is Slavic and at the time of the war very many of the Slavs left the country in order to serve in the armies abroad. That left the older men in our plant, and we found that the more they advanced in the studies the more adverse they became. They did not understand the fundamentals of what we were getting at in our efforts to teach them to understand the sentiment of America as presented through the public press.

We were very successful in carrying through our percentage of attendance. There was very little turn-over on the part of the men who attended the classes, and the progress that was made was surprising and gratifying. The only disappointing feature about the whole thing was our inability to get a large number of men to take advantage of the classes under the conditions which were present.

We went still further than the Solvay Process Company. We paid the men one-half time while attending the classes. That amounted to a great deal of money at the end of the term, but we didn't care anything about that so long as the classes were successful.

We held the examinations and it was surprising to see the information those men gathered, and their ability to write and express themselves in the English language. We ended our classes last year with a lesser number than before, simply because the number of our foreign young men was less than before, and it has been an open question in our minds this year whether we could start the classes successfully because the young men hadn't come back.

We intend to start the classes again when the young men get back in order to help Americanize the foreigners in our section. We heartily believe in it, and the only question is whether we can make it sufficiently successful to warrant our continuing it.

MR. S. H. KERSHAW (Hercules Powder Co., Wilmington, Del.): I should like to ask the last speaker what percentage of the total number of foreigners in the plant, who do not understand the English language, attended that school? Do you have that data?

MR. CRASS: About two-thirds of the employees of our plant were foreign to the degree that they understood English imperfectly. These men attending the classes talked very haltingly and before they were through with the year's session, we graded them as you would in school. Most of the men who were still in our classes at the end of the third year period were men who had started at the beginning of the period.

One thing I would say, to show the degree of interest of those who did attend, we intended to hold at first two classes a week and through the request of the men themselves we held six classes a week. It means a whole lot to a laboring man to spend an hour studying at the end of his day's work, and when they want to do it six times a week, it is an argument against a good many who say that a large proportion of our foreign-born men do not want to learn English. We gave them six classes a week all through the term.

MR. KERSHAW: Have you found it at all useful or necessary to take an interpreter who has a good personality and appeals to the foreign element, and put him down in the communities where they live to work with them, and to explain to them in their own language what citizenship means and the ways of the American people?

MR. CRASS: The Americanization work in Cleveland was carried on very vigorously during the war. We had a public education committee and they had speakers working continuously throughout the year, and after the war, in the foreign settlements, conducting English classes and giving the people free addresses with reference to Americanization and the necessity for them to educate themselves so as to appreciate the American view-point.

That has assisted us, but our foreigners being in a very large city, come from different districts. We have possibly half a dozen different settlements and these men come to the different settlements, and it is almost

impossible to work up a campaign at any one point which would affect the men and re-act upon the attendance in our classes.

MR. WARREN: We have quite a number of Italians working with us especially laborers, and one of our great troubles is that we find them slow to act and slow to think, and in places of danger they will stand and watch without getting out of the way.

I tried an experiment some time ago and it worked to a certain extent, but I don't know whether it was very successful. I took a gang out back into the yard where they wouldn't be looked upon by their fellow-workers, and I passed the ball around; first of all very simply so that each one could catch it. As it went around, I would throw it to this fellow here or that fellow there. They were not prepared to receive that ball nine times out of ten. They couldn't catch it; they couldn't act quickly enough. By and by I tried to get them on to the idea. I tried to show them that I didn't know where that ball was going. I couldn't instill that into them. I had to look at them and give them to understand I would throw that ball and then they would get ready and catch it.

The idea of the thing was to demonstrate to them how necessary it is to be on the alert and then to find out how to get them to be quicker in thought and action. I can't say that it has lessened our troubles but the experiment might be interesting to you.

#### "PLANT MISSIONARIES"

CHAIRMAN KEPNER: A number of the manufacturers and the firm that I am with have what is called "Plant Missionaries," and we find them to be a factor in reducing accidents and turnover. They are foreigners speaking several languages, who understand English, and they are a great help in educating these men, both in English and in the dangers and hazards of the various places where they work. These "missionaries" are above the average foreigner in intelligence and education. They generally hold responsible positions—such as foremen or sub-foremen. The accident records of our plants show that we do not have as many accidents among the foreigners as we do among the American born, and yet we employ approximately 60 per cent foreigners. Of course it is rather a difficult problem to educate some of the foreign types while others acquire knowledge rapidly.

MR. DEBLOIS (Manager, Safety Section, E. I. du Pont de Nemours & Co., Wilmington, Del.): I should like to introduce Mr. McDonough to tell you a little about the Italians.

MR. M. J. McDONOUGH (Du Pont Company): In our works at Philadelphia the Italians are about 22 per cent of our entire working force. We found after making a study of our records that they contributed in the course of a year about 40 per cent of our major or time-losing injuries.

In the works we fortunately had an Italian chemist, a high-type fellow, a man of quite a good deal of personality, and a fellow who was looked up to by the Italians in the works. We interested him in giving a talk to the Italians relative to the hazards of the industry and the manner in which accidents might and could be prevented.

As I recall, Dr. Petrini's talk was delivered on the seventeenth of June. Since that time we have not had a major or time-losing injury to any of the Italian workmen on our payroll. That to my mind is one of the best methods of reaching the foreigner of any class, if you are fortunate enough to have connected with your works the type of fellow who can talk to them in their own language.

CHAIRMAN KEPNER: This is a very interesting topic and we will probably take it up during the latter part of the meeting if we have an opportunity.

The next paper is by Mr. S. H. Kershaw, of the Hercules Powder Company on "The Goggle Problem in Chemical Plants." This company represents a group of large plants, and they have spent much time and money in bringing about safety among employees. The result has been that the powder business is by no means as hazardous as might be expected.

### THE GOGGLE PROBLEM IN CHEMICAL PLANTS

S. H. KERSHAW, SAFETY ENGINEERING DIVISION, HERCULES POWDER COMPANY,  
WILMINGTON, DEL.

To those who are so deeply interested in safety work as to attend this great National Safety Congress there is no need of emphasizing the importance of protecting the eyes against accidental injury or of making any further explanation of the horrors that accompany the loss of one's vision. There is, however, a vital need for a practical discussion with a whole-hearted exchange of ideas as to the best methods to employ to get plant men into the habit of wearing goggles and other eye protectors.

There is no longer an excuse for the cry that suitable eye protectors are not available, for the opticians have accomplished remarkable development work during the past few years with the result that today eye protectors of all kinds imaginable are available on the market and the best are sold at prices within reason.

I shall not attempt to describe the various kinds of eye protectors in existence or to classify them according to their application to different kinds of work, as excellent displays of them may be seen at the National Congress exhibit and I should only be duplicating the work that has been done so thoroughly by the United States Bureau of Standards should I attempt to classify them properly. I shall, however, explain to you some of the fundamental principles that underlie their successful application to industrial occupations, particularly to the chemical industry.

The ideal condition is that in which eye protectors affording one hundred per cent protection are worn by all workers whenever exposed to eye injury possibilities. However, in speaking of the choice of goggles, I would ask you to bear in mind this point: It is far better to choose those that afford only seventy per cent protection but will be worn all of the time, than it is to choose those that afford one hundred per cent protection but will be worn only thirty per cent of the time. A few safety engineers have been so over zealous in their attempts to find protectors

affording one hundred per cent protection that they have encountered great difficulties in getting the men to wear them and have consequently become discouraged with the entire problem.

If one establishes in his mind a reasonably liberal view toward the degree of protection afforded by the eye protectors it is equally important that he recognize the fact that the lens which affords the direct protection is the one part of any eye protector that should meet the most exacting requirements. Other parts may fall short of the best requirements to some extent but in no case should the quality of the lens be neglected. Some would argue that lenses designed to resist flying chips of metal are not necessary in goggles worn by men who are employed as operators in the chemical areas of a plant. To those I would say that there are often times when such men are required to use a hammer and cold chisel in the performance of their duties or find it necessary to be on hand when the repairmen are called in to do work that may involve the most severe eye injury possibilities. In other words, it is not worth while to permit the use of eye protectors fitted with high lenses by operators who are ordinarily only exposed to light flying dust, particles or sprays and splashes of liquids but who sometimes expose themselves to flying chips of concrete, iron, steel, stoneware, or brick. The dangers that accompany a shattered thin lens are too great, and it is not reasonable to expect a worker to carry two kinds of protectors so he can change from one to the other according to the work he may be doing.

As for the other parts of the protectors, it stands to reason that goggles with screen sides are not the logical things to use to protect against sprays and splashes of liquids, and that those offering suitable protection against sprays and splashes are usually unsuitable for use where only heavy flying particles are encountered.

The first most valuable step that can be taken by the safety engineer or, in fact, any one who finds it necessary to enter the field of eye protection and apply that protection to the workers in his plant is to secure from the more reliable companies samples of the various kinds of goggles that in his judgment will afford reasonably good protection for the various occupations. All of these samples should be equipped with the very best lenses available as to resistive strength and optical perfection. They should then be handed out for trial to some of those workers who have shown their willingness to co-operate, great care being taken to see that the goggles are properly fitted to their faces. A trial of this kind, properly made, will quickly indicate which kinds of protectors meet with the approval of the men and those may then be standardized.

The next thing in order of importance is to arrange for one man on the plant to assume the duties of distributing the goggles as they are needed. He may be a member of the employment or stores department, or he may be the plant physician or first-aid man. Whoever is chosen, he should have the spirit of safety at heart and should be willing, and in fact anxious, to learn how to adjust the eye protectors so they will afford the maximum of comfort to those who use them. He will be the pivot about which your eye protection problem will revolve inasmuch as improperly fitted

goggles will do more to react against you than anything else that might be done.

#### DEPARTMENT HEADS AND FOREMEN MUST SET PROPER EXAMPLES

When the proper distribution of the protectors has been arranged for, it is imperative that the department heads and foremen take the lead by setting the proper example for the men under them. A good foreman will always have his goggles with him and will wear them whenever required to be in the presence of those men who are doing work requiring eye protection, even though not exposed to the hazards himself. The foreman who does not take it upon himself to set this example has no moral right to command his men to use them. Carrying this point a little further, it is in order to establish a stringent rule requiring all persons to wear eye protectors when entering a department where eye hazards are abundant and the plant superintendent should take the lead in complying with this rule. In this connection, I can relate an instance in which a large force of inspectors working in the chipping room of a steel foundry refused to wear eye protectors because they deemed it unnecessary inasmuch as the foreman of that department did not wear them. However, as soon as the foreman was won over to the idea, they all fell into line.

Apply the few fundamental principles set forth in the foregoing paragraphs and your eye protection problem that may now seem enormous will reduce itself to a very simple process. Of course any tune may be played with variations and it is far easier to strike a discord than it is to maintain harmony. This probably accounts for many of the disappointments that have discouraged safety engineers in their work, for the more variations they have tried to adopt in applying certain principles, the easier they have found it to strike a discord.

I have not thus far attempted to explain what I would consider the best method of handling certain details that go with the application of eye protectors, but I shall do this by reading to you the substance of an operating standard that has been adopted by the company with which I am connected. This should be of special interest to those of you who are about to develop standards for the guidance of your plant men.

#### OPERATING STANDARD

##### Eye Protection—Goggles

##### *Types of Goggles*

1. No goggles are to be used in the plant except those listed as standard. They are as follows:
  - a. For chipping, grinding, babbitting, and like operations; \_\_\_\_\_ goggle equipped with \_\_\_\_\_ lenses and with wire temples or elastic headbands. This goggle is made in \_\_\_\_\_ bridge sizes and it is therefore necessary to keep on hand a reasonable supply of each size. However, experiments should readily indicate the sizes of the bridges used most commonly.
  - b. For chipping, scaling, riveting, and like operations in places

where the above goggles would become a nuisance because of steaming of the lenses: \_\_\_\_\_ goggles or \_\_\_\_\_ goggles equipped with \_\_\_\_\_ lenses and elastic headbands.

- c. For acid work: \_\_\_\_\_ goggles (all metal parts to be of aluminum) equipped with \_\_\_\_\_ lenses and elastic headbands, and the eye cups padded with rubber where they come into contact with the face.
- d. For Oxy-acetylene welding: \_\_\_\_\_ goggles equipped with \_\_\_\_\_ shade \_\_\_\_\_ lenses.

#### Cases

- 2. With each pair of goggles given out to employees one all-metal case should be furnished to protect the goggles when carried in the pocket or put into locker.

#### Tests for Lenses

- 3. There is always the danger that lenses with ground surfaces may be slightly prismatic which would subject the muscles of the eye to severe strains. An approximate test for this may be made as follows:

Hold the lens about six inches away from the eye and look at a distant object through it. Revolve the lens and if the object as seen through it does not appear to be in motion the lens is all right for use. If the object shows any appreciable motion as seen through the revolving lens, the grinding of the lens has made it a prism and it should be rejected and returned for replacement.

At those plants having plant doctors, more scientific tests than this can be made under their supervision. However, each lens received on the plant should at least be subjected to the test described above.

- 4. Lenses not properly heat-treated break much more easily than those that have been. Therefore, at least one pair of lenses from each dozen purchased should be subjected to the following tests:

A steel ball  $\frac{6}{8}$  inch diameter (weighing 16 grams) to be dropped 21 inches from an electric magnet onto the center of the lens 25 times for \_\_\_\_\_ lenses and from a height of 18 inches for \_\_\_\_\_ lenses. Lens to be mounted in its frame and supported only from its frame when the weight is dropped on it. Frame from which lens is held to be mounted on a block of rubber during test.

#### Special Lenses

- 5. For those who have defective vision and ordinarily wear corrective glasses, goggles with lenses ground to their oculist's prescriptions or to match their present glasses will be furnished. It is recommended that employees furnish the necessary prescriptions as prepared by their oculists. The goggle lenses will then be ground from the proper lens blanks, fitted in the frames, and adjusted to the employees' face by a local optician at the expense of the company.

**Distribution**

6. All goggles to be given out fitted, and adjusted, upon written order from department supervisor, employment supervisor, or safety inspector, by one of the following men to whom that work will be assigned by the plant superintendent:

Plant doctor

First-aid attendant

Safety inspector

7. Written record in the form of a receipt signed by employee, of all goggles given out to be kept on standard form No. ———, this record to be filed with the employee's employment record.
8. If goggles are not returned at termination of employment the cost price of the goggles which employee had (not including cost of replacement of broken or damaged goggles) will be deducted from his wages in accordance with the agreement on the receipt signed by him.

If employee has been in the service of the Company continuously for six months or over he will not be charged for specially ground corrective lenses that may have been fitted to his goggles. If employed less than six months he will be charged the cost price of the specially ground corrective lenses if any have been provided.

**Repairs**

9. A supply of extra lenses for all goggles should be maintained on the plant and the necessary replacements made by the plant men.
10. Whoever gives out, fits, adjusts, and repairs the goggles should be equipped with the following tools:
- 1 Eye glass screw driver
  - 1 Pair snipe nose pliers
  - 1 Pair screen eyelet pliers
11. Goggles damaged through use or by accident beyond the repairs that can be made on the plant should be put to one side until a sufficient number have accumulated to warrant returning them to the manufacturer to be overhauled. This overhauling is less costly than replacing them with new goggles and is just as satisfactory.

**General**

12. All foremen, supervisors, and in fact every one in supervisory positions will be expected to set a good example for the workers by themselves wearing goggles when exposed to splashes of acid, flying particles, and the like.

**RECEIPT FORM****RECEIPT FOR GOGGLES**

Employee's Name..... Check No..... Dept.....  
Date..... 19.....

This is to certify that I have received one pair of goggles (With  
Without  
specially ground lenses from the \_\_\_\_\_ Company and that



I agree to always wear them when doing any work where goggles will protect my eyes from flying chips, sparks, acid, dust, molten metal, and the like.

I hereby authorize the \_\_\_\_\_ Company to deduct the cost price of the goggles (not including the cost of lenses ground to prescription if I remain in the service of the Company for more than six months) from any wages due me in case I should leave the employ of the Company and fail to return these goggles.

\_\_\_\_\_  
Employee's Signature

This receipt must be filed with the Employee's Employment Record

There is one thing that has struck me very forcibly in a number of instances, and that is—the safety engineer will very often make up his mind that he has a bad condition on the plant, where goggles will become steamed or something else happens which makes it very impracticable for a man to wear goggles. He will worry along for perhaps a year or two years, hoping that some genius will come along with a miraculous discovery that will solve his problem in a few minutes. In many cases if he would devote about half an hour of his time to a more careful study of the situation, the chances are he could discover a very good and perhaps not very expensive way of changing operations so that the hazards would not exist.

I think this is true in a lot of the safety work we do, but I just want to mention it in connection with goggles because it applies so specifically.

I would like to cite a little experience I had on a glass plant. In the pot chipping room, where a number of colored fellows were chipping the old glass melting pots a very dangerous eye hazard existed. I walked through the department and there were about two men wearing goggles out of about five.

There was one old colored fellow sitting in a corner who didn't have his goggles on and when I asked him for them he had to go over to another department and get them out of his locker. He brought them over and I asked him why he did not wear them. He said: "Boss, they kind of hurt my eyes, nose and side of my face." I worked with him about fifteen or twenty minutes, carefully fitting the goggles. Finally I fixed them up and he put them on, admitting they felt comfortable.

About a week later I happened to go back into that same place and as I looked around the door there was the same colored fellow chipping away with his goggles on. I walked up to him and asked how his goggles felt. He said: "Boss, they feel fine, in fact, I like 'em so well I'm goin' to wear 'em Sundays."

CHAIRMAN KEPNER: I think we are very much indebted to Mr. Kershaw for this good talk on goggles. Let us hear what has been your experience, and what you do to get the men to wear them and keep them on. The company that I am with furnishes goggles free of charge and we are willing to give them special lenses and do everything we can to make the

goggles comfortable for them. We had one fellow who had his eye taken out. He was wearing his goggles on his hat.

This is one of the most serious problems there is in the chemical industry.

#### DISCUSSION

MR. CRASS: I would like to ask Mr. Kershaw if he has ever experimented with "wide-angle" lens goggles. We have difficulty in getting men to wear goggles, and the complaint has been that the goggles are not comfortable. We also have had some serious accidents.

One serious eye case we had occurred just after the foreman had instructed the man to wear goggles and it turned out that the man had the goggles on his forehead ready to slip them down when the foreman came around again.

Our aim has been to supply goggles that are comfortable, feeling that if we succeeded in this it will cause the men to use them more generally.

We have been giving out a "wide-angle" goggle for protection against acid splashes. This goggle we have is not perfected, but is being perfected and gives an angle of vision of at least 180 degrees. If you demonstrate to the men the difference between an eye cup goggle and a "wide-angle" goggle, they will be more willing to wear them. You put blinders on a horse to prevent him seeing sideways, and you are putting some goggles on men which limit their vision to 90 degrees.

We have been trying to give our employees the protection with the natural angle of vision. We have great hopes for the "wide-angle" goggle. You can get them with leather or velour padding and they are quite comfortable.

MR. KERSHAW: I think I know what you mean by the "wide-angle" lens. It is a curved lens, rectangular in shape.

Our company adopted the aluminum cup goggle in preference to any other. The reason we didn't decide upon the "wide-angle" lens was this: so far as we know, those curved lenses are not ground. If they are ground, they are very difficult to grind perfectly. You take any unground lens and cause a man to work with it before his eyes day after day and you will be very fortunate if you don't cause some eye trouble for him.

Another thing, in our industry, we find that men who work in acid, while they are ordinarily only exposed to sprays and splashes, very often carry on heavy work that involves serious eye injury possibilities from flying chips. We arrived at the conclusion that the thing to do was to use the eye cup type goggle, which was chosen by the men themselves, and fit it with a perfect lens that would stand up under any chipping hazard.

#### GOGGLES SHOULD BE STERILIZED

MR. HOMER HOFFMANN (Monsanto Chemical Works, St. Louis): You failed to make any mention of the sterilization of your return goggles. Eye diseases may be spread very rapidly by giving out unsterilized used goggles—particularly in the Southern states where there is a great deal of trachoma, and if the goggles that are turned in are not properly steril-

ized you can infect the whole community. Just what steps do you take for sterilizing?

MR. KERSHAW: I am very glad you brought up that point. It is very important. The best way to sterilize most goggles is simply to steam them.

In a machine shop you have a difficult problem simply because there is a tendency on the part of the men to want to keep one pair of goggles available, for instance at grinding wheels, and let every Tom, Dick, and Harry who comes in use them. We are putting a stop to that. Every machinist, every repairman, every acid man who comes in from outside and wants to grind a tool on the grinding wheel has his goggles which are fitted for machine work just as well as for acid work.

MR. McDONOUGH: Do I understand, Mr. Kershaw, that you have one standard type of goggle that fits the many different kinds of work in which a man may engage? As, for instance, the fellow engaged in acid, the goggles supplied him will carry him through if he is put on a chipping operation?

Just another question. Is that aluminum cup equipped with a lip that the man raises in order to get ventilation, or is it equipped with a closely woven wire mesh on the side?

MR. KERSHAW: The acid goggle is equipped with the aluminum lip, and it is just raised a little bit. It is a thing you have to watch very closely. The men are apt to open them too wide or take them off. That is a job for the safety man.

MR. F. C. REED (Victor Chemical Co., Chicago): My experience in giving the men goggles, especially the foreigners—we have about 750 men—has indicated that these men will not stand for any deduction from their wages for goggles. So I took it up with our president and he said: "Well, that is all right, to adopt a liberal policy." So I decided to give the men the goggles and when they leave the service, if they take them with them we are money ahead any way, because the eye hazard is so great in the chemical industry. If the men lose their goggles we tell them: "We will get you another pair. But try and take care of them and wear them when necessary." I find we get better results in that way.

MR. KERSHAW: In answer to what you have just said, there is no question in my mind but that it is well worth the expense of having the goggles taken away. However, I would like to ask you one thing. If an employee comes into your plant and he is given an air tool or similar appliance to work with and he fails to return it, what does your company do?

MR. REED: We have a check system and a tool crib, and a man can't get an air tool or any tools at all with the exception of a tool crib check. But the goggles we don't use a check on. I find that you can get a great deal more out of the foreigner by giving him the goggles when he comes in, and he will wear them. I have been in the business twenty-one years. I started safety on the Missouri-Pacific and Iron Mountain Railroad twenty years ago. I find that these men will take care of them and wear them when they need them and it is not necessary to have them sign for them and make a deduction from their wages.

MR. KERSHAW: Do you get a good percentage of your goggles back?

MR. REED: Yes, we do.

CHAIRMAN KEPNER: Will your men wear the goggles?

MR. REED: You have got to keep at them.

CHAIRMAN KEPNER: You have eye accidents then?

MR. REED: We have quite a number.

MR. RIGGIN: I have been a manufacturer of caustic soda for twenty years, and if any of you know what caustic soda is you know we have an eye protection problem.

We have tried all styles and all kinds of goggles, and when we started the caustic soda plant in Detroit, our manager was sold on the proposition himself, so that he said every man must be fitted with goggles before he left the Syracuse plant to go to the Detroit plant. Every man must wear goggles in the plant.

We had to overcome the difficulty of the men objecting to certain kinds of goggles. We tried out twenty different styles and we got down to one simple goggle that is handled by nearly every seller of goggles; and if a man comes in and objects to that style of goggle, we tell him to go out and find a goggle that suits him and if he can find a goggle, all well and good. We get that goggle for him.

I think it safe to say that we have yet to find the man who stuck to the goggle he picked outside of the one we are using. If a man wants one of our goggles he goes to our tool crib and gets it, but he has to turn in his broken goggle or a piece of his broken goggle. That is all he has to do—just turn in a piece of the old goggle. It is one of the things he is equipped with when he starts on the job, and being a foreman on the job, I have often walked to a man and told him—when I have seen him at work with his goggles up on his forehead or in his pocket—I would tap him on the back and tell him, if he was one of these obstinate fellows, "It is a case of your goggles or your job". You wouldn't have to bother that fellow for a month or two months.

In the nine years' experience of the Detroit plant we haven't had one serious eye accident. The men have settled the eye problem themselves because we have often seen one man tell another to put his goggles on and in many instances we have had them come to us and tell us that such a man is not wearing goggles and won't wear them. We have overcome our difficulties to a large extent but we have got a long way to go yet.

MR. KERSHAW: Eight or nine years ago it was my job to get 360 men in one department to wear goggles every day.

#### TYPES OF GOGGLES AND DIFFICULTIES IN GETTING MEN TO WEAR THEM

We had in this department about six or eight railroad inspectors who came in to inspect castings. They were not under our control and it was very difficult to get them to wear goggles. We were trying to weave an influence around the men who were doing the chipping because we wanted them to see that everybody else recognized the hazard and were going to protect themselves. So I tried to persuade these inspectors to wear goggles. However, I met with difficulties.

After a while a salesman came in with a light goggle, equipped with thin lenses. So I gave this fellow an order for about half a dozen, and I took them to the inspectors and said: "Here, I have what appears to be a very light, comfortable goggle. Will you wear them?" They looked them over and decided they would. Within one month after that, two of those inspectors lost eyes through shattered lenses. It is very important that you insist upon the use of substantial lenses.

MR. CRASS (Addressing Mr. Riggis): What kind of a goggle have you adopted?

MR. RIGGIS: We have adopted the Wilson light leather No. E-1.

MR. WHEEDEN: On this goggle proposition I have had some experience also. Four years ago I was working for a firm which was working night and day to turn out high explosives for the Germans. Now, don't misunderstand me. We were making them for the Germans, but we sent them by way of the French and English and eventually by way of Uncle Sam. We were having so many eye burns that my monthly sheet of eye burns began to look like a column in the paper of those listed for taxes. I was getting crazy and had to adopt some means to get that down.

I happened to be in the city and I went to an oculist and I saw some glass eyes. Right then I got my inspiration. I put one of these glass eyes in my pocket and I tackled the eye protection problem and nothing else.

I used to go around and I would see a man working on an acid still without his goggles, and I talked to him and got him interested in his wife and family, and when he was just bubbling over and telling how he was going to send his boy to college, I would bring this glass eye out of my pocket and say: "What do you think the kid is going to think of you if you go home with this stuck in your face instead of an eye? That is what you are going to get if you don't wear goggles."

I said to him, "They are sold in pairs, and when the time comes that you want one I will sell this one cheap. You can't see out of it very well, but you will save some money." In that way I cut down in seven months my eye burns so that I wasn't having half as many in a month as in the entire previous time.

MR. F. T. CHRISTOPHER (Superintendent, Graselli Chemical Co., East Chicago, Ind.): Mr. Kershaw, have you been up against the problem of getting men to wear goggles where they are subject to steaming and fogging of the lenses? If so, have you overcome it?

MR. KERSHAW: We have only attempted to do that in this way: We can provide a goggle that will overcome steaming to some extent, but will not protect against splashes and sprays. That goggle is the "boiler-maker's" goggle. We do not know of any goggle we can provide to protect against sprays and splashes and at the same time not steam. We can provide our employes with a piece of soap that they can rub over the lens and then wipe the lens free of the soap and that will prevent steaming for a short time.

However, when we come to a problem of this kind, we work pretty hard on the other end of it. We try to overcome the condition under which the

men have to work. This can't always be done. I feel pretty safe in saying that it is now very seldom a man has to work under those conditions in our plants.

Mr. P. T. FRILL (Du Pont Chemical Co., Hopewell, Va.): We have had quite a lot of trouble in our plants with goggle steaming, and beginning the first of 1919, we started to tear the plant down. We cut down several hundred steel tanks and several steel buildings. I think it is safe to say that we cut several million rivets.

We use a commercial preparation on the goggles. We dress the goggles before we give them out. We put a little note in the steel case stating that the goggle has been dressed with preparations to prevent frosting, and if it frosts, to return for re-dressing.

We have had some of the goggles returned in three days. We have had some that weren't returned in months. We have not had a complaint of goggle steaming since we used this preparation. We have quite a number of broken goggles, but we haven't lost but one eye in all the cutting of those rivets, and that man was not wearing goggles.

Mr. KERSHAW: I see several Du Pont men here. At one of their plants in Jersey one of the men developed a goggle with an air attachment. I wonder if there isn't some one present who can describe that and tell us whether or not it was successful. Maybe Mr. Barnholt can tell us about that goggle.

Mr. J. H. BARNHOLT (Du Pont Co., Carney's Point, N. J.): We are trying this out but I wouldn't say it is successful yet. It is still in an experimental stage. The goggle is fitted with a special tubing around the lenses and a small amount of compressed air is permitted to go into this tubing and expel both on the outside and the inside of the lens. It is the idea of our boss lead burner, and it is still in the experimental stage. I have my doubts as to whether it will work out satisfactorily.

Mr. KERSHAW: The idea is to blow away the steam or vapor on the lens, is it not?

Mr. BARNHOLT: Yes.

Mr. DEBLOIS: I want to ask Mr. Frill what that preparation was he spoke of.

Mr. FRILL: We have used what is called "Frost Queen". It is made by a goggle concern.

Mr. DEBLOIS: I don't know that it exactly touches upon the goggle problem in the chemical industry, but perhaps one of the Du Pont men could tell of the special anti-flash electrical worker's goggle that we tried out. I haven't heard recently what happened to it. Are you familiar with that, Barnholt?

Mr. BARNHOLT: I am not.

Mr. DEBLOIS: We have had difficulty in making electrical workers wear dark glasses on work especially back of switchboards, because it obscures their vision, and we want the dark lens to protect the eye in case of flash. We had special goggles made up. The two-thirds above was white glass. The lower third was of a special dark glass, like medium welder's glass. The thought was that a man working would normally look well over the dark section of lens. If a flash occurred, two things

would happen. One, he would instinctively throw his head back, and the other, his eye-lids would instinctively start to close. We didn't think he would get them closed entirely. We didn't think he would get his head all the way back, but the natural result would be that his line of vision would be more through the dark glass.

We tried them out. I haven't heard of the final results, but the preliminary trials indicated that the men liked them and were wearing them.

MR. BROWN: We seem to meet on common ground in that we all have the same problem—the difficulty of getting men to wear the goggles.

The fault, I find, isn't altogether with the man on the job. Unquestionably the man on the job in the past has had good reasons for discarding the goggles we have served out to him. We have covered the problem by providing a miscellaneous lot of goggles at the store-room, and they were there for a man to get if he wanted them, or we handed him out goggles that were not by any means fitted to the contour of his face. And beyond that, I take it the most of us in the past have not done very much toward finding a really suitable goggle for the man.

#### MEN'S REASONS FOR NOT WEARING GOGGLES

We sent out a questionnaire to find out just what the causes were for men not wearing goggles, and we sent them to the foremen with special instructions to get right down to business and find out just what the objections were; and we got them. Badly fitted to the face; dust settling around the rims causing irritation; condensation that led them into more danger than they would have met with had they not been attempting to wear a goggle.

Then the problem was up to the company to find a way of overcoming those objections, and we did that. We got into contact with the furnishers of goggles of any repute and we told them just exactly what our problem was. In fact, we sent them a digest of the questionnaire and a digest of the answers we received, and we thought that gave first-hand information of the very best kind.

They all showed themselves ready to meet the needs. We had supplies of goggles coming from all quarters, all labeled as to what needs they they were best fitted for. Then we selected some of the old-time men in the plant that were known to be the obstinate kind and objectors, conscientious objectors they might be called, to the wearing of goggles. The General Safety Committee asked these men, the biggest kickers of them all, to meet them in conference, and we sat around the table and we said to them, in effect: "Boys, your indictment is all right. We have asked you what the trouble was and you have shown us unmistakably, and it is up to us to meet it. Here is the evidence that we have tried to meet it. Here is a goggle for this condition and the goggle for the other. Try them."

We sat there and talked in an informal way, and finally these men pledged themselves to be missionaries in the goggle wearing effort. They said: "Now you have given us a goggle that looks to be adapted to the need in our department. You have had it fitted to the face. It is com-

fortable and we will wear it for a month anyway, and will tell you later what the results have been."

We haven't completed the test yet, but in the main the objections have been overcome.

They have gone further than I have told you. They have promised to carry on that campaign until all the rest of the fellows have been won over.

The fogging problem in our plant has been one of the greatest to meet.

CHAIRMAN KEPNER: We have certainly hit the bull's eye many times during this discussion and I am delighted. It is almost next to impossible to remember all the good points which have been brought out during this discussion, which, by the way, is not only of interest to the members of our own section, but, to the members of all the other sections and industries which have eye hazards. Many of our members have been unable to attend this wonderful Congress and the only way we have of communicating with them, outside of writing them a letter, is through our little friend, the NATIONAL SAFETY NEWS. The National Safety Council founded this wonderful safety magazine for the use of its members, and we should make use of it. If the members will send in to your Chairman, any news items on the various experiments, you have made they will be passed on through the pages of the NATIONAL SAFETY NEWS. This will not only help our members, but, boost our section as well. Among ourselves, I do not think we should be the least bit backward in telling each other the names of the firms, or individuals, selling approved safety equipment, and your experience with such equipment. If you have found a good device tell your Section about it so that we may all benefit by your experience. Our Section is essentially a clearing house of information for its members. A clearing house involves two things,—giving and receiving. If you send in the information we can send it along. If it is something that is confidential, that can't be published in the NATIONAL SAFETY NEWS I will get it to our members in the form of a personal letter.

It is up to each and every one of us here to help make our Section a real bureau of information, and we can do it if you all will just do your part.

About four years ago the Chemical Section tried a face mask. We had some made up and various companies said they would take a dozen to try them. We had to get twenty-five made in order to get some manufacturer interested enough to make them. We did. We first put mica in them and later glass. But they would fogg up. We couldn't use them very well in our Plant, but, we still do use them at times when we have an Acid leak. They are satisfactory for about a five minute wear.

MR. WARREN: In having our men wear goggles, do they effect their eyes at all?

CHAIRMAN KEPNER: Mr. Kershaw will answer that.

MR. KERSHAW: In talking with an oculist some time ago, he told me he had a little trouble with one of his eyes. His eyes became "crossed" occasionally—muscular strain. He knew the game pretty well, so every



evening when he went home he took a prism and he would stand for about twenty minutes and look at a light, through it with the defective eye.

In less than a half hour each evening for a few evenings he did that and he got that muscle trained around to the point where he didn't have to wear glasses.

If you go to work and put goggles that are not optically perfect, on a man's face you can see what is going to happen. Your eye is one of the most sensitive parts of your body, and it takes very little to cause it to get out of working condition.

MR. BROWN: I don't want to abuse the privilege but I would like to add that our chemists did develop a preparation that overcomes fogging of goggle lenses entirely. Just what it is I am not prepared at this time to say, but I should be glad to send the formula to any member who is interested.

CHAIRMAN KEPNER: If you will send it to me I will be glad to pass it on.

Another great problem of the chemical industry, in fact one of the things that causes so many time-lost accidents and a whole lot of worry for the safety engineers and superintendents is fume and gases. Dr. Martin Szamatolski, of the Department of Labor of New Jersey, Trenton, was to deliver an address on this subject this morning. But at the last minute we received a letter from him along with his paper stating it is impossible for him to be here. We have asked Mr. T. R. Weedon, of the Smet Solvay Company, to read this paper.

## GAS AND FUME REMOVAL IN THE CHEMICAL INDUSTRY

DR. MARTIN SZAMATOLSKI, CONSULTING CHEMIST, NEW JERSEY DEPARTMENT OF LABOR, TRENTON, NEW JERSEY

The removal of gas and fumes forms one of the most important and difficult problems in the chemical industry because:

- a. The fumes and gases generated are usually more or less poisonous and dangerous to the health of the workingman,
- b. Because they frequently present the danger of an explosion.
- c. Because they are usually very destructive and corrosive and require, therefore, apparatus of special design or made from special material for their removal.
- d. Because owing to their peculiar properties it is frequently impossible simply to expel them into the atmosphere and it becomes necessary to provide special absorption apparatus for their disposal.

The easiest way to remove gas and fumes is not to create any. This may seem to be somewhat of an "Irish bull"; the fact of the matter is, however, that it is possible to do this in a surprising number of cases. To cite only a few examples:

- (1) When transporting liquids from one vessel to another it is frequently feasible to connect both in such a manner that the air replaced

by the liquid in the one vessel may be returned into the one to be emptied preventing in this manner gases and fumes to vitiate the atmosphere. I remember a case where tank cars of wood alcohol used to be emptied into underground tanks; the fumes spread all over the neighborhood and created so much trouble among the people living near-by that quite an elaborate mechanical installation was under consideration. The simple suggestion of connecting the top of the underground tank and the top of the tank car with a hose and connecting the outlet of the tank car tightly with the underground tanks did away with the nuisance with hardly any expense.

(2) A great many operations which are carried on in open vessels creating gases and fumes, as for instance evaporating concentrating, etc., can much better be carried on in closed vessels and under vacuum doing away with the whole trouble. The reasons usually offered for not doing so are:

- a. The cost of such apparatus is very much higher,
- b. The process becomes too complicated.

The first objection has quite an element of truth in it but the economy of the operation caused by the smaller fuel expense depending on the lowering of the boiling point of the liquids, the better quality of the product, the larger yields, the practical elimination of all fire risks due to the fact that leaks become apparent at once and have no chance to get large and dangerous should counteract this objection completely. The second objection is absolutely incorrect, if only the proper apparatus is selected and is properly installed. To operate a vacuum equipment satisfactorily the highest possible vacuo should be employed and to this end it is necessary that the whole apparatus is absolutely tight and no apparatus should be taken in use before one is sure that this is the case.

All failures are usually caused by not complying with this requirement, or by employing unsuitable vacuum pumps.

The pumps used should be of adequate size to handle the work which they are required to do. For evaporation and similar apparatus Radio jet pumps work very satisfactorily, for stills and similar apparatus reciprocating pumps with so called rotary valves give the best results. Rotary pumps with parts sliding on the casing are not satisfactory for chemical purposes and are the source of endless troubles. Where only a low vacuum up to 20 inches is required the Nash Hytor gives excellent results and will with the slightest amount of care work 24 hours year in and year out.

(3) Many organic substances may be dried or purified or both by simple distillation in vacuo doing away altogether with the open air drying, crystallizing and grinding operations so productive of gases and fumes. Instead of drying substances of low melting point in a dryer and then grinding which is always a source of great difficulties and objections, it is often much more simple to place the moist compound in a still, drive the water off in vacuo, run the liquid compound onto suitable pans or better yet on a water-cooled rotating cylinder. By properly regulating the speed of the latter it then becomes possible to obtain the product

in most any desired shape, flakes, or fine powder, or any other form desired. Substances of even quite high boiling points up to 300 degrees centigrade may frequently be readily purified by simply distilling them in the vacuo. To give a few examples I might mention cumarine, heliotropene, etc.

When it is impossible to avoid the formation of fumes or gases in the working room their removal becomes obligatory. The usual time-honored plan is to suspend a hood over the vessel in which the vapors are created and to connect the hood either with the chimney or a fan or a similar apparatus. When more than one vessel is to be protected a flue or conduit is usually constructed and the various hoods connected therewith.

"Hopeful Harry," the constructor, is then usually very much astonished and chagrined that only the hoods next to the fan will draw. The whole scheme is fundamentally wrong, owing to the fact that such hoods usually draw a lot of air and only a small part of vapors, and as a consequence are not only very uneconomical but also extremely objectionable from the safety standpoint as they draw the vapors usually right in front of the face of the workingman. The proper way to handle vapors is to remove them as concentrated and as free as possible from inert gases like air. To this end it is best whenever feasible to cover the vessels completely. Where stirring is necessary this should be done by mechanical means. In a great many cases artificial ventilation will then be necessary and a flue going straight up through the roof will be all that is required. If it is not possible to cover the vessel tightly it can often be arranged that it is completely covered for at least the greater part of the time. If this is not feasible either, then a hood should be placed so that it will cover as much of the vessel as possible and will draw the fumes away from the face of the working man. Where more than one vessel is to be connected to a duct the size of the latter as well as that of the fan, must be ample and the inlet for the various vessels properly graduated. In some cases it will be found helpful to arrange steam jets in the duct and misfit arrangements can sometimes be improved in this manner. Care of course must be taken that the steam jets are manufactured of such material as will withstand the vapors they come in contact with.

Where it is impossible either to cover or hood the apparatus, general ventilation has to be resorted to as for instance in the case of rooms where there are furnaces or gas producers or similar apparatuses in use. The common rules for ventilation govern here of course and no special apparatuses are necessary. In every case good construction of all ducts, proper connections without too many joints, exact determination of the proper size of all the apparatus in question as well as all fans, etc., are absolutely essential. Do not let yourself be misled or deceived by the rating in catalogues and price lists which usually are obtained under quite special circumstances. Be sure to ascertain the capacity of your fans, etc., under the circumstances under which they are going to be used. As in the case of drying rooms it will be found to be much cheaper in the end to have installations of any size done by an expert instead of by

home talent. While the first cost might seem to be excessive, this will not prove so in the end because a home-made installation will in ninety-nine cases out of a hundred, be found to be unsuitable and will have to be replaced and changed so often that the ultimate cost will be very great while the whole outfit will only be found to be a makeshift in the end and a sore forever. Of course, if I speak of an expert, I mean an expert who understands his business. Such an expert may be readily recognized by the fact that he will guarantee the outfit to do certain specified things. If your installation firm is not willing to do this you can rest assured that they do not understand their business. The material for the ducts must of course conform to the requirements imposed upon them by the nature of the fumes. In many cases asbestos board, especially when painted with rosin oil or with a solution of rosin or cumar gum in rosin oil, works very satisfactorily; so do materials saturated with phenol aldehyde resins, which are sold under a great variety of names as condensite, bakelite, etc.

#### TYPES OF FANS

As to the fans very many types are in use. The ordinary fan is very low in efficiency and should not be employed. Care should be taken that it is well accessible especially at the places to be oiled. A great many fires and even explosions have occurred from fans running hot or getting out of true and the plates striking the casing.

As in the case of ducts the materials from which the fans are made should be suited to the gases to be handled. The manufacturers of fans in this country have not paid enough attention to this matter. Abroad one finds enameled fans, lead lined fans, fans made from aluminum and all kinds of alloys. In this country the art of enameling has not advanced for enough to make me place much trust in an enameled fan. Where no other material will stand up earthenware must be employed and exhausters handling up to 2,000 cubic feet per minute are obtainable.

In view of many accidents, it is essential that the fans be guarded properly by a screen so as to avoid anything getting into contact with the blades.

Before leaving the subject of exhausters, etc., I might mention a little combination apparatus which I have seen frequently abroad but never in this country: a small truck on which an exhauster and electric motor is mounted and which can be wheeled to places which only occasionally need an exhaust fan as for instance tanks or towers which are only cleaned once in months.

After the gases have been removed from the working room they may be either expelled into the open air or if poisonous or obnoxious they may either be led into the smokestack or in some cases may be burned under the boiler. In the latter case an arrangement of fine wire cloth must be provided to prevent explosion.

If the gases are of such a nature that neither of these expedients can be used, precipitation or absorption becomes necessary. For precipitation we have at present one practice device, the Crottell system of Electric Precipitation. It must not be forgotten however that precipitation is

feasible only when the obnoxious products are present in the form of solids or liquids (mist) or by the addition of steam or another gas, can be transformed into a solid or a mist. Carbon monoxide or nitrous fumes for instance, being true gases cannot be precipitated electrically, but if ammonia gas is introduced before entering the precipitator thus forming the gases into solid ammonia nitrates, nitrites, etc., their electric removal becomes possible. Dilute gases and vapors require however quite an outlay for first installation; repairs and depreciation when used with acids are very high and the use of the process is subject to a license fee. In most cases it will be found therefore better to use the absorption process. This consists in letting the gases and vapors pass through an apparatus commonly called a tower. Through the latter and in the opposite direction to the gas flow an absorbent liquid is run, usually water, alkali solutions or oils are also sometimes employed. The towers are filled with material which resists the action of the fumes and at the same time offers to them as big a surface as possible, so that they may have the greatest possible chance of mingling with the absorbent and being dissolved with the latter.

A very frequently employed substance for the filling of towers is ordinary coke, but its condensing power is only limited. A great many other fillings have been suggested which usually are made from earthenware, as for instance plates in the form of sieves, balls of various forms, tubes and nipples, etc. Practically all have the objectionable feature that they either offer too much resistance to the gases, or not enough surface or both and that they necessitate that the tower stands perfectly straight and remains straight or its absorbent action will be very much diminished. Of late there has come into use a filling material which offers a great many advantages, the so-called "Raschig Rings." This material has been in use for a long while in Germany, but was kept a secret, which however leaked out some years ago. The material consists of nipples made from a suitable material either earthenware, iron, brass, or copper cut into nipples one inch long and one inch diameter. It is essential that the dimensions are absolutely correct; otherwise the effectiveness of the device will be interfered with. The nipples are simply thrown into the tower, and owing to the fact that they are just as long as broad, they form in the tower an irregular mass, while if even slightly longer in one direction they will lie in regular layers. Owing to their irregular placing the current of gases passing through the tower is broken up many thousand times, and a great surface presented to the passing fumes, while at the same time owing to the one-inch opening the resistance placed in the way of the gas current is very slight. To illustrate this the following figures may be of interest:

One cubic yard of rings contains on an average about 55,000. Each ring has a surface of 40 square centimeters. A cubic yard presents therefore an available absorption surface of not less than 220 square meters. On the other hand the filling medium takes up only 8 per cent of the space leaving free 92 per cent of the total tower room. If the gas speed is one meter per second and the tower one meter high and one meter

diameter, the resistance is less than 20 millimeter water column. The pressure increases in proportion to the height of the tower. In other words a tower 10 meters high will, under the above conditions present a resistance of 200 millimeter water column. If the gas speeds are reduced, the resistance becomes much smaller; with a gas speed of  $\frac{1}{2}$  meter per second the resistance is only 5 millimeter and with a speed of  $\frac{1}{5}$  meter per second only one millimeter water column. If the tower is to be more than 18 feet high a sieve or other support must be built in to prevent crushing of the lower layers of rings. The effectiveness of such a tower is extremely high, about four times that of the usual tower, while the resistance is only a small fraction.

It is of course not avoidable that at times gas and fume leaks occur, which have to be repaired and a good many apparatuses have been designed for the protection of the worker while making repairs in a gas-filled atmosphere.

The old respirator is of course quite unsuitable for the purpose, in fact I do not know for what purpose it is suited, and almost the same may be said of the old gas masks. Unfortunately, the experiences of our soldiers with the gas masks have made them place quite an unwarranted reliance on these appliances, as they do not realize that there is a very big difference between using a gas mask in open air and using the same in a gas-filled room; gas masks should never be used where there is more than 1 per cent of poisonous gas present. In all such cases an oxygen breathing apparatus is the only suitable one. It is of course quite true that the present types of this apparatus are very heavy, clumsy, and hard to work in, but it is to be hoped that the improved type which is now coming on the market will prove more satisfactory.

Of course you will understand that the short time allotted me allows me only to indicate a few of the many rules to be observed in the removal of fumes and gases; to go into detail would require quite a volume. The subject merits a close study by the safety engineer, superintendent and everybody connected with the chemical factory, as fumes and gases are practically the main cause of the occupational diseases with which the chemical industry has to contend. Unfortunately present legislation makes it impossible to deal effectively with people who are remiss in observing even the most elementary rules and requirements in this direction.

It seems that the only thing which will bring a reform in this matter is the co-operation of all interested in the industry together with the legislation which will make certain occupational diseases compensable just the same as an accident; only then the pressure of the insurance companies on those delinquents who disregard even the simplest safety rules, will bring the improvement which we all desire.

CHAIRMAN KEPNER: Before we close, there are just a few questions I want to ask you. The principal one is—has the National Safety Council given you service?

Members of the chemical industry have written to the National Safety Council from time to time for certain chemical information and their

requests have been forwarded to me. I have written out to the other members of the Section endeavoring to get the information they desired. I have met with success on every hand and I appreciate the support you all have given me in answering these inquiries.

#### HOW CAN THE CHEMICAL SECTION IMPROVE ITSELF?

The question is: how can the Chemical Section improve itself? You all have problems. You have come all the way out to Milwaukee in order to get some information. That is fine. The idea is to get together and talk over our problems. We go away, we are all enthusiastic and full of "pep" when we leave here. But how can this Section be of greater help to you between Congresses?

After the Congress, your Chairman, no doubt, will follow the same line that I followed last year; that is, in sending out questionnaires. That has been a wonderful help to us in many ways. But how can we give you the *greatest* service? I would like to have opinions on that. How can the Chemical Section serve you better?

MR. CRASS: I want to cite a statement that my secretary made to me some time ago. He said: "Why is it we can't get more co-operation from the Safety Council and chemical industries?" The answer is, that it is lack of co-operation on the part of the individual members.

I want to say, so far as we are concerned, that we are going to co-operate as fully as we can, and if we run across anything, as we certainly shall from time to time, we will be glad to turn it into the Council for use. It occurs to me that the NATIONAL SAFETY NEWS can be a source of great profit to the various members.

Take this discussion on goggles, which is a very important problem with all of us. This is only one of many. The different members who have experimented and found a line of goggles that is especially satisfactory or anything of that sort which is of general interest—if they would send it into headquarters and have it put into the NATIONAL SAFETY NEWS, we would watch the NEWS very much more closely than we have in the past to get the information. It would become a very much more valuable medium for getting information.

CHAIRMAN KEPNER: You have certainly hit the "bull's eye," but, we must remember your Chairman wants the information for some persons who do not get the NEWS—so if you will please send in your items, your Chairman will get up news-letters in addition to putting items in the NEWS. You can readily see that if all information is sent in to your Chairman, he will be able to retain copies in his files for future reference, the idea being that if any one wants some Chemical Section information, he can write to the Chairman, who will probably have just the information desired, tucked away in his files, even after it had been published in the NEWS.

I would like to see a weekly-news letter in that part of the NEWS given over to the Chemical Section on items of special interest to the Chemical Section members—particularly with reference to our common hazards, various safety problems, and personal news items.

I would like to hear some more expressions from some of the members, such as we have just heard from our good friend, Mr. Crass, but if you will bear with me just a few minutes I would like to give you a little heart-to-heart talk about our Section and our duty to it.

You know very well that no one man's efforts, or even the efforts of all the officers of our Section can get enough real information to satisfy all. No matter how hard they hustle around to get it something is always overlooked. However, I will say, that everyone who wrote to any of the Chemical Section officers, during the past year, generally received the information he was after, even if it was necessary, sometimes, to comb the chemical industry to get it.

I wish I could instill, in your minds, how very necessary it is for the Chemical Section members to get better acquainted with each other, and with their officers, whom they elect each year. We are all working toward the same end—to prevent accidents, especially in the industry which we represent.

Every member of the Chemical Section of the National Safety Council should know, if they do not know already, that it is an unwritten law that any information which may be helpful in saving a life or a limb, or in the promotion of health, should be passed along to those in need of such help.

Success will come in larger measure to the Chemical Section if we compel it and put our hearts in the effort to accomplish results.

We still have a few minutes before we close this morning session, so let us have a few minutes of rapid-fire discussion on any topic or problem which is on your mind.

MR. BARNHOLT: Mr. Chairman, would it be possible for the Chemical Section to issue a letter assimilating all of the information that they receive once every three months and send it only to the members of the Chemical Section? There are many little things that would interest me, I know.

CHAIRMAN KEPNER: As Chairman of the Chemical Section, at this time, I might say that the National Safety Council is ever willing to go a long way toward giving the members what they want. Their expense just now is very heavy, but I am sure they could be persuaded to send such a letter to each member of the Chemical Section—I think there are 173—once every three months.

MR. KERSHAW: As you no doubt have noticed in receiving service bulletins and one thing and another from our Council, it is a very difficult matter to know where to file them so as to be able to refer to them and secure the information we want when we want it.

Some time ago I suggested to the other officers of our Section that we get together what data we have and what is coming in, and instead of writing long news letters telling you what has come up recently, that we design a bulletin sheet perforated for a three-ring book, with a subject index in the upper right-hand corner, and whenever we get any good data on a specific subject, we index it, write out a few paragraphs, illustrating



it if we have illustrations, and then send it to you in that form so you can put it in a loose leaf book.

Mr. Keefer knows better than I do whether this is practicable or not and I would like to ask him to give his views concerning it. It looks to me like a real way to send out data, for you could eventually build up a permanent text on the subject.

MR. KEEFER: That is a very good suggestion, Mr. Kershaw. I think it could be done. It seems to me the biggest advantage in doing it that way is to have an index and make ready reference easy.

I don't know how many members of the Chemical Section have seen the latest copy of the NATIONAL SAFETY NEWS. If you haven't received a copy, try to get one and refer to Page 11 and there is a short article telling about the rates of insurance in different industries. This was written by one of the members of the Council from records that were sent in from members of the Paper and Pulp Section. I don't know whether the members of this section are interested in finding out what the other fellows are doing or not.

It seems to me this is a very good gauge on where you stand in your plant, and if we can get the records from various sections, we can print some similar article for the Chemical Section; and I think a great deal of good could be done by getting up such an article.

We have developed a standard form for reporting accidents, and if it comes in on this form it can very easily be put in tabulated form so that we could make a real article out of it.

MR. CRASS: I would like some information. Representatives of the Du Pont interests are here and I would like to know what they consider an accident and what they consider not an accident, as far as statistics go.

#### USE NATIONAL STANDARD FOR REPORTING ACCIDENTS

MR. DEBLOIS: We use the national standard. The accidents are divided into tabulatable and non-tabulatable. A tabulatable accident is one which involves loss of time longer than the shift or turn on which the man is injured. Otherwise, it is a non-tabulatable accident. All our statistics are based on that.

Our plants report also what we call minor injuries, which are the "non-tabulatable". But it is simply a case of reporting to us as so many injuries per month. Those are the injuries that are dressed in the plant and involve no loss of time.

Of course, there is one thing to remember in applying this: that it doesn't make all plants exactly comparable because if you have a plant which has a hospital or a doctor, he will fix up and return men to work without loss of time other than the remainder of the day or shift, while if another plant has no doctor and you send an injured man out, he is apt not to come back, or the doctor may baby him along. So you don't have an absolute comparison.

But that is the national standard and the standard to which we all in our records should adhere; and only in that way can we get anything comparable.

**MR. CRASS:** We insist upon our plants making out the accident reports as soon as the accident occurs. We have a clause there, "estimate of time lost", and we find a number of plants have been saying one day or two days and when we checked up the doctor's report, we found out in most cases there was no time lost at all excepting during the course of the day in which it occurred, when possibly the man went home. How do you gauge that?

**MR. DEBLOIS:** The reports that come to us from the plant have on them: "Estimated disability hours", and our preliminary filing in Wilmington is based on that. Really, the record of an accident is not complete until the final personal injury report comes in from the plant. That has the actual time lost on it.

Our statistics of plant records are gotten out on the fifteenth of the following month and by that time, of course, we know whether every accident is a tabulatable accident or not. Those statistics are based on the actual loss of time where the case has been closed. Where the case has not been closed, it includes the estimated total loss of time of that case.

We don't base our accident records on simply the hours lost during the month, but all the hours of loss incurred by accidents happening during that month.

MEMBERS SHOULD SEND MATERIAL FOR SECTIONAL BULLETINS

**CHAIRMAN KEPNER:** Just one word before we close. In reference to bulletins: Some of you wonder why it is there is only one Chemical Section bulletin every once in a while. We have been very fortunate in getting them more regularly recently. But things that are of interest to the Chemical Section came from the members of the Chemical Section. We can't expect to send out a bulletin showing some accident or measure of protection in the chemical industry unless it comes from some member of the Chemical Section or from some chemical plant.

I would just like to know how many of you would be willing to send in a picture of some safe practice in your chemical plant. Has your management any objections to your sending any such photographs? All those please raise their hands that would be willing to send it in. (Many of those present raised their hands.) Will you do it? Has your management any objections? I don't know why they should. There are some companies in the chemical industry that refuse to allow any one to go into their plants or send out any pictures. But when it comes to safety problems, I don't believe any one would object to it, providing pictures are properly censored first.

We are indebted to Mr. Kershaw as well as many other members of the chemical industry for having sent in pictures which were used for bulletins. During the past year we received quite a number of pictures, from various members of the Chemical Section for bulletin purposes. Not being sure they would meet the demands of our section, the headquarters staff, made up these pictures in bulletin form, and submitted them to the officers of your section, and a number of them were censored. No doubt

the censored pictures looked good to those who were kind enough to send them in to the National headquarters, but a number of them did not show safe methods, although the interest was shown. All were sent back to headquarters in due time, and the ones not censored were used. The headquarters' staff also endeavored to take a few pictures for the Chemical Section bulletins, and some of these were likewise censored. However credit is due to the member and to the Chicago Office who contributed.

We want the bulletins of the Chemical Section to compare favorably with the best bulletins issued by our Council, or by any Section and I hope they will be just a little bit better than any of the rest. We can do it if our members will send in the photographs, or if not the photographs, the stories of the conditions and it is possible that we shall be able to stage the picture.

MR. REED: I sent, about two months ago, a bulletin on which I spent quite a good deal of money. We went to the hospital and we had a photographer take a picture of a chemist who had his eye very severely burned. He was in the hospital about two months and he was all bandaged up. He was perfectly willing to have his picture taken, and to have it put up in our plant.

Lots of men look at bulletin boards, and read the bulletins posted, and lots don't. But, our men formed around this enlarged photograph and looked at it. Later we posted above this photograph, the words: "Wear your goggles." That did more good than all other bulletins we have had.

CHAIRMAN KEPNER: I wish that all our members—and more especially those members who make their own plant bulletins—would after they had used them in their own plant, and found them interesting, send them to your section officers, along with the facts regarding each case. These could be made up in the form of chemical section bulletins.

It is now time to adjourn, but, before such a motion is made I want to ask you to "round-up" some of the other boys, at the Congress, who are interested in our Section. We have had about 100 in this room this morning, and I am sorry that we did not get all the names. We have some good speakers for tomorrow, and some good topics, so let us all be present.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

THE second session of the Chemical Section was called to order at 9:55 a. m., Thursday, September 30, by Mr. Ira V. Kepner, Chairman.

CHAIRMAN KEPNER: I note that the Nominating Committee is in the room, and I will ask the Chairman of the Nominating Committee to report.

#### REPORT OF NOMINATING COMMITTEE

MR. DEBLOIS: Your Nominating Committee reports as follows:

For Chairman, Ira V. Kepner, Pennsylvania Salt Manufacturing Company; Vice-Chairman, S. H. Kershaw, Hercules Powder Company; Secre-

tary, M. J. McDonough, DuPont Company. The other officers are appointed and not elected.

CHAIRMAN KEPNER: The Chair will now entertain nominations from the floor. As I hear none, are you ready for the question?

(On motion the candidates nominated were elected.)

MR. DeBLOIS: May I say a word in behalf of the Nominating Committee? The thought of your Committee, is, that for the next year at least, there should be great development work or organization work in this section, if we are really to progress. It is very difficult when officers are scattered broadly over the country, to get together and organize for work, properly. You will notice in this case that all the officers are located in or about the Philadelphia District. The thought is not in the least to keep the Section in any way Eastern, and I think this year even though the executive officers are East that we might well arrange some of our other committees to be purely Western or Middle-Western so that they can get together.

But we must have our elected officers meet frequently and with the least amount of inconvenience if we are to get the organization work in the Section started and real service to the members produced.

This is a word of explanation. I think we all of us realize that we are only the beginning of what may be a very strong and a very useful Section and we should concentrate, not for any one's personal priority, but, for active construction work.

CHAIRMAN KEPNER: The first address of the morning is one of special interest to most of the members of our Section. "Tanks and Pipe Lines as Causes of Accidents," by Mr. Homer A. Hoffmann. Tanks and pipe lines, I dare say, constitute probably one of the greatest sources of accidents to the people who manufacture and handle chemicals.

MR. HOFFMANN: I think that you all are fairly familiar with the causes of accidents in connection with pipe lines and tanks, so that I will not dwell so much on the causes as I will on the prevention which will cover the layout and also the safe practice.

### PIPE LINES AND TANKS AS CAUSES OF ACCIDENTS

HOMER HOFFMANN, SAFETY ENGINEER, MONSANTO CHEMICAL WORKS, ST. LOUIS, MO.

Pipe lines and tanks are an important factor in the distribution and storage of liquids in a chemical factory and it is not infrequent that we hear of an accident due to a break in the line, the overflowing of a tank, of persons becoming unconscious while in a tank, and even explosions as a result of directing a line into a tank other than the one intended. Although this is but one of the hazards of the chemical industry it is one to which considerable attention may be given.

Our first consideration is the liquid to be handled, what are its reactions, its specific gravity and viscosity. In the selection of pipes and tanks it must be known in what way they will be affected by the liquid

handled, what will be the probable life of the pipe or tank, and will they in any way change the structure or give off impurities that will affect the liquid.

The field to select from is large and various so that generally a choice can be made to fit the case. For instance, cast-iron does very well for sulphuric, but not for tannins which are best handled in copper or brass-lined tanks and pipes. A few of the materials may be enumerated, such as stoneware, earthenware, monel, which satisfactorily resist acids and alkalies, aluminum for acetic acid, glass-coated or enameled cast-iron, hard rubber, and wood all of which are used to meet certain conditions. The choice of woods are cypress, redwood, and long-leafed pine.

For high-pressure pipe where the liquid necessitates costly material, cast-iron pipe of sufficient strength and lined with the particular material is used. Connections on all high-pressure lines must be flanged connections, and valves are to be of a reinforced type. It will be found advantageous to use replaceable seats in such valves.

Under location, it may be well to classify tanks for storage and piping for distribution. No attempt will be made to discuss the types engaged in processes.

Tanks used for the storage of flammable liquids should be placed so as to conform to the requirements of the National Fire Protection Association or other such body. As these come under another subject, Fire Explosions, etc., they will not be given here. For nonflammable chemicals the tanks acting as distribution centers may be placed above ground or overhead and underground.

Underground tanks may be set in vertically or horizontally, the latter being preferable for those of large capacity. A well or pit of concrete should act as a receptacle, the space between the pit walls and tank should be wide enough to allow the passage of a man at any point and mounted about 15 inches above the pit bottom. This will allow for an easy inspection, room for any one making repairs, and provide proper ventilation about the tank. If the tanks are in too close quarters the painting of same is often overlooked and the life will not be as long as expected.

The pit will withstand the action of fumes and acid far better if lined with asphalt, tar, or one of the like preparations on the market, the latter as a rule contains a binder of asbestos or other material which prevents its cracking or scaling off. A stationary ladder should be at the pit opening so a person may emerge without delay. When a person is working in the pit a sign to that effect should be hung outside or better still, have a man above the pit.

Gratings are not suitable pit covers as they allow water and dirt to accumulate in the pit, but if used, drainage should be provided for. A sliding cover or sectional lids are generally used for the purpose.

With a tank in a pit of this type a leak can easily be located and in case of a burst or overflow the contents can be recovered and repairs can be made without removing the tank. Tanks so placed should not exceed

10,000 gals. capacity and should be at least two feet below the ground level or floor surface. All gauges should be placed where they can be clearly read, and all control valves, cocks, etc., should be fitted with long stems that can be turned without entering the pit and have on them locks or warning signs if any danger exists or they are likely to be tampered with. Vent pipes should end in a receptacle for that purpose.

Distribution from underground tanks necessitates pumps or compression, the latter being quite satisfactory for a good many liquids. Any difficulties in distribution are outweighed by the fact that there is no drip, splash, or spray to contend with, material would not be lost in case of a burst, valves are above the tank, it is not easily reached by fire, and in plants where space is limited it is out of the way.

#### OVERHEAD TANKS

Overhead tanks present more problems. The location is an important consideration. If placed over passageways which is sometime done, a drip pan of sufficient size, with a drain to a sewer or emergency tank must be provided to carry off any liquid from a leak, overflow, or burst. When placed in or on a building, it must be known that the floor, roof, or building will not be overloaded when the tank is full.

Wood is used to a large extent for overhead tanks and the woods previously mentioned will resist the action of sulphuric and acetic acids of 20 per cent Baumé so many of them, mostly of the open type, are found in chemical works. The failure of wooden tanks is often caused by corrosion of flat hoops, the inner side of which cannot be seen and any defects noted. It is advisable, therefore, to use only round hoops which can be gone over from time to time. Wooden tanks should not be allowed to dry out but if such is the case the hoops may be tightened before being put into use again.

Dry rot is another cause of failures, so periodical inspections should be made. There must be as small a surface as possible in contact with other materials.

Pressure tanks should be tested over pressure before being put into use. Thus a tank car of liquid chlorine would be subjected to a pressure of about 300 lbs. per square inch. Such a tank will receive jolts, so it must be heavily insulated and the dome fittings encased in a hood. Switchings and sidings from which such tanks are being loaded or unloaded should have a warning or lock on the switch.

In the case of all above-ground or overhead tanks, a hose line with a stream sufficient to drown a burst, and an emergency box containing gloves, goggles, safe clothing, etc., should be kept in the vicinity.

A runway or platform should be built over the tops of closed tanks so that valves and cocks can be reached from above or to one side. The chief advantage of the overhead tank is that distribution from the same is by gravity.

## CLEANING AND REPAIRING TANKS

Care in cleaning and repairing tanks is very important, and rules governing such operations should be strictly enforced, the importance may be illustrated by an occurrence at our plant which took place before the safety idea was recognized. The work of the particular tank was a welding job and before consulting the superintendent or chemist to ascertain if the tank had been properly ventilated, the welder injected his torch into the tank causing an explosion which resulted in his death and injury to his helper who had expected something of the sort and was making a getaway.

On another occasion, a foreigner who was employed as a lead burner was found doing a job on a tank that had not been inspected. When asked how he knew it was safe to start, he replied, "He is all right, I try him first with my torch, he no blow up."

It is well to have steady crews to do such work as cleaning and repairing tanks. The accepted method of cleaning tank cars may well be applied to all other large closed tanks. The work of cleaning such tanks should be under the direction of a superintendent and as nearly as possible from the outside. This can be accomplished by removing the cleaning blank and opening all drains after which a  $3\frac{1}{2}$ -inch hose fitted with a curved 2-inch pipe which can direct a stream to any part of the car is used for washing. If the pressure is not strong enough to remove the sediment or scale, a bar fitted with a long flexible handle may be used to good advantage. If there is no bottom outlet, the tank must be filled enough to hold all the sediment in suspension when agitated so that it may be pumped or siphoned out.

In cases where a workman must enter a tank it should be run full of water to exclude all gases, or a jet of fresh air run in for a sufficient length of time. Any workmen entering a tank must be supplied with an approved type of respirator and protective clothing, and if entrance is through a manhole, he must wear a belt with slings under the arms attached to a flexible cable held at the other end by a man on the outside of the tank. A jet of fresh air from a compressor or some reliable source should be run into the tank as long as there is a man inside.

If an open light or flame is used inside of the tank, we use a helmet which has a hose supplying air from outside the tank or one with a compressed air tank fitted to the helmet which supply will last for one-half hour. Proper supervision is absolutely necessary.

## PIPE LINES

The same classification overhead and underground may be applied to pipe lines. Condition of climate enters as a factor so that underground lines are preferable in colder climates when not housed or in heated buildings. For outside use where a number of lines are run parallel they should be set below the frost-line in half-round tile and cover acting as a conduit with a break at intervals to serve as a drain in case of a

leak or break. The tile cover not only prevents seepage but can easily be removed for making new installations or repairs.

Pipes, when set in this manner and given a coat of resisting paint will last for a long while without showing any signs of external corrosion. An exhaust steam line may be run through the conduit which will maintain an even temperature in winter months. For heavy pipe or pipe of large diameter such installation is costly and unnecessary.

With underground lines a burst can do little or no damage, there are no drips to contend with, all valves can be reached from above, the tripping hazard is eliminated, no insulation is required, there is no freezing in the lines, and no danger from falling material when the installation is made.

All valves, cut-offs, cocks, etc., must be clearly marked and open ends tagged to show what is being handled in the line. When compression is used to force the liquid through the lines, all connections should be flanged and the line tested before being put into use.

Overhead lines present quite a few hazards. In routing the lines care must be taken to see that those to contain toluol, benzol, alcohol, etc., are not run above or too near to motors, open flames, boilers, and switches, as a drip may become ignited.

Where it is required that acid, lye, or other such lines cross passageways, they should be jacketed to prevent a drip or spray from falling on any one beneath. The hangers supporting pipe should be strong enough to support the weight of a man in addition to the working load, as invariably you will find some person who will lean a ladder against, or stand on a pipe.

All overhead lines should be marked in some way to indicate their contents. The most desirable method is that of painting the lines of different colors, but where this cannot be carried out, all cocks, valves, and lines should be marked in some way, and at open ends warning signs should be placed, stating what precaution should be taken or protection worn when handling the contents.

Difficulty sometimes arises due to an accumulation of sludge or the tendency of a liquid to crystallize in the pipe. The latter can, in most cases, be prevented by using a small steam coil about the pipe and covering with asbestos. Overlooking such a precaution was the cause of an accident at our plant. A length of 1½-inch steel pipe was carrying hot material which crystallized near the open end. In thawing out the pipe, the man used a blow-torch starting at the open end to allow the material to run out as it thawed, which it partly did. Some of it re-crystallized clogging the pipe and building up pressure where the torch was being applied causing the pipe to blow out along the seam, driving the hot material with such force that it penetrated his clothing, burning his arms and chest.

A periodical inspection should be made of all lines and any faulty valves, leaking connections, or corroded pipe be replaced and all lines no longer in use removed. Discarded lines should be allowed to drain,



or better still, be washed out by forcing water or air through them. Too often temporary lines are allowed to remain after having served their purpose. Work on lines should be done from a scaffold built on a level with the line, by persons wearing the proper safe clothing and goggles. Where a connection is to be broken, it should be covered with a shield or with a reasonable amount of sacking or rags to absorb drips, and a warning sign hung below. In all cases the pipe should be supported so that it can be lowered to the ground and not left to fall.

It is very important to have a steady crew to do this work, ones who know the rules and observe them, because it is through the errors on their part that they or others are injured.

CHAIRMAN KEPNER: We certainly are indebted to Mr. Hoffmann for this paper. Now, let us have some real discussion on the problems of tanks and pipe lines. I know that you have all had more or less trouble with them.

#### DISCUSSION

MR. F. W. LAW (Standard Oil Co., Whiting, Ind.): I have heard quite a bit of discussion on pipe lines. Have any of the members had any experience with loading tank cars? I should like to hear a discussion about a contrivance of some kind that we can get to load cars. We have quite a hazard. We use only a small one by twelve platform to get back and forth to the cars. We have installed a portable rack operated by weights the same as a lift-bridge, and it is very easily operated but that is only for a stationary platform where we can "spot" probably five cars. It is a very cumbersome affair and we would like to hear someone else give us their view on what they use on a larger rack where about thirty-five or forty cars can be easily moved and pushed back and forth.

We have had several fatal accidents from men falling from tank cars or in getting to the platform from the cars. We also have had accidents from men getting on to cars that have no platforms. I would like to hear some one give us a discussion on how to reach cars from the platform and from the ground.

CHAIRMAN KEPNER: Will someone please answer that question?

MR. P. T. FRILL: I never had any experience with oil but we have had with acid, and we usually solve the platform problem by having a swinging platform at each station. It is hinged on a steel rod so we can swing it up and down. I have seen a platform used, hinged to a carrier, something like on doors that travel on a rail and this carrier supported the swinging platform. I think that would solve the problem, if he wants to use one swinging platform on a platform that would serve twenty-five cars.

MR. KERSHAW: May I ask whether you have had any trouble with the railroad companies in using that type of platform? I am thinking of the danger of shifting a car by accident with the platform down.

MR. FRILL: We have not, because the platform immediately when a man gets off of it swings back in place. That is, it is balanced so that a man walking out on a platform will swing it down onto the car, but when

he gets off the platform it will swing back into place. If he wants to continue to use it on the car he hooks it down on the car.

MR. KERSHAW: Is your platform large enough to provide safe operating space for the fellow who wants to use a big wrench on top of the car?

MR. FRILL: It is a platform four feet wide.

MR. KERSHAW: You have a safety shower or something on the main platform that he can get to hurriedly in case he receives a spray of acid.

MR. FRILL: On a platform that would hold ten cars we had ten safety showers.

MR. KERSHAW: Are those safety platforms railed?

MR. FRILL: They could be.

CHAIRMAN KEPNER: Will you tell us what the Hercules Company does with reference to the loading and unloading of tank cars?

MR. KERSHAW: I shall be very glad to. We have been trying for the past year and a half to design a really practicable platform. We have been in touch with the National Safety Council and the large chemical and oil companies throughout the country and to date we haven't been able to get together any valuable data. We want to build a standard platform. It has been our practice to put up a large stationary railed platform with a stairway approaching it and then we use a portable plank walkway to get across to the top of the tank car. In our experience we have had quite a number of accidents. We have not found a real solution of the problem yet. We were working on the idea of using a swinging platform. We had our designing engineers working on it. They drew up, I should say, a half-dozen different designs and none of them have been considered wholly.

Today we don't know just where we stand on the problem. It appears to be a very difficult problem to solve.

In speaking of the swinging platform, you have got several conditions to overcome. All tank cars are not alike. There is a lot of difference. You have some with a square platform around the dome with a railing on it. You have some with a long walkway with a railing on it. You have some without walkways or railings. When it comes to swinging a platform down onto a tank car with the railing on the walkway running both sides of the tank, your platform is going to strike the railing and it won't be of much use to you. If a man climbs up on that tank car and attempts to work around there without having that connection to the stationary platform where you have your safety showers, if he gets a spray of acid he is in a bad way because he cannot get to a shower quickly.

It is a very difficult problem and we have almost come to the conclusion that it cannot be done, that you have simply to use the old portable walkway and trust to luck that the fellow is going to be able to get to a safety shower if he gets a bad burn.

MR. FRILL: I should like to say that we build our stationary platform higher than the top of any car and we make this portable platform or the swinging platform so that it will reach the dome regardless of any rail and the rail is rarely ever higher than the car, and if it is our platform dropping over will reach the top of the car.

MR. KERSHAW: In other words, it assumes an angle on the car that has no railing, and on all cars it clears the railing when there is a railing there.

MR. CRASS: I would like to inquire what this gentleman means by a safety shower?

MR. FRILL: It is an emergency shower. We made a cross with one-inch pipe and had three-sixteenth-inch holes drilled in it. It is controlled with a quick opening valve and one pull of the valve would open it and deluge any one standing underneath.

MR. KERSHAW: I might supplement what the gentleman has said by saying that some companies have gone to the extent of providing a safety shower with a platform under it and when a man steps on the platform he is automatically deluged with water.

#### SHOWERS SOMETIMES DANGEROUS

MR. CRASS: That is the point I want to bring out. There is just as much danger in using a shower as there is in using no shower. With the folks who use acid but are not handling it every day it may appear that the washing off is all right. If you have a low degree, concentrated acid, the shower is all right, sixty degree baumé for instance. If you have anything in the way of olein or sixty-six degree and ninety-seven and ninety-eight and if you get under a shower that is not adequate you are apt to land in the hospital for about six months. This happened about three months ago to an employee who had worked in our plant for about twenty-five years. He was one of our oldest employees in the plant and he was supposed to know how to handle acid. He was loading a tank car, a shifting engine came down the same track and bumped into a car, and the coupling broke and drove the car against the tank car. It broke the swinging arm of the filling line and deluged him with acid down his body. Instead of getting a rag or getting waste or anything to wipe that off and then washing himself off, he immediately jumped under a stream of water and the chemical reaction was such that it scalded him and burned him to a degree that I don't know if he will ever get over it.

I speak of that especially because there was an article recently published in the NATIONAL SAFETY NEWS or in a bulletin relative to safety showers. I immediately wrote the National Safety Council requesting them to call attention to that hazard. If one supposes that washing with water to get the acid off as quickly as possible is the right thing they are badly mistaken unless they join with it the precaution of first wiping off the acid. I would wipe off with "sixty" acid. I would wipe it off and then wash. If I were covered with acid to any degree, I should certainly not wash it in water until I had wiped it off first. Or if the acid was hot I would apply medical lotions that would neutralize the acid rather than wash it off with water and increase the burn.

MR. KERSHAW: I should like to ask the gentleman if he can supply a lotion that will neutralize the acid without getting that reaction?

We find with the safety showers that we are using that we can get such a large volume of water instantly that the reaction does not have time to generate the heat necessary to burn very seriously. Of course,

that is governed largely by the type of shower that is used. You take an ordinary shower head and it is not worth much as a safety shower.

MR. CRASS: You deluge the man with water.

MR. KERSHAW: Yes.

MR. CRASS: What I had in mind was if the acid would penetrate a man's clothing it would be some time before the water would have flushing action.

MR. KERSHAW: There is that danger.

MR. FRILL: A tub is much better than a shower.

CHAIRMAN KEPNER: Do you use lime water in the tub?

#### ARE TUBS BETTER THAN SHOWERS?

MR. FRILL: When a man gets into a tub, the water passes between his clothing and his flesh and washes the acid outward. When the shower is turned on it washes the acid that is on his clothing through the skin. In our last installation we put in a barrel and we never had any trouble with the barrels.

MR. KERSHAW: At one of our plants they had the safety shower and then underneath they had tubs. We have found it next to impossible to keep the men from washing their acid pitchers, etc., in those tubs. Consequently the water that we have in them isn't much protection.

MR. FRILL: In making olein you couldn't wash your pitcher and cup. It would break. We didn't have any trouble on that account. Our men are not allowed to wash sample bottles or anything of that kind in the plant. I don't know how it would work in nitric acid or weak sulphuric. It worked very well there.

MR. SUMER: We have quite a few burns. We have large bottles of saturated solution of bicarbonate of soda about the plant and they have worked out very well. We have very few acid burns on the feet. Most of them are due to pipe lines leaking or breaking or something of that kind. We find that the bicarbonate of soda solution answers the purpose very well.

#### HAZARDS IN UNLOADING TANKS

We do find that the men using water to get the acid off are burned more severely than those who wipe the acid from the surface. Quite a few of our men understand that and they don't try to put water on. One or two have told me they invariably wipe the acid before they wash themselves. Our burns are not large and the half gallon or gallon of bicarbonate of soda solution to wash the hands or face in seems to everybody to serve the purpose very well.

MR. H. F. DOEPKE (National Aniline & Chemical Co., Buffalo, N. Y.): The State Department of New York has issued a bulletin entitled "Hazards in the Chemical Industry". I don't know how many of you have read the bulletin but whoever has read it probably noticed a certain accident that happened in connection with unloading of a tank. The man who did the work, I know, had been unloading about three hundred tank cars before he came to the fatal one. He did not provide himself with the protection of rubber coat, because he was too confident that nothing

would happen. He was a steamfitter whose special duty was to unload cars. He stepped on the platform and unfortunately he removed the wrong valve cap first. Instead of releasing first whatever compressed air might have been generated in the tank car during the time of shipment and arrival he released the other valve and whatever compressed air was in the tank car shot the mixed acid about fifteen feet into air and covered him, causing terrible burns which resulted in disability for over a year.

There is an experience which is very tragic and at the same time it teaches any man who is unloading tank cars to provide himself with a helmet and a coat.

But recently in the same plant where this happened they unloaded another tank car of the same type and they found that the shipper of the tank car had misplaced the valve caps. The valve caps are marked with a certain mark but instead of placing the air release valve cap on the air release valve they placed the air cap in the wrong place. So instead of blaming this man who was charged with carelessness we found there was a very serious hazard created by the shippers of cars that might have been the cause of the accident.

MR. CRASS: Were there any discs in the dome of the tank cars?

MR. DOEPKE: I understand the safety appliances of the cars were not properly working. The acid shot up about fifteen feet in the air and just covered this man thoroughly. So whatever safety appliances were on the tank were not properly taken care of.

What I want to point out is the hazard of not properly placing air caps.

MR. KERSHAW: I should like to mention one thing in connection with this question of unloading tank cars which we are now taking care of in practically all of our plants. We have recognized the great hazard of having a man control the air (the air he uses to blow the acid from the tank car) from a position where he will be exposed to sprays of acid that might develop when pressure is applied. So we are taking the air lines and running them to points either on the stationary platforms or on the ground level some distance away from the cars so that the man absolutely cannot turn the air on from a position in which he can be sprayed with acid if a leak should develop. We feel that it is a very good thing to do.

MR. A. L. THOMAS (Du Pont Co.): If you were talking about large splashes of acid when you talk about wiping it off with waste, wouldn't it be the common practice of the acid man not to stop to wipe off but to get out of his clothes? If he should carry enough waste to make a regular swab to wipe off the acid, he would have to carry a bale of it around with him.

MR. CRASS: We tear a man's clothes right off, peel them off.

MR. THOMAS: That may be all right in theory but I don't know whether you can do it in practice, that is, require a man to carry enough waste around with him.

MEMBER: As a rule he can find enough dry clothing on him to wipe off the acid.

CHAIRMAN KEPNER: What occasion has the Du Pont Company had to use those showers for acid splashes?

MR. FRILL: We had about four hundred sixty in use on the Hopewell plant and I think it is safe to say twenty-five per cent of them were used daily. Then we had eye cups with a little fountain of water coming up continually for eye burns. We have had men going to the shower whose clothes were laying at their feet when they got through. We have had others where the clothes were washed off and there wasn't a burn. We had one man go into a pit of acid up to his neck and he was washed off by shower and was not burned at all except on his hands.

CHAIRMAN KEPNER: One of our members says he does not think these showers are a good thing. I was always under the impression they were fine. In fact, the last couple of years we have had quite a number installed, yet we still use the tubs. We have more or less trouble with the fellows washing their hands and using them for any other purposes. We have to fill them the same as we do fire barrels.

MR. CRASS: I don't like to let this matter go as it stands because it is a source of danger. It is one of our principal hazards, yet we don't call it much of a hazard because it is very seldom we have a man burned from that source handling thousands and thousands of tons, as we do. If we had showers or tubs on our plant I would venture to say any of them wouldn't be used once a month.

MR. FRILL: This acid the man tumbled into was the regular n. g. mixed after it had been used. It was a spent acid.

MR. CRASS: I surmise that. It wouldn't have been attained with olein or sixty-six or sixty. I want to cite this illustration.

We had another case years ago with acid, concentrated sixty-six degree. The man stepped in a bath of acid up to his ankle and the canal was about ten feet away. He immediately jumped into the canal. He started a pickling process that ruined that foot. He didn't kick off his shoes or his socks. You cannot emphasize the importance of that if it is concentrated acid.

MR. KERSHAW: I think that brings up a serious objection to the tub for that reason. If a man gets a bad burn and the acid is inside his clothing and he sticks his foot for instance in a tub there is no circulation of water. The water just seeps in and the reaction starts and heat builds up.

With a shower if you have running water there is bound to be some circulation of water.

MR. CRASS: Here is the point. You take and dilute sulphuric acid and it is very easily soluble in water. It disseminates itself and very quickly reduces the bromine strength. But you take strong "sixty-six" and apply water to it and it is not so easily soluble. It does not disseminate itself throughout the acid. You take sixty-six acid in that water and you would have to agitate it to get a thorough mixture. You wouldn't have that agitation with skin contact.

#### PROBLEM OF MECHANICAL FEATURES OF TANK CARS

MR. HENRY: We have had a great deal of trouble with regard to the mechanical features of tank cars and I think there ought to be closer

supervision, and inspection by the loaders and owners of the cars in regard to the mechanical features such as gaskets and air release valves.

Do I understand that in the American Car Builders' Association specifications there was no safety release valve specified on tank cars prior to 1917 and they are not compelled to put those on any car built prior to that time?

CHAIRMAN KEPNER: I am not very conversant with that. Can any one answer that question?

MEMBER: So far as I know for sulphuric acid cars they carry only the flangible lead disc which is supposed to release when the ordinary safety valve for liquids such as gasoline will not operate. As far as I know the installation of those flangible lead discs does not depend on when the car was built. The rules call for the use of that flangible lead disc regardless of when the car was built if it is in sulphuric acid service.

MR. HENRY: We use a good bit of this acid in pickling sheets and I understand there is not one car in fifteen equipped with an air release valve and in one or two cases where this flangible lead disc was used they say it does not work.

Another complaint we have is the condition of the gaskets around the dome. They are all rotted to pieces and when the air is applied the acid will shoot out around that dome in any number of places. I took photographs of a car several weeks ago in which the workmen had driven about twenty wooden wedges into this gasket in order to retain the air in the car. We had a very bad accident in which there was no air release valve and the common cap was being used and as soon as that was removed the acid spurted in the workman's eye and he lost his eye. There was no air release valve on it at all. There was one on an old chain and evidently it had not been used for several years and a common plug was used.

I think it is up to the manufacturers and the acid owners to be more careful in regard to the placing of an air release valve and mechanical features such as gaskets. I do not think that is a hazard we can control in the plants as receivers.

CHAIRMAN KEPNER: I think it would be a very good thing to appoint a committee to study this tank car problem and make a report some time in the near future or when they get the information. I am going to ask for volunteers who will form themselves into a committee. Who will volunteer? We want about four or five. We want them located in different parts of the country.

#### COMMITTEE FORMED TO STUDY TANK CAR PROBLEM

MR. DOEPKE: I very heartily support the institution of a committee. I believe it is a real branch of the chemical section activities, to appoint committees to investigate just such problems. In connection with this problem I should like to be one of the members because I am right in the vicinity of two acid manufacturing plants and I have a great opportunity to gather information.

CHAIRMAN KEPNER: Mr. Doepke has offered to serve. Mr. Kershaw has offered to serve. Mr. Crass will serve.

MEMBER: I should like to ask if there is anybody here from the Newport Chemical Company, New York State? I should like to see this State represented.

CHAIRMAN KEPNER: Is Mr. Baxter in the room?

MR. BAXTER: We don't have such a lot of trouble or at least we haven't had up to the present time. I haven't been on this work a great length of time. I am here more for the information than anything else.

MR. DOEPKE: I have in mind the General Chemical and the Solvay Process Companies.

MR. KENISTON: I will volunteer to serve representing the State Industrial Commission.

MR. G. H. SCOTT (Virginia-Carolina Chemical Co., Richmond, Va.): I shall be very glad to serve.

CHAIRMAN KEPNER: We now have Mr. Doepke, Mr. Kershaw, Mr. Crass, Mr. Keniston, and Mr. Scott, who are going to serve on this committee.

I would suggest that you gentlemen get together at the close of this meeting or shortly after and I am going to let you elect your own chairman. If we work together we can get some good data on this tank car problem and have it published in the NATIONAL SAFETY NEWS, because it is of interest to all of us.

MR. CRASS: What will be the scope of the investigation? What do you want us specifically to report on?

MR. HENRY: I think I protested to the manufacturers in regard to the air valve and I am sure they wrote back that on cars built before 1917 it wasn't specified. It seems to me an air release valve can be put on every car regardless of when the car was built and I would suggest that the committee take that up as soon as possible and make it compulsory that an air release valve be placed on all of these cars.

CHAIRMAN KEPNER: At last we have come to a concrete problem, which is going to give our newly-formed committee some real work to do. I know if we all work together on our problems we shall be able to solve them—we need the help of the manufacturers as well as the users of acids—when we get both working together we shall get data which will be of real value to us, and which can very easily be made up into a set of "safe-practice" data, which can be universally used at all the various chemical plants. I would also like to have this new Committee investigate the use of tubs and showers and advise this section whether it is a safe-practice to use them. Some of our members say, "use showers"—others say, "stay away from water." We must not be divided in our opinion, and our information must be based upon actual investigations by the members of this new Committee, so when their report is submitted, they will all be of one mind and opinion. I should also like to have this Committee consider safe-loading and unloading platforms, and anything of interest to our Section in reference to tanks, pipe lines, etc., study them all. Does that answer your question, Mr. Crass?

MR. CRASS: I think it does.

MR. McDONOUGH: As regards the use of showers and the use of loading platforms, I feel, with all due respect to the other members present, that our Mr. Frill, from the Hopewell Plant, has really had as much experi-



ence, if not more, than any of us, and I believe Mr. Frill ought to be on this Committee.

CHAIRMAN KEPNER: By all means. Will you serve, Mr. Frill?

MR. FRILL: I will agree to serve.

CHAIRMAN KEPNER: The greater part of this committee work will be through correspondence with your Chairman, whom you will appoint. The members of this Committee are to gather all the information they can, regarding the topics under discussion, from their own plants, and the plants in their vicinity or elsewhere just so we get the information; then mail this information to your Committee Chairman. All the information is to be compiled by your Chairman, and he in turn is to send it on to your Sectional Chairman, who after taking a "Copy" for the Chemical Section files, will send it on to the National Safety Council Headquarters for use in making up Safe Practices pamphlets and for NATIONAL SAFETY NEWS items—anyway just so we can get the information to our members quickly. Is there any other member here that would serve on this Committee representing the consumer? How about you, Mr. Watson?

MR. A. L. WATSON (Hooker Electro-Chemical Co., Niagara Falls, N. Y.): We are hardly classed as consumers of acid. We are more of a manufacturer and I think you have enough members on the Committee who are manufacturers to take care of it without any more.

CHAIRMAN KEPNER: Is there any one in your vicinity from whom you might get this information?

MR. WATSON: I possibly could. We have a lot of acid manufacturers in Niagara Falls and I should be very glad to get any information that I possibly could.

CHAIRMAN KEPNER: We now have on this Committee, Mr. Doepke, Mr. Kershaw, Mr. Crass, Mr. Keniston, Mr. Scott, Mr. Frill, Mr. Krone, and Mr. Watson. Mr. Krone is with the Proctor and Gamble Company of Cincinnati. With such enthusiastic workers we are sure to get some real data. It is expected that all the members of the section will send in to the Committee Chairman any information they may be able to get, even if they are not named on the Committee.

MR. DOEPKE: I would suggest in addition to having a copy in the NEWS that if the committee should find any discrepancies on the part of the car manufacturers in connection with safety devices, the Chemical Section, as a body, should bring pressure to bear on the manufacturers and shippers so that the cars will be in proper condition before they are shipped, and so that the hazard does not fall on the consumer of the contents.

#### PORTABLE EXTENSION LAMPS

MR. KERSHAW: There is still another question I would like to bring up. In our plants we are very anxious to prohibit absolutely the use of portable extension lamps. We have two things in mind—first of all, we don't want to have any explosions in our powder mills, and we don't want to have any explosions in tanks caused by portable extension lamps. The Germans before the war developed a storage battery lamp that looked excellent to me as a substitute for portable extension lamps. The battery

is in an aluminum box on each side of which is a vapor proof globe housing the light bulb. Each of these globes is protected by a substantial cage. They stand out so as to give good general illumination.

Here is the problem we are up against. We realize that this is a good portable lamp, but the question is to get manufacturers of portable electric lamps to take it up. They feel that they have to let the market develop before they can make it a paying proposition.

We are interested in this thing. If we establish a rule absolutely abolishing the portable extension lamps in our plants, it means there is going to be a demand for quite a large number of these portable lamps. We would appreciate it if you other gentlemen would give this matter consideration and see if you think that the development of such a lamp would be useful on your plants. In other words, we should like to see a demand created for such a thing so that we will eventually have available on the market a real good substitute for the portable extension lamp.

MR. BARNHOLT: Mr. Kershaw, have you seen the Edison Storage Battery Lamp that the Mine Safety Appliances Company handles?

MR. KERSHAW: I have studied that very carefully. There are two objections to it. One is that it throws a single beam of light only. I realize that the range is rather wide but at the same time if a fellow is working inside a still or a place of that kind one part of the still is illuminated for him and the other part is in darkness. That is one objection to it.

Another objection to it I believe is the fact that if you are going to use it as a cap light, you have got to give a man a cap to wear which is not a very nice thing for outdoor repair work with the thermometer two or three degrees below zero and furthermore we advocate in our plants the wearing of broad-brimmed felt hats to protect the face, neck, and ears against drips.

MR. BARNHOLT: We have used this for three years with a lot of success. You can hook the lamp on any kind of a hat. These lamps are used extensively by the miners all over the country. I might state that they are on exhibition down here now in the Exhibition Hall and they are really worth going in to look at. It is impossible to get any short-circuits from them because the lamp when it goes out of the shop is locked and you cannot open it unless you have a key.

I would like to state if anybody is interested in that kind of a lamp, we replace the extension cord. I think that is the lamp.

CHAIRMAN KEPNER: We have certainly had a very interesting discussion on tanks as the causes of accidents.

Our next topic is "Health Surveillance of Workmen Exposed to Industrial Poisons," by Henry F. Doepke.

MR. DOEPKE: I explained to the Chairman this morning that I regret very much not to have received my paper. My paper had to be submitted to our New York office and while I have the news that the paper has been accepted, it has not reached me. So, with the consent of your Chairman, I will read a paper containing much information as to the necessary equipment and the proper organization which is essential to maintain efficiency and proper rules where workmen are exposed to poisons.

If you search the proceedings of the National Safety Congress you will find that they have many excellent papers on problems in the chemical industry and other industries and the contents of my paper are to a large extent the same. I think what was true in 1916, 1917, 1918, and 1919 is also true in 1920 to maintain high service.

### HEALTH SURVEILLANCE OF WORKMEN EXPOSED TO INDUSTRIAL POISONS

HENRY F. DOEPKE, SAFETY ENGINEER, NATIONAL ANILINE AND CHEMICAL COMPANY, INCORPORATED, BUFFALO, NEW YORK

As in any branch of plant management, a very important part in favor of efficiency and everything else is fixing responsibility and that also holds true in connection with health surveyors in the plant, and to my mind there are two factors that have been omitted or have not been mentioned very often in papers that were read during the last years and one of the factors is the importance of the employment department in connection with health supervision.

I have studied several employment departments in chemical plants and I have found that many of them are not equal to the task of supplying labor, especially during times of so-called shortage when many men are placed indiscriminately regardless of their physical and mental conditions in a particular department which required health that could be depended upon.

Many an employment manager of today is on the same level with an employment agency that you will find around river fronts and lake fronts and near railroad stations. All they do is to fill the positions. With all the wonderful systems that most plants have equipped themselves with in connection with medical examination of prospective employees, I have found that the employment manager in many instances is paying no attention to those medical examinations. Under a strain their argument would be that labor is scarce, many requisitions for labor are in hand for various departments and the argument will be used to hire types of men to work in chemical plants whose employment is absolutely criminal. I have found that they were hiring one-armed cripples for elevator operators. All of us know that an elevator shaft always presents a hazard of fire and what chance has a one-armed man to climb out through the top of the elevator in case of fire? He has absolutely no chance.

We also know that there are many slippery floors in chemical plants. What chance has a one-armed man to balance himself and prevent himself from falling?

I have found that men have been hired who are half blind. I have studied examination cards and I have found on those cards they are disposed to hernia, very defective vision in one eye or both eyes, heart trouble, all symptoms of sickness and still they hire them. We had a case in our own plant where a man was half blind and by mistake dumped a barrel of hot water on a fellow workman and scalded him badly and the same man got a spray of acid in his eye and he claimed blindness from the acid, where

the examination card showed he had been blind before he came to the plant.

There is your proposition in the employment end.

I know of a case where an employment manager—and he was in a prominent chemical plant—made the statement, "To hell with the doctor, what does he know about our employment work; we are scarce of men and we must provide men". That is the sentiment of a so-called employment expert.

I have also found employment men in chemical plants with little knowledge of the common ailments of men or when they do know the ailments they fail to recognize them in times of scarcity of labor.

I would suggest that all chemical company representatives here go home with the idea of investigating their employment problem and investigating their employment department and their employment manager especially. Is he fit to be an employment manager from the standpoint of looking out for the health of the men he employs? Furthermore, is he acquainted with the common ailments of men, such as heart disease and hernia and arterio sclerosis, and many other things? And, if he is acquainted with them, is he paying attention to them? Furthermore, is he a man who is willing to learn? It is very easy to study the common ailments of man.

#### TREATMENT OF FOREIGNERS

I have heard an employment manager say, "Foreign laborers should be treated as children, because they are children." I hate to express myself right here as to what I think of the man who made that statement, terming foreign laborers as children. I heard yesterday—I think it was Mr. Flesinger in his talk about educating the foreign laborer—a statement made that the foreign laborer seems to like the chemical industry and is therefore working in the chemical industry. I would like to differ with him. I believe the foreign laborer is working in the chemical industry because he is following the line of least resistance. If you should happen to make a survey or read of any survey made in the chemical industry as to the nationalities employed in the chemical industry you will find they are mostly all Polish, Russian-Polish, Italians, some Germans and many negroes and Arabians, and all kinds of foreigners who are working in the chemical industry today and who are doing work that a native American or a native laborer will not do. Either he is too proud to do it or he feels that the foreigner is born for such work. At any rate, the foreigner is doing that type of work and I would like to ask your opinion inasmuch as the chemical industry is a very important industry, inasmuch as the work in chemical industry has to be done, what is our duty to the foreign laborer who does the work for us?

I believe that the duty of foremen and plant managers in chemical plants is to help the foreign laborer in getting and finding his bearings, because the mental attitude of a foreign laborer in the plant so vitally affects his physical health, especially where the surroundings of chemical plants are not very inviting. I believe it is a sacred duty of any plant manager or foreman to bring about some cheerfulness in his plant; if it

is not in the surroundings let it be in the attitude on the part of the foreman or plant manager.

Much has been said about the foreign element and I may refer to yesterday. Mr. Weedon was reading a paper which was to be read by some one else and he was talking about the different kinds of English. He was talking about the Scotch English and the American English and Polish English, and you will notice that my English may chiefly be German English. As much as they are talking about the foreigner, I would like to give you some idea as to how foreigners really feel who now work in your chemical plants, because I was a foreigner myself. And I do know this—that the most important thing we can do for any foreigner working here is to see that he is helped and enabled to find his bearings, that he may feel himself as a foreigner welcomed to work here and that he is treated as a man and not as a child. If a foreigner is doing wrong, treat him as a man and correct him properly. They are just as much men as anybody else. They are just as well created by their Creator as you or I or any one else here and should be treated accordingly.

A few days ago this country celebrated the three hundredth anniversary of the Pilgrims' landing here. I would like to ask what is the difference between the Pilgrims who landed here three hundred years ago and the men who have arrived here in the past decades and who are coming every day? There is only one difference and that is the race, but there is no difference in purpose and there is no difference in expectation.

Shall we destroy the expectations of these foreigners by treating them with indifference and contempt in our plants and incidentally destroying their health? You will all agree with me that the mental attitude of the man is reflecting and reacting upon his physical condition, and you as chemists are well acquainted with the elements and I know you appreciate the fact that the most fundamental element in connection with health is good cheer; and I think that it ought to be impressed on the foremen to consider in connection with health supervision the spreading of good cheer as a great part of your health surveys.

There is one more thing I would like to say in connection with this matter. It is very easy for me to put myself in the place of a foreign workman who enters a plant. Let us say he is entering a chemical plant. You have a lot of leaks from overhead floors. You have a lot of acid fumes. You have a lot of water and dirt and in some places you have dirt accumulated on top of machinery which is ordinarily mistaken for the results of corrosion and improper care. This man comes into your chemical plant, starts to work for you and he is in many instances ridiculed for his English. I would like to say right here that the most broken English is very beautiful if you are able to see the effort that is behind this man to speak English, and I would like to impress upon you the importance of refraining from ridiculing or criticizing your foreign workman for his habits or for his type of language that he may use.

It is a much more important thing to correct him in a kind manner and thus help him to find his bearings.

CHAIRMAN KEPNER: We certainly are indebted to Mr. Doepke for this talk and I know that his paper will cover the subject very clearly.

Mr. Doepke's thought that we, as safety men, should give more study to the foreigner, before we condemn his shortcomings seems to have struck a keynote. A spontaneous talk, such as we have just heard, always seems to come so much more from the heart.

Next on the program is a paper and discussion on the "Treatment of Acid and Alkali Burns". Probably one of the greatest causes of time-lost accidents and very often fatalities is from acid and alkali burns, and I think we are very fortunate to have Dr. A. K. Smith, Manager, Medical Section, E. I. du Pont de Nemours and Company, to give us a talk on this subject. He has had a great deal of experience in treating acid and alkali burns, and I am sure that he has something interesting in store for us.

### TREATMENT OF ACID AND ALKALI BURNS

DR. A. K. SMITH, MANAGER, MEDICAL SECTION, E. I. DU PONT DE NEMOURS AND COMPANY, WILMINGTON, DEL.

The wounds caused in tissues by acids and alkalies are not strictly burns according to the accepted definition of a burn. Rather such chemicals belong to a class of materials known as escharotics or caustics, substances which applied to living tissue, cause its death and produce an eschar or slough.

The strong caustics are sulphuric acid, nitric acid, potash, chloride of antimony, chloride of zinc, acid nitrate of mercury, bromine, chromic acid, lime and a hot iron. Applied to the skin they immediately unite with it, killing the tissues to a depth proportionate to the strength and quantity of the caustic. Their burn is self limited and immediately the caustic has exerted its strength by union with the tissues it is no longer destructive.

The burns may be conveniently classified just as burns from heat are classified.

A first degree burn in which only the epidermis is destroyed or inflamed.

A second degree burn extending into the true skin and causing its destruction or inflammation.

A third degree burn which not alone destroys the skin but also extends into the underlying tissues.

The treatment naturally varies with the degree of burn. The most important branch of treatment of these caustic burns is prophylaxis or preventive measures, and under this head comes all the safety methods observed and appliances used to render immediate aid in case of accidental spills.

You will notice hot iron classed as a caustic and many of these innocent looking liquid acids or solutions of caustic alkalis are quite as potent for harm as the hot iron.

First-Aid to be of any great value must be immediate aid and probably the most valuable is the shower bath and of course it must be used

before any attempt is made to remove clothing and every effort made to get a large volume of water between caustic-soaked clothing and the skin. Directly after drowning the caustic a saturated watery solution of bicarbonate of sodium may be mopped on the burned area in the case of acid burns and a 2 per cent solution of acetic acid similarly used in the case of alkali burns. After this has been liberally carried out the patient should be placed in a physician's care.

In simple first degree burns mopping the burned area with dry gauze and the application of a bland clean ointment, such as boric acid ointment or burn ointment which is made of bicarbonate of soda and petrolatum, or oxide of zinc ointment may be used by spreading a liberal layer on gauze and holding it in place with a gauze bandage. Such a dressing relieves the pain and is sufficient with renewal of dressing occasionally.

In second degree burns, the wound should be cleansed of all loose rolled up epidermis, mopped with a mild antiseptic such as boric acid solution and an ointment applied on gauze and held in place by a rather loose gauze bandage.

In this degree of burn, blisters are encountered. Small blisters unruptured are let alone and large blisters where the tension is likely to cause pain are opened by first sterilizing the area with a 3½ per cent alcoholic solution of iodine and a liberal incision is made with a sterile knife near the edge of the blister, allowing its top to collapse and remain. The ointment used in dressing these cases should be absolutely clean, sterile, and mildly antiseptic and should have a melting point that will insure its non-separation on standing in the surgery and still be of such consistency that it will spread with ease.

The dressings are renewed as the judgment of the physician dictates more often at first when discharges are profuse and later at as long intervals as possible in order to allow healing to progress without disturbance.

The epidermis must grow over wherever it has been destroyed and this growth takes place from the sound edges of the wound only. The newly formed epidermal cells are exceedingly delicate and easily torn loose by the removal of a dressing and it is for this reason that dressings should be changed only when absolutely necessary.

Third degree burns are cleansed of all loose detritus and dressed with a sterile ointment as in second degree burns. After three or four days the ointment dressing is replaced by a wet gauze dressing, using a sterile, normal, salt solution. The dressing must be kept wet by repeated applications of the salt solution.

A slough forms in these cases necessitating a long wait until the sound tissue loosens and throws out the dead material and all this must take place before healing takes place to any extent.

The use of wet dressings leaves the wound in a very favorable condition for skin grafting, should it become necessary.

The long time required for healing in these cases is due to the slow

separation of the slough and after that has taken place, granulation tissue must fill up the sloughed out spaces and a new epidermis grow to cover the entire area.

Healing may be hastened by a careful removal of portions of the slough when redressings are being made also by keeping down excessive or exuberant granulation tissue growth and most important of all by skin grafting.

The making of numerous small pin point grafts, some of which will grow, will reduce the time of ultimate closure of the wound. In some cases larger grafts, by the Thiersch method, may be preferable.

Shock may be an accompaniment of second and third degree burns and should be combatted by a hypodermic of morphine, and the earlier it is given the better.

The patient is wrapped in hot blankets and surrounded by hot bottles or hot bricks. Care should be taken to cover the warming bricks or bottles with flannel or other material to prevent burning the patient. Salt solution may be introduced into the system by one of the various methods to increase the volume of blood. Ordinary stimulants given by the stomach are of little value in this condition.

Burns of the eyes by caustic are given first-aid by douching the eye with a watery solution of bicarbonate of soda in the case of acid burns and a 1 or 2 per cent solution of acetic acid in alkali burns after which a piece of boric acid ointment about the size of a pea is put under the eyelid and carefully worked into all corners by gentle manipulation on the outside of the eyelid. Further treatment of the eyes can best be done by an eye specialist.

In giving this, our treatment for caustic burns, I am aware of the various other treatments used in burn cases, many of which are not without good points, but I believe that the treatment as outlined will give the patient quicker relief from pain and quite as rapid a recovery and with as little scarring as any.

I might say in this connection, that if a man gets burned with strong nitric acid, "sixty-seven," "sixty-nine," or olein, he is going to have a burn whether he takes the shoe off or not. He is due for a good burn whether you wipe it off or not. It might be a great advantage to take that shoe off as quickly as possible and then stick it under the shower. Where you cannot get a circulation of water, you cannot get the cooling effect of water.

CHAIRMAN KEPNER: We are certainly indebted to Dr. Smith for his paper. I would like to know what treatment the majority of the manufacturers of acids and alkalis give for burns in their first treatment. I want to know what they have found good, or what they would recommend. Do you use bicarbonate of soda or do you think water, either in tubs or a shower, is the best?

#### DISCUSSION

MR. SUMER: We have stationed all through our plant little cabinets containing bicarbonate of soda and acid. The doctor mentioned two per



cent. acid. We use five per cent. The cabinets are inspected, and kept clean and kept filled. We also have in the Alkali Department a large tub that we are just inaugurating containing five per cent acetic acid. We do not know how that is going to work out for these fellows that have stepped into alkali. We have had some very bad foot burns and our treatment has been very much the same as Dr. Smith's with one exception, that this heavy thick stuff that forms in the center of the mound is hard, fibrous, and very slow in separating from the tissue. For instance, on smaller burns, from an inch to two inches in diameter, I have taken that stuff out and it is surprising how quickly the wound heals after you get that away. In other cases I have applied boric acid ointment and allowed it to come away which it will do in the course of a few days and then treated it as an ordinary ulcer or open wound.

For eye burns from alkalis we use paraffin oil in the eye, the paraffin oil with a small amount of cocaine stops the pain and it gives very satisfactory results in a case of that kind.

MR. KERSHAW: It has been my understanding that if you use more than three per cent solution of acetic acid for treating burns such as are received from caustic soda, etc., that it is apt to prove harmful to the eye. I would like to ask Dr. Smith if he can confirm that.

DR. SMITH: We have always kept it down between two and five per cent. In an emergency I wouldn't be afraid to put straight vinegar in their eye or even eight per cent. I think vinegar runs up to about eight per cent. I wouldn't hesitate to use vinegar just for the instant to neutralize and then afterward use water.

MR. SUMER: We don't use the stronger acid in the eye but for other purposes we do. We do not use over two per cent in the eye unless it is in an emergency.

MR. KERSHAW: May I ask what you use for the treatment of carbolic acid burns in the eye?

MR. HOFFMANN: We have had quite a bit of experience with phenol burns in the eye and we have always found that magnesium sulphate is about the best thing to use for eye burns in solution (saturate solution).

DR. SMITH: Is that the first treatment or do you put oil in right away?

MR. HOFFMANN: If you put oil in there the oil mixes in with your phenol and you have got your phenol still there. We take a dropper or syringe and wash it right out.

MR. CHRISTOPHER: On acid burns where the skin is not broken and just blistered we very seldom ever use an antiseptic wash. We use a salve that is on the market now called unguentine. We formerly used a mixture of lime water and linseed oil. We found we get the most satisfactory results from unguentine. If the skin happens to be broken we use a boracic solution. In case of eye burns if it is burned with acid we generally wash it out with a weak boracic solution and then follow that up by putting a few drops of castor oil into the eye. All eye cases, regardless of whether it is an acid burn or whether a man gets a small particle in his eye are always sent to the doctor. No distinction is made whatever in an eye case. They all go to the doctor. In case of caustic burns in the eye of which we have very few they are taken care of with

a weak acid solution such as Dr. Smith spoke of, followed up with your oil.

#### OBJECTIONS TO THE USE OF OINTMENTS

DR. G. H. WOOD (Frederick Stearns and Company, Detroit): Years ago pretty nearly everybody used ointment and I did the same but in recent years I have almost done away with ointments entirely. I practically never use an ointment on a burn any more. My first treatment for burns is to neutralize the burn, acid or alkali, it must be neutralized. But the treatment of a burn itself is a question of keeping it in a normal condition until nature does the repairing. Of course, a burn is sterile when it occurs, but the great danger is of an infection occurring afterward.

An ointment seals up the pores, seals up the crevices in the tissue, it forms an insulation between tissues of the wound and the surrounding tissues which prevents the application of any further things. It is liable to seal the infection if it is there. For that reason I use wet dressing on the flesh burn, either chlorofen or alpho-zone, one is alkali and the other is acid. But, the alpho-zone acid, there is no objection to it after the original acid has been neutralized.

I change this wet dressing frequently the first day, perhaps in an hour, for the first dressing, perhaps in two or three hours in the second. Then after that I either continue the wet dressing or use the paraffin or oil as the doctor suggested as the case progresses. A doctor has got to use his judgment. It is not a question of following a routine, but a wet dressing has one disadvantage that you must all recognize. It depletes the natural heat of the tissues and also depletes the secretions and tends to the exudation of blood and serum and as I say reduces the heat. If you carry this too far you reduce the vitality. A doctor has to use his judgment.

But within proper limits I keep up the wet dressing until healing is well established for several days, and then either use paraffin oil or occasionally an ointment.

One thing is of great importance. It is frequently desirable to use the waxed meshed gauze to separate the tissues from the other dressing. That helps to prevent the tearing off of tender tissue.

In regard to oil in the eye I want to say one thing that is quite important. I never put oil of any kind in an eye if at the time I am doing it I think there is any possibility that it may go to the eye specialist. If the eye specialist is going to see it let him see it before you have done anything with it. But if I am going to treat the case myself I use the paraffin oil or a bichlorid ointment and find it very satisfactory.

MR. G. A. ORTH (American Car and Foundry Co., New York City): In the treating of caustic soda burns we use a solution of zinc sulphate for all burns for eye or body burns and after the zinc sulphate has been neutralized it is washed out with water and then we use an application of olive oil in the eyes.

CHAIRMAN KEPNER: You get them to the doctor as soon as you can.

MR. WEEDON: We use three per cent acetic acid in our first-aid stations for caustic burns. Then an olive oil and then send them immedi-

ately to our dispensary in the works which is inside of five minutes from the burn to the dispensary.

We have one problem with our acetic acid that we have been trying to find something about for three or four months. We have all through our plant, every thirty-two feet a cabinet with two litre bottles for acid to supply the immediate surroundings and we have trouble from the men taking the bottles out from these cabinets and taking them away and setting them down some place else. When a man wants a bottle of acid he will go to the box and there is none there. Of course, we have every sixty-four feet a ten litre bottle of acetic acid to fill all of these bottles from. I have tried for three or four months through our Purchasing Agent to get a two litre bottle that will not set any place and if anybody knows where we can find one of those I would like to know. We want a two litre bottle with a round bottom that will not set any place but in a rack made for it.

If we cannot get that we have plans under way to put a tank on the roof of our building and run pipe lines all through our building so that we can take care of any burns immediately. We have followed that game up for a good many years in taking care of the burns and our men in our plant—this idea of the round bottle came from our Safety Committee, one of the men in the plant, and the idea of the tank on the roof with the station with the pipes running all through the building came from our Safety Committee and our men are interested. We have one of our shifts that went the complete year of 1919, the production shift, without a time losing accident.

DR. GEIER (Cincinnati Milling Machine Company): Just a word I think as a matter of warning as to the statement Dr. Wood made. I think it is rather unfortunate that we go away with the idea that they should not use ointments in the eye for fear that a specialist would have his work discommoded. My experience would lead me to believe that you can't put any ointment in an eye if the effects have been over twenty or thirty minutes. The water is washing out the eye at all times and the difficulty with all ointments used in the eye is that they are of very temporary value. You cannot get any very extensive application of ointment in the eye unless you keep using the suction of the upper lid to keep sucking it up there. I think we get so very much comfort and our workmen are so very insistent in having ointment used that it would be rather unfortunate if we should give up the practice of making them comfortable until they get to the oculist. I think that has been rather overstretched by Dr. Wood.

DR. McLAUGHLIN: I heartily agree with Dr. Geier in the statement about the comfort that it gives a man in the application of oils. I use castor oil or white Russian paraffin oil usually directly after a burn in the eye, either from acid or hot iron or alkali, etc.

In answer to the gentleman over there, I don't know where you can buy a round bottom bottle but I think I can save him a little on putting a pipe line in if he will go to a drug store and see how the druggists have a large bottle and then a little rubber tube hanging down with the

glass tip and a little stopper on, so that you can siphon your solution there.

MR. REED: We have a building eight hundred feet long and four hundred feet wide and four stories high where we supply acid. So that a little arrangement like that wouldn't do very much. We use that same arrangement in our central station.

DR. WOOD: I would like to say a word. I didn't say not to use ointments. Dr. Smith said that if a burn is at all serious it would go to the specialist for further treatment. What I said was that if at the time I treated the case I considered the case serious enough to go to the eye specialist I would leave that work for him to do. I wouldn't put anything in his way. This is not on my own authority but one of the best eye specialists in the State of Michigan spoke very strongly on that line to me and my experience has been along the same line with his.

MR. J. H. LAFFERTY (Du Pont Co., Paulsboro, N. J.): I would like to ask what your opinion is of the new skin treatment for burns?

DR. HAET: Of course, Dr. Smith has covered this burn problem as well as it can be covered. These little differences are really minor differences and don't amount to anything.

I suppose the really best treatment for burns is the prevention of burns and when you safety men have taken up the problem of preventing burns then you have given burns the best kind of treatment. I have seen used for the last quarter of a century an ointment manufactured by the Norwich Formative Company—which can be gotten from a doctor in New York, and it is a very fine ointment and is used by almost all industries in the country. An ointment is known to be a fine treatment for burns especially in the hands of the first-aid men of today. The other treatment of eye burns we all agree with. You will find that when you get a burn in the eye you have got an intense amount of pain. A solution of two per cent cocaine relieves the pain immediately.

Then in Mr. Doepke's article I would like to hear him bring up that problem of the individual laboring man. We labor under much the same conditions as he does, that the employment manager and the American or American laboring man feel that the foreign laborer is an ignorant man. I think if you will investigate the thing thoroughly you will find that the American sees the European only as far as the coast of Europe and after he gets past the coast he doesn't know him. Rather the foreign laboring man is the better educated laboring man if you know him and know him well, broader educated, understands fundamental things better.

I remember an instance of examining a young fellow whom the manager had sent along to me for work. I noticed an expression about his face that indicated more refinement than the usual American workman possesses, although he had the dress and all other appearance of a workman. I noticed his hand was a little different type of hand although the hand of a workman and the blistering was different and I said to myself, "What have you been doing all your life?" I found he had been through a thorough school education in the old country and I found that he could give me Demosthenes' Philippics in the original, he could give me Cicero's orations in the original, and he could give me higher mathematics, and

by that time I was careful to keep him moving. I was afraid he might turn on me. I kept him so busy that he had no chance to come back and ask me.

I am sure if you taught foreign workmen you would find that is a common situation and I think it behooves us to appreciate that and to help to Americanize them and meet them more than half way.

#### HOME-MADE BULLETINS

MR. KERSHAW: In connection with educating the foreigner, I want to say that I, like most safety engineers, feel that one of the most valuable educational activities we have ever undertaken is the manufacture of home-made bulletins. We have done a lot of it about our plants. We go about it in this way. Our plant safety inspectors go out into the plants with cameras and get hold of the foremen of the departments and say—"You gentlemen have the ideas for some good safety pictures and I have the camera. Let's get busy." The foreman usually rounds up several of his men and he will ask them one or two questions, perhaps himself suggesting the first subject for a photograph, showing the right and wrong way of doing something. These fellows pose and the first thing you know they have some ideas themselves.

For instance, at one of our plants I personally was taking some photographs with the plant safety inspector one day and started out with the acid supervisor and he called over a little Italian who couldn't speak English very well and was known as the "little devil" around the plant. We asked him to pose for a photograph showing the wrong way to pull on a wrench. We had had a number of bad falls due to men pulling on wrenches the wrong way. We got our photograph of him showing him pulling on the wrench the wrong way, the wrench slipping and the result. We had no sooner taken the photograph when the Italian said, "Mister, you want another picture." We said, "Yes." So he took us up to a platform where we were handling some drums with acid in them and he said, "Now look." He took the drum and he started to unscrew the bung. He said, "Sometimes I get acid squirted in eye with that." We afterward discovered that what he was driving at was this: that sometimes a little pressure had built up in those drums and unless he kept that drum perfectly straight, the bung vertical, as he opened it the little pressure in there would squirt the acid out on him. Then he said, "Let me show." So he took a piece of burlap and he put it over the bung after he loosened it and unscrewed it with his hand and was protected against the spray of acid.

We find that by going out and taking these photographs among the men and getting them to present the subjects and getting them to pose for them that we immediately get them interested in all kinds of safety ideas. They take to it, particularly among the foreigners—there is something that appeals to them very much about getting in photographs.

When we take those bulletins and post them on the bulletin boards we find that they attract a great deal of attention because there are familiar faces and surroundings illustrated. When we post our bulletins

we post them under glass and take very good care of them. We are very careful to try to get photographs in series so that a man doesn't have to stand and read a whole lot of written matter to get what is meant by the pictures, and so that the foreigner can understand it.

After we are through using them on the bulletin board we don't throw them away but we take them and put them on file numerically, and bring them out from time to time for the benefit of new employees or for the benefit of others in other departments who haven't seen them.

In connection with the taking of photographs, I want to say to you just this: that in my experience in that work I have found that the use of a vest pocket size camera is mighty valuable for this reason: that a safety engineer on the job can put it in his hip pocket and carry it with him practically all the time. When he sees an opportunity to take a photograph he can take it, and he can get photographs with a little camera having an anastigmat lens, capable of enlargement.

A lot of fellows who are using the larger cameras get out on a job and they find a wonderful opportunity to get a subject for a bulletin but it is just a little bit of trouble to go back and get the big camera from the office and set it up and consequently do not get the photograph. I just mention this as a suggestion. Incidentally the vest pocket size picture (1½x2½ inches) is very good for series of photographs when you want to mount them on eight and one-half by eleven sheets. But I think if we would start this bulletin work on our plants and have the bulletins censored and passed on to our Chairman here we could all exchange a lot of mighty valuable ideas.

MR. G. K. NICKEL (Du Pont Co., Parlin, N. J.): Regarding the question of the foreigner in our chemical plants, some of you men may have had more experience than I have had, but my idea is if you want to get results from the foreigner in your plant the first thing is to get his name and if you have to sit up a half-hour every night for a week to learn I do it because when you get his name you get his heart.

#### "NATIONAL SAFETY NEWS"

CHAIRMAN KEPNER: The headquarters staff has sent a little box here which they call the suggestion box asking the members of this Section how they like the NEWS. I should like to hear somebody express himself. What do you think of the NATIONAL SAFETY NEWS?

MEMBER: It is a great idea.

MR. BARNHOLT: We can't wait until we get it every week.

CHAIRMAN KEPNER: Is it sent to you regularly?

MR. BARNHOLT: Yes.

MR. REED: I would be glad if you could place it in every foreman's hand throughout the country.

CHAIRMAN KEPNER: Each member gets one, but they can be purchased very reasonably in quantity lots and the National Safety Council would be glad to sell them practically at cost and they would be glad to get them in the hands of every foreman. There is some real good stuff there.

But our little page in this NATIONAL SAFETY NEWS is going to be just

exactly what the members of the Chemical Section make it. If there are only two or three little lines in there you will know some of you have fallen down on the job.

I am going to ask you again if you won't please send in to me as Chairman the coming year all information that you have. You have my address. You can get it on the letter heads of the National Safety Council; care of the Pennsylvania Salt Manufacturing Company, Widner Building, Philadelphia. If you will just send in information that you have or if you want information in regard to any particular topic I will do my best to see that you get it.

MR. A. L. THOMAS: I hope that in taking up this idea of going after the tank cars they won't lose sight of the fact that I think that we who receive these tank cars are almost as much to blame as the shipper. I think we have been encouraging the shipper to send us any kind of a tank car because we wouldn't make a kick and wouldn't look at it and as I heard from one fellow when I said, "Do you get tank cars in such and such a condition? Do you kick?" He said, "What is the use, nobody will back me in the kick." I think if they do a little more kicking it will help them out.

MR. CRASS: I want to O. K. what was said by that gentleman. We get some of our tank cars back in the most shameful condition imaginable. Speak about accidents from defective gaskets. We get them back without gaskets at all. Some of the shippers seem to have no idea of the value of gaskets. We get them back with the cocks open and in every imaginable shape. There are two sides to every question and it is a mighty good thing for the men who receive acid to look into that question a little bit and to see that the property under the other man receives the protection.

MR. THOMAS: I will say this much for the plant that I am with: We have a tank car inspector and I will safely say that I don't think any manufacturer has been able to say that his cars in the past eighteen months have gone back in bad condition.

MR. CRASS: We don't sell the Du Pont Company and I can't answer that.

#### ADJOURNMENT.

On Thursday morning, September 30, there was held a meeting of the Special Investigating Committee on Tank Car Hazards (see pp. 548, 549). The following members were present: Messrs M. F. Crass, The Graselli Chemical Co., Cleveland, Ohio, Chairman; H. F. Doepke, National Aniline & Chemical Co., Buffalo, N. Y.; P. T. Frill, Du Pont Chemical Co., Hopewell, Va.; C. W. Keniston, Industrial Commission of Wisconsin, Madison, Wis.; I. V. Kepner, Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; S. H. Kershaw, Hercules Powder Co., Wilmington Del.; R. H. Krone, Proctor & Gamble Co., Ivorydale, Ohio; G. H. Scott, Virginia-Carolina Chemical Co., Richmond, Va.; A. L. Watson, Hooker Electro Chemical Co., Niagara Falls, N. Y.; Charles Wolf, Mineral Point Zinc Co., Depew, Ill., and plans were made for carrying out the work of this Committee.

## **Construction Section**

**September 29 and 30, 1920**

**LEO D. WOEDTKE, Chairman**

**Director of Safety, Fred T. Ley and Company, Inc., Springfield, Mass.**

**W. F. AUSTIN, Vice-Chairman**

**W. E. Wood Company, Detroit, Mich.**

**F. L. HURLBUTT, Vice-Chairman**

**E. I. du Pont de Nemours and Company, Wilmington, Del.**

**EDWARD W. BUSH, Secretary**

**Civil Engineer, Aetna Casualty and Surety Company, Hartford, Conn.**

### **WEDNESDAY MORNING SESSION**

**T**HE first session of the Construction Section was called to order at 9:45 a. m., by Mr. Leo D. Woedtke.

**CHAIRMAN WOEDTKE:** You all know that this is the third annual meeting of the Construction Section. Most of you are the old faithfuls that have been with us and I won't waste any time in remarking about the past only to say that it is mighty gratifying to see the construction industry take such an interest in accident prevention to the extent of coming away out here to Milwaukee. Our meetings in Cleveland and St. Louis were very good. I think this is going to be better than the others. I know the speakers and the discussions are going to be well worth while.

In order to facilitate matters so as to accomplish all that we have in mind, we are going to shift the program a little. The first paper will be "Securing the Interest of the Construction Executive Force," by Mr. J. H. Schults, who is Safety Engineer of James E. Stewart and Company of New York City and many other cities where they are operating.

#### **SECURING THE INTEREST OF THE CONSTRUCTION EXECUTIVE FORCE**

**J. H. SCHULTS, SAFETY ENGINEER, JAMES E. STEWART AND COMPANY,  
NEW YORK CITY.**

In accepting the invitation to speak on the above subject, I had in mind the numerous questions that have been asked me on this self-same subject



at different times, and the wonderment expressed at the apparent interest which seemed to actuate our job offices on safety work, and in order to try and give you our experience along that line, I believe a résumé of our work will be necessary.

Our company actually started in on safety work in Pittsburgh some fifteen or sixteen years ago, but it was not until four or five years later that we decided to push this on our work throughout the country, and of course the safety movement had not reached the point where we could procure bulletins, literature, etc., to facilitate our campaign, so that it necessitated making up our propaganda—so to speak—as our experience suggested, and we had printed in five or six languages, circulars giving safety suggestions, which were handed to each man on his employment; notices and slogans on back of pay envelopes; oil-cloth and enamelled signs to be posted around the job; circulars to superintendents and also to foremen for their attention and guidance.

As is usually the case with new methods, it was a little difficult to secure the earnest support and co-operation of the construction forces and required constant efforts on the part of the main office to try and get the superintendents and foremen to see the humanitarian as well as economical value that the prevention of accidents would have on the work. As many of you can no doubt appreciate, there were then superintendents of the old school whose only thought was to get the work done, and accept the fact of injured men and consequent loss of their services to the job as part of the natural hazards of construction work and let it go at that. It was here that we had our hardest problem of converting them to this idea, and the conversion was not done by the heroic method of firing them, as good superintendents are only developed by long training to our methods, and do not, even to this date, grow on bushes. These same remarks, of course, would apply to the foremen and in order to secure the necessary interest, we started the following:

Copies of accident reports covering our work throughout the United States and Canada are sent to our main office with a slip showing the name of foreman in charge at time of accident. (We might add here that instructions are to report every accident, no matter how trivial, and that every man injured be sent to a doctor for treatment.) These are tabulated each month, and a memorandum sent to each job showing the number of accidents charged to each foreman, and where any one class of injury shows a large frequency, or an increase as compared with the month previous, an explanation is asked for from the superintendent, together with plans for the reduction of such accidents. We then follow this up with letters to the jobs to the effect that a foreman's value to the company depends as much on his accident record as on the work performed. This, of course, has its effect in two ways, the more important one being that it brings right up to the foreman's attention how his record stands on accidents as compared to the other foremen, and brings a competitive spirit into the matter, as well as the undoubted moral effect that a certain number of men had been injured while under his control, and was another factor in arousing interest.

As the question of Safety First spread and our construction forces realized the importance to the work through the conservation of men, new problems arose. The following will serve as an illustration:

We had a contract for work on the New York State Barge Canal, covering a length of approximately 60 miles, and operated a number of dredges, drill boats, tugs, scows, etc., which presented the hazard of drowning. Although protective railings, life lines, etc., were installed, drownings occurred which could not be prevented by protective devices or safety instruction, the victims almost wholly being the common laborers, usually foreigners. We then decided that a solution of this matter might be effected by segregating the swimmers from the non-swimmers, and using the former men on the water work. After making a canvass of the employees, we came upon a peculiar situation, namely, that the majority of men working on the shore could swim, and those working on the water could not. We then started to switch the men around as much as possible, and in addition had some of our foremen who were adept swimmers to start a swimming school. It can be realized here that safety meant something tangible to each man and not much urging was required to have the men take up swimming as knowledge might mean the difference between life and death. Between the two we finally reached the point where drownings practically ceased. I might incidentally add, based on the foremen's report, that the swimming lessons were also beneficial from a health standpoint.

We also commenced the inauguration on each job of a Safety Committee composed of the superintendent as permanent chairman, and foremen of each trade as members and representatives of sub-contractors. The duties of the committee are to go around on the job from time to time and observe that general safe practices are being followed out, and meetings held every two weeks on a regularly appointed day when suggestions are brought up and discussed and, if of value, the suggestions are transmitted to the foreman affected in writing. Regular minutes are kept of each meeting, copies being sent to the main office for information, suggestion, and generally to keep in touch with the Safety situation, and where suggestions of value are brought up, transmitted to our other work. Where the size of the work permits, different foremen are rotated from meeting to meeting, in order to obviate the possibility of falling into a rut, and at each meeting reports are made on the suggestions that were ordered to be carried out at the previous meeting. To illustrate the form of minutes as kept by our jobs we give below copy of a typical report:

Carpenter foreman and steward were instructed to inform all men to be sure and see that scaffolds are safe before they start to work on them.

Guard for saw received today and is being put on.

Foreman Lindquist was instructed to clean concrete off ladders, also to be careful in cleaning out chute and try to avoid dropping water on men below.

Foreman Al Ansley was instructed to put one man on turning down nails.

All foremen were instructed to warn new men regarding accidents and as soon as they have one the office is the place to report same.

Goggles should be used by all men chipping, working in cement bins, and stripping that requires them to look up in the air.

Carpenter foreman was instructed that whenever building ladders in the future rungs should be set in.

All bolts sticking out of floor after being concreted should be cut off by ironworkers.

Just as a side light, I might add here, that only recently one of our superintendents wrote in that he had put the stewards of several of the trades on the Safety Committee, and they had told him this was the first time in all their experience on construction work that they had seen a Safety Committee in operation, and they were impressed with its value. Apparently they were sold to Safety right then and there, as in following up the succeeding minutes on this job, I notice they are giving talks to members of their union on Safety, as well as making suggestions of value from a safety standpoint at the Committee meetings.

This keeping of minutes we have found gives a very good index of what interest is displayed toward Safety and is considered by us as one of the principal features in this work. In addition, suggestion boxes are put up on the work for the use of the men and where any suggestions are found to be of merit, are put into operation and the man making suggestion is given credit by posting his name and particulars on the bulletin board, and here again we secure the interest of men through this feature.

A bulletin board is in use on all jobs and as bulletins are received from the National Safety Council they are posted thereon together with such local notices as job offices may deem pertinent to the work. The board is of a size sufficient to carry eight of the small-sized Council bulletins and covered with glass to protect from the weather as well as from the men also, as we have found on some jobs the men object to bulletins depicting what might be termed the grewsome results of an accident, but in our judgment this is more than compensated in the doubtless vivid impression that the men retain of what should be avoided in the prevention of accidents.

The foregoing is given to show the progression of methods pursued by our company in furthering the cause of Safety, and we require our jobs to adhere as strictly as possible to the above, varying it only where the best interests of the job and Safety may deem it necessary in the superintendent's judgment, but in general this is the practice as followed by our various jobs. In all our experience on Safety work we have no recollection of where it has been necessary to use coercive measures to secure co-operation. We have found that the job office men are just as human as the rest of us and just as quick to see the benefit of accident prevention as the main office, not only as a saving of men from injury and the consequent advantage of keeping experienced men on the job, but also as a means of bringing the entire management and men closer together in a common interest, resulting in better co-operation and better fellowship. As stated previously, in bringing about the interest of the men in the

safety movement, it is true that the old order of things was not changed in a day, nor a week, nor a month, but now it is almost as automatic with the majority of Stewart men to put Safety measures in operation as is the laying out of lines, securing equipment, or the ordering of material.

CHAIRMAN WOEDTKE: What Mr. Schults has just said to you touches upon one of the most vital problems we have to contend with in this safety work among the construction industries. It is one thing for the chief executive or the several executives at the head of any construction firm to be for safety, sanction it, spend their money on providing all the mechanical safeguards that are known, or which they themselves can create, but the next step is to get the construction executive force to put safety over and put it over right, not only because they have to, or because they are being paid for taking orders, but particularly because they want to.

I am going to allow the usual ten minutes for the discussion of each of these papers.

#### DISCUSSION

MR. F. L. HURLBUTT (E. I. du Pont de Nemours & Co., Wilmington, Del.): This is a pretty good opportunity to bring out two points which are primarily ones on which the construction is concerned: First, the feasibility and practicability of carrying on organized safety work.

The second point I had in mind was the matter of the economic value of it. I would like to cite an instance of one of our own jobs, not by way of boasting of record but to show you that it is actually saving of dollars and cents. We had the plans drawn and started construction of a large plant in New Jersey. We had a pay roll of 625 men on the job. We started with a safety engineer. We kept the safety engineer in the background as much as possible. We organized safety meetings and held them once a week. They consumed approximately three quarters of an hour. We divided the job up geographically into two areas. We appointed foremen as members of committees of these meetings and they ran the whole show themselves. The safety engineer gave them a little information outside of meetings which would be of value to them.

The committees would report directly in writing to the safety engineer, who went over the job the day before the meetings. He brought this report to the meeting and where a recommendation had not been carried out he called for an answer from the foreman who was concerned in that particular area.

One thing, Gentlemen, be honest and frank with them in any suggestions you make. If you aren't you kill it right off the bat.

We started last October in a drive to go ninety days without an accident. That was something we had never been able to do. By accident, I mean a major accident that necessitates loss of time. We went eighty-six days and some odd hours the first time. We started again and strange to say we went eighty-six days and a few more odd hours. We started again and only went thirty days. The final shot we went ninety-one days and accomplished what we set out to do. That is a total of 293

days in which there were five accidents that required loss of time. The interesting part of that was that during that period of 293 days, which was up to the middle of last August, the compensation paid under the State Acts of New Jersey was just \$5.00 on a working force of approximately 340 men throughout the period. I ask you if that isn't worth an attempt on the part of every construction industry? We saved thousands of dollars in our compensation as against some of the jobs we had in the past.

MR. W. J. GRAVES (Michigan Mutual Liability Company, Detroit, Michigan): One method adopted in industries for securing interest of the foremen is to arrange to have them attend the local meetings of the National Safety Council chapters in other organizations for promoting safety in the town in which you happen to be conducting your operations. I would suggest that that might be a thing which would help. Also whenever the National Congress is held near enough to your operation to warrant the expense, I think it is a good thing for the foremen and superintendents to attend at least a portion of these meetings if they can possibly be spared from work. I know one company as far away as Sault Ste. Marie sent ten men of the plain executive type to Cleveland last year.

MR. F. R. FOSTER (Liberty Mutual Insurance Co., Philadelphia): I would like to ask if they had any experience with resuscitation on jobs where the men were subject to drowning hazards.

MR. W. H. MULLIGAN (Hydro Electric Power Commission, Toronto, Ontario): I would like to reply to that question. On the large development jobs we have at Niagara Falls we are using 4,000 volts on our shovels and we have yet to have a fatal execution. Our foremen are all trained in resuscitation. We had an engineer who was getting up to a steam shovel and an electrician had removed a guard in preparing to do some work and the engineer came in contact with the 4,000 volts but he was brought around. We had another workman on the same job who was dumped over by one of the shovels and some earth spilled on him. He was almost smothered but he was also brought around.

We use the Prone Pressure method only.

MR. F. A. DAVIDSON (Dwight P. Robinson and Company, New York City): Another method which I think is of value in securing the interest of executives on the job, at least, we have found it so, is the sending out periodically, either month by month or quarter by quarter, accidents summary reports of all the jobs in which there are accidents. Have the job with the least accident frequency rate appear at the top and running on down to the bottom. This is of interest to the superintendents. A man doesn't like to appear at the bottom of the chart more than two months.

CHAIRMAN WOEDTKE: I wish to appoint James E. Griffith of E. I. du Pont de Nemours and Company, Secretary pro tem in the absence of Edward W. Bush, the regular Secretary who is in California.

The next speaker we have on the program brings to us something which is more or less new to most of us. There has been a great deal of attention paid to the question of medical work and accident prevention

in other industries, as you know of course. The permanent plan within four walls, or the industry where there is a fence around it which keeps it right there, and which has about the same number and the same kind and types of men to handle all the time, has developed the matter of physical to the last word of finesse, but in the construction industry it has always been a problem. There isn't one of us who isn't befogged at times to know how to handle that problem. Dr. Cleary of the Du Pont Engineering Company of Detroit has had a wonderful experience in this line and I am sure that he is going to bring to us a lot of valuable information on the subject of "Field Hospitals and Their Value".

### FIELD HOSPITALS AND THEIR VALUE ON CONSTRUCTION WORK

DR. J. P. CLEARY, DU PONT ENGINEERING COMPANY, DETROIT, MICH.

The importance of Field Hospitals in construction work is steadily gaining greater recognition. They have, indeed, become an indispensable part of organizations in that particular field of labor. It is my purpose, or rather my desire, to suggest some data from which a firmer conviction may be gained of their value; value that is both practical and altruistic. It may be added that full discussion of the subject in all its ramifications would consume more time than my hearers have to allot, and hence only the main ideas relating to the matter will be advanced.

In the initial stages of these components of the complete scheme of a working plant, rendering first-aid to the injured seemed the conclusion of the whole human purpose, but the range of the field hospital service has obviously become extended far beyond that original scope. It now incorporates within the bounds of its efforts the conserving of the general health of the workmen, their social welfare, and their relative fitness for the tasks they assume.

The efficiency of the worker in the strict line of his employment is easily seen to depend to a certain degree upon his home life, his general environment and the entire social status. These factors appear, perhaps, to savor of some sort of scientific theory and invoke sociology or kindred ideas of wide projection, but one gains easily the notion that herein science is not entirely technical, nor the principles too involved for application in industrial and labor problems.

Accepting as axiomatic that the interests of both the employer and employee are identical in the last analysis, it behooves all concerned to consider in some detail the practical advantages.

The employer derives what may be styled a mercenary benefit, but he also enjoys the reflex action of practiced humanity. He saves the time, the very essence of construction work, wasted by removal of an injured workman to a hospital or physician's office some distance away from the immediate field of labor, with all the attendant expense escaping his own audit. He loses the chance to show sincere sympathy for the suffering employee by not providing the means of caring for the injured on the "home grounds". Then, this quick conveyance to some distant

hospital or office entails in itself aggravation of the accident or disease. Measured in dollars and cents, elements to be watched in these days, the economy of treatment near-by can not escape reflection. The opportunity to administer instant remedies, or make quick diagnoses, and thus obtain a grasp upon the malady or injury immediately, must readily be figured by business men into terms of money. The return of the employee to his work as quickly as possible is an important consideration, and in this desideratum employer and employee share equally.

The cost of installing and maintaining a hospital is more than offset by the advantages derived. Insurance companies extend a lower rate on liability insurance to concerns maintaining a first-aid station on their plants. The expenditure required to pay the physician, the supplies used, the equipment and all other expenses can be easily ascertained, but it would be difficult indeed to determine the actual monetary returns from the investment, for the influences of the plant hospital are wide and numerous.

#### EXPERIENCE OF DU PONT COMPANY

In the construction of a plant for the Cadillac Motor Car Company in Detroit, Michigan, the Du Pont Engineering Company, from August 1919 to August 1920, employed, all told, about 17,000 men, the maximum at any one time being about 3,600, and the minimum about 800. Construction work has many hazards, probably more than exist in industries engaged in operation. During the year referred to there were 4,490 injuries. Eighty of that number were major injuries, necessitating loss of time. Of the eighty major injuries, four resulted fatally, one in permanent, total disability, and the remaining seventy-five caused a loss of approximately 14,752 working hours, an average of 196 $\frac{2}{3}$  hours per major accident. In addition to the 4,490 first dressings or treatments administered, approximately 3,229 redressings were required, amounting to 7,719 treatments for injuries administered during the year.

It is estimated that 3,500 medical cases were treated during this time, making a total of 11,219 treatments given during the year. During the influenza epidemic last winter on an average of thirty medical cases were treated every day. Of the 11,219 treatments, perhaps 1,432 were required in cases of major injuries, leaving 9,787 treatments administered for minor injuries or illness.

The cost of equipping and maintaining the plant hospital here for the period mentioned amounted to \$6,800. Of this amount, \$5,900 was applied to the treatment of minor injuries and medical cases. Dividing this amount by the number of treatments, 9,787, shows an average cost of 60 cents each.

During this period of time, 15,765 men were examined by the Medical Department, and 15,615 were accepted, and placed on the company's roll. In addition to this number, there were approximately 2,500 men on the rolls of the sub-contractors during this time, making a total of 18,115 men who were protected by the Medical Department during the year in question. This amounts to an expenditure of approximately 37 cents for each man so protected.

During the same year there were 366 penetrating wounds of the feet, resulting from stepping on nails. Of that number two, or .54 of 1 per cent, resulted in lost time.

It may be of general interest to know that in the Dye Works of the Du Pont Company at Wilmington, Delaware, during the year 1919, with an average working force of 625 men, the compensation paid during that period was only \$6.00, a really remarkable record. In the same plant 7,778 medical and accident cases were treated during the year referred to at a total cost of \$2,383.41, or an average of 31 cents per case. In the first six months of 1920 the Wilmington plant had 1,207 surgical cases, and of that number only 5 were serious enough to necessitate any loss of time.

To be of greatest value, the field hospital should be centrally located, so that it may be easily and quickly reached by the injured. Its location should be pointed out to all new employees immediately after being hired, or before starting to work. Whenever possible, the employment department should be in close proximity to the hospital so as to facilitate the examination of applicants for work. The hospital should not be placed in a noisy portion of the plant where the rumbling of heavy trucks or machinery would interfere with the efficient use of a stethoscope in making physical examinations. For industries employing more than a thousand men, there should be a plant dispensary and a physician constantly in attendance.

The size and extent of hospital equipment necessary depends upon the number of employees. For an industry employing a large number of men, the hospital should contain a waiting room equipped with chairs or benches, and a quiet office where files and a few cots may be kept, so that employees may be placed in a recumbent position to overcome some temporary condition and return to work within an hour or two. There should be an examining room for the doctor. This room should be quiet, and should contain an examining table, a writing desk, several chairs and other necessary equipment. The doctor's room should be closed off from the other rooms, so that confidential conversations with the various employees may be conducted. In addition, the hospital should contain a surgical room, where accident cases can receive immediate attention. An X-ray machine and a sterilizing room would be valuable additions.

Where the number of employees would not justify the expense of maintaining a physician in the plant, arrangements should be made with a near-by physician to take care of accident cases, and to use his office for the purpose of making the medical examinations. In places where such an arrangement can not be made, one or two promising men, such as foremen, could be easily trained to administer first-aid. In plants engaged in night work, men with such training would be of considerable value. All plants, no matter how small the number of employees, should have first-aid kits available for immediate use.

To obtain the best possible results, the co-operation of the employees is necessary. No effort should be spared to bring them to a realization of



the importance of reporting for medical treatment immediately after an accident. The workmen should be informed they will not be docked for the time spent in having their injuries treated. All injuries, no matter how slight, should be given medical attention. To overcome the hesitancy of the workmen about going to the hospital for treatment of slight injuries, a first-aid printed slip should be given by the foremen to the injured employees to take to the hospital. This is of considerable importance in that it seems to impress upon the injured employee the necessity of receiving medical attention. The foremen should be made to realize the necessity of getting the injured workmen to go to the hospital for treatment.

#### PHYSICAL EXAMINATION OF APPLICANTS

Another phase of the value of field hospitals in construction work is afforded by the physical examination of applicants for employment. Contagious and infectious diseases, heart lesions, impaired vision, deformities, malformations, and defects of all kinds—both congenital and acquired—may thus be detected, and such applicants as are unfitted can be excluded from communicating actual disease to their fellow workmen or increasing the hazards of accident to them through neglect, oversight, or bodily defect of those in the same line of work.

How this branch of the subject expands upon meditation, it is needless to remark. It has become a recognized obligation, morally and legally binding employers to eliminate from their forces of workmen all whose ailments or defects are such as to enhance the risk of accidents or to transmit disease. All must remember how steadily these doctrines of denying employment to the unfit have progressed until they rule. Human life can not ruthlessly be placed in jeopardy by careless hiring of the members of a working group.

The field hospital service can be utilized to restore to health those temporarily incapacitated by minor ailments, by means of which the labor unit is conserved. This saving of mankind has become of supreme importance, certainly of equal and as far-reaching value to the future as the conservation of material resources upon whose development the human factor is demanded. Such care responds to the dictates of modern thought. It spells wider prosperity.

The doctor can be of inestimable value to a construction organization by a proper and sympathetic attitude toward the workmen, and by his willingness to show the men that the company has their interests at heart, both when they are receiving their physical examination and when they are having their injuries treated. In the physical examination of applicants for employment, there is gained by the employee the advantage of an early discovery of disease, and therefore a more rapid and surer cure, while to the employer there is a reduction in time loss due to sickness and epidemics. To those applicants with organic disease, the danger of overwork and hazardous occupations can be brought out, and to the employer there is a reduction in risks for compensation due to accident disability, deformities and deaths. In advising and treating the sick there is brought

to the employer a steadier working force, while to the employees there is brought protection from contagious diseases. By efficient medical treatment the employer gains an increase in the general efficiency of the working force and secures the good will of the employees.

Field hospitals have both the merchandise and altruistic phases, the ledger showing a profit and the heart feeling a warmer pulsation. But before ending it may not seem too burdensome to recur to one branch of the hospital service not directly within its work, but so allied that it is hardly escaped. It relates to the disposition of workmen to reveal their home lives, their grievances, fancied or real, within their homes. It requires no argument to gain agreement that such tribulations affect in all degrees of influence the efficiency of a workman, tormented by perplexities, brooding, suffering mental anguish, all perhaps the products of transitory unhappiness, impairing the usefulness of the employee. It affords opportunity for the conscientious doctor to give counsel, and often to adjust these differences and disturbing factors arising within the household.

I want to digress for a moment from this paper and say that in the few days that I have been in Milwaukee attending this Conference I have heard many interesting things but I am sorry to say not one word have I heard about the invisible things which are of vital importance to doctors and to safety engineers. Safety engineers and physicians have more than a tangent relation to one another. They must work together in the closest co-operation.

For illustration, I would like to bring before you some of the little things that come up in the treatment of contagious diseases, and how contagious diseases are spread. The little germ that causes tuberculosis is about one-tenth of a thousandth of an inch in length and about one-fiftieth of a thousandth of an inch in width. This fact can be very easily demonstrated by the use of a microscope.

These little germs float about in the air, wholly invisible to the naked eye. You have seen the sun shining in the room on a clear day and noticed little specks of dust drifting about, sometimes remaining suspended in the air for several hours. The little germ that causes consumption can remain drifting and suspended in the air for hours.

My reason for bringing this up to you is because a great many of you employers may have men working for you a considerable period of time who may have acquired consumption. If you see men who are losing pep, who are losing weight, who are not on the job, who may have expectorated blood, it is highly important that you should bring the notice of such an individual to the attention of the doctor. He may be able to save the life of that individual by getting to his treatment early and he may be able to save the lives of many of his associates in the plant by getting him away from them and placing him in the proper environment.

CHAIRMAN WOEDTKE: I feel after listening to Dr. Cleary's remarks that we have had perhaps one of the most important contributions made to the Construction Sections problems.

## DISCUSSION

DR. H. L. DAVIS (Cleveland, Ohio): I can appreciate Dr. Cleary's paper very much because we are working along the same lines. We have a hospital on a job employing at the present time about 1,400 men, but the statistics basing on an average of 1,000 employees for four and a half months' time gave 820 injuries with fourteen cases of infection, which is 1.7 per cent and I think as well as I can remember twelve lost time cases. The amount of compensation paid out on those cases was, I think, \$146 or \$147.

To you men who are in the construction game and have not had this experience, the points laid down by Dr. Cleary are worth consideration. Where he says if a thousand are employed that should warrant a field hospital, we maintain that you should put them on where there are three or four hundred. By having a dispensary and a nurse there, and a doctor for about four or five hours, you are going to cut down a whole lot of compensation and lost-time cases.

MR. O. H. ULBRICHT (Builders' Mutual Liability Insurance Co., Milwaukee, Wis.): In reference to the 366 puncture cases that the Doctor mentioned where only two of them resulted in lost time, were there no fatal cases at all?

DR. CLEARY: There were no fatal cases. The cases of infection were reported to the hospital. The treatment for puncture wounds was always, to my mind, a very important one. We would first clean the part and then inject or swab it with iodine, following which we would inject or insert tannic powder. The man was told to return the next day where a case of infection would develop. But we only had two cases of infection with loss of time.

MR. ULBRICHT: Do you insert anything in the nature of drain?

DR. CLEARY: No, we do not. Tetanus cannot live in the presence of air. It has to have a media or surroundings where air is excluded and for that reason we always make adequate incisions. The patients generally complain a great deal about the radical treatment but it pays in the long run. If you explain to them about the germs that cause tetanus they will yield.

CHAIRMAN WOEDTKE: Doctor, assume that you find upon medical examination that a carpenter or a brick-layer is inclined to have vertigo, would you reject him completely, or, if he is good, keep him off the scaffold? You don't simply turn a man down and get rid of him altogether because he is not fit for the particular kind of work he has applied for, do you?

DR. CLEARY: Vertigo is just a dizziness. It may be caused by constipation, heat, indiscretion in diet, and in case vertigo is due to any of the causes outlined, of course, the man is not rejected. If, however, vertigo is due to heart trouble, or it is due to some kidney lesion, then, of course, there would be no question but what the man should be rejected. If the man could be placed in some position where he would not likely endanger others, then, I think, he could be taken care of.

CHAIRMAN WOEDTKE: Do you turn him down or send him back to the foreman?

DR. CLEARY: I either reject or make some suggestions to the foreman.

CHAIRMAN WOEDTKE: This is a mighty important matter that we are coming to. Following the reading of the next paper we shall have no discussion of it, for the reason that the report of the Standardization and Statistics Committee will be read at that time. It will then be open for discussion, modification or rejection, or referred back to the Committee. That will be left to your pleasure.

Mr. Davidson, the Chairman of that Committee, is going to deliver his paper and I want you to listen carefully. Mr. Davidson has been one of our faithfuls. While a youngster in the game, he has lined up and put his shoulder to the wheel in this Section.

### STANDARDIZATION OF ACCIDENT STATISTICS AND THEIR VALUE IN CONSTRUCTION WORK

F. A. DAVIDSON, SAFETY ENGINEER, DWIGHT P. ROBINSON AND COMPANY,  
NEW YORK CITY

Whenever the popular cartoonist turns his hand to the construction industry we find him almost invariably indicating his size up of the situation by portraying a poor worried individual staggering under the weight of many burdens, which tax him almost beyond endurance. This representation with occasional variations has become commonly accepted by construction men as expressing perfectly the present plight of their industry.

The loads which retard the progress of and weigh down so oppressively on our friend in the picture representing the construction industry are of various sizes and are variously labelled. Deciphering the labels we find among others "Shortage of Materials", "Rising Wages", "Transportation Difficulties", "Underproduction" and "High Liability Insurance Rates". Nor do we find the last named caption marking by any means the smallest of the burdens.

Moreover, no well-informed observer is surprised at finding liability insurance depicted as one of the substantial burdens bearing down on the construction industry today. For if a penalty amounting on the average to approximately four or five per cent of the payroll expenditure is defined as anything less than a serious handicap in any industrial pursuit in which manual labor is such an outstanding factor, as is the case in the construction industry, then it is not properly described. It is true to be sure that at the present time some of the other discouraging elements mentioned weigh perhaps more heavily. It is also true that in our habits of thought and speech we tend to follow a certain fashion. At the moment "Shortage of Materials", "Rising Wages" and so forth are fashionable terms. In attempting to solve our problem of today, namely, high costs, we cannot afford to overlook a single factor. Is it not possible that by focusing our attention exclusively on certain fashionable ills which beset us we may overlook the importance of this item of insurance

which relentless, persistently, day after day, in season and out, goes on swelling our cost figures, a constant tax on all our operations?

Although sums expressed in terms of percentage have a way of sounding small, every construction man who has checked over an estimate will agree that the allowance demanded by insurance looked amazingly large. Most jobs in these days on which the payroll expenditure is not over one hundred thousand dollars, are regarded as small jobs. Yet what builder with an operation involving a payroll of this sum has not coveted the four or five thousand dollars which he is obliged to pay for his liability insurance. Naturally, on the larger undertakings the sums spent for this purpose are more impressive. On a job with a million dollar payroll the insurance bill may be in the neighborhood of forty or fifty thousand dollars. If we were to total these increments paid out in connection with all contracts large and small throughout the whole country, needless to say we should find that the yearly cost of liability insurance to the construction industry reaches a startling figure.

It is sometimes said that this charge is passed on to clients and owners. The point is made that even if it were possible to avoid this item of expense no part of the saving would be retained by members of the construction industry. Therefore, why need we be concerned about it? We cannot argue along this line if we are alert to our own best interests. In our chosen field our livelihood depends on obtaining work. It is common knowledge that those who contemplate improvements are postponing their execution just as far as possible, deterred by high costs. Estimates are weighed most carefully and often the decision to go ahead or to hold off is determined by a very narrow margin. Certainly it is a fact that any possible saving of the sums mentioned above would look just as attractive to the investor as to the builder. It is unquestionably true that any reductions in cost which it might be possible for the construction industry to make, would be reflected in an increase in the volume of new construction business.

#### MANY PROBLEMS BEYOND SCOPE OF CONSTRUCTION FIELD

Surveying the field once more to try and pick out a point to hammer down the costs we observe that many of the problems are beyond the scope of the construction field. Indirectly, of course, builders can help some in removing the obstacles imposed by the present insufficient transportation facilities. But in the main, the construction industry will have to depend upon the efforts of those responsible for the management and operation of the railroads for the removal of the burden imposed upon it by transportation difficulties. In general, the same thing may be said with reference to the handicap imposed by the scarcity of materials.

On the other hand, in the case of the burden of liability insurance the construction industry does not have to depend upon assistance from any other quarter. This is a matter which is strictly within its own province. Is it not logical, therefore, in attacking high costs to devote some earnest attention to that item which is not only recognized as a serious burden, but also is a factor for which the construction industry alone is responsible?

What is the real character of this problem of liability insurance? Have we not sometimes fallen into the way of thinking that insurance partakes of the nature of time and tide, in that it is something quite beyond human control. Yet, fundamentally, our liability insurance is simply a question of the number of accidents which occur on construction work. If we have a relatively large number of accidents we are obliged to pay a relatively high insurance premium. If accidents tend to increase, our insurance rates tend to rise. Likewise if accidents can be reduced, the insurance rates will be reduced. Thus, the insurance problem resolves itself into a problem of accident prevention.

To those who have followed the progress of the Safety Movement it is an old story how industry after industry has achieved amazing results in reducing accidents. Reductions of fifty, seventy, and ninety per cent have become the common occurrence, and have demonstrated absolutely that accidents can be definitely brought under control.

#### CONSTRUCTION LAGGED BEHIND IN SAFETY MOVEMENT

Unfortunately construction has lagged behind the other groups in recognizing the possibilities in, and the valuable results to be obtained from a whole-hearted participation in the Safety Movement. Possibly the age-old notion: "Our business is different", explains one reason for our backward position. However, there is no reason for believing that the modern principle of accident prevention cannot be as successfully applied in construction as in other lines. Methods of application may be modified, but the principle is fundamentally sound and properly applied will certainly yield just as good results as have been obtained so widely in other industries.

As a matter of fact, the plan of applying a thorough-going safety program on construction operations has been adopted by several individual construction companies and has been proven beyond question to pay. Those who have attended previous meetings of this body recall the astonishing savings in insurance costs which representatives of these companies were able to show me in describing the accident prevention methods employed by their organizations.

Nevertheless, while a few progressive companies have accomplished splendid results in cutting down their individual costs the co-operation of the whole industry is necessary in order to achieve the benefits of lowered costs on a large scale. The construction industry as a whole must adopt a vigorous well-planned program for eliminating all preventable accidents.

It goes without saying that the first step in such a program is a determination of the facts relating to accidents. In other words, the foundation of a successful drive against accidents must be reliable accident statistics.

Statistics is a much abused term. At the very sight of the word the average man pictures a dry meaningless mass of figures and looks about for the nearest avenue of escape. Yet the proper kind of statistics simply represent facts brought together in a logical form and tabulated in such shape that they may be properly studied and made to serve a useful purpose.

All construction companies should establish at once a systematic plan of keeping their accident records that will fit in smoothly and naturally with their regular procedure. In accordance with the requirements of the Workmen's Compensation laws, all accidents must be reported to the state authorities. Thus, it is necessary in any case to put on record the essential information relative to all accidents. Instead of merely filing this data in a pointless, unrelated fashion, it involves little if any extra time and trouble to record this same information in accordance with a definite orderly plan, so that the facts may be readily tabulated and used.

#### ADVANTAGES OF SYSTEMATIC PLAN FOR KEEPING ACCIDENT RECORDS

Every company which adopts a systematic plan for keeping its accident records will find it of the utmost assistance in its efforts to prevent accidents on its own individual operations. First, it will show the chief executives the number and causes of accidents which are occurring. It will enable them to grasp clearly the waste and loss of efficiency which accidents represent. Only when the facts regarding accidents are presented in a more or less exact, concise form, instead of in a vague general way, can busy executives be reasonably expected to realize fully the importance of their accident problem and its significance bearing upon the well being of their employees and the productiveness of their business. The attitude of the chief executives of an organization toward accident prevention is reflected all down the line. Therefore, there exists the absolute necessity for them to have at hand the data upon which to base their judgment.

Second, clear-cut properly compiled accident records will show superintendents directly in charge of construction operations just how many accidents they are having and what causes are responsible for them. Thus, they can direct remedies and know where to concentrate their efforts toward prevention. Such records are of course, invaluable to men in any organization who may be assigned to supervise safety activities.

Furthermore, such records can be utilized to great advantage in attracting the attention of foremen and workmen to accident prevention. Statistics may commonly be regarded as of little interest. Yet every day millions of Americans display the keenest interest in one set of statistics, the relative standings of the major league ball teams. The spirit of competition makes the cold hard figures glow with life. Different jobs or different divisions on the same job can be put on a competitive basis and their accident records compared. The figures can be arranged and displayed in an attractive way to appeal to that universal spirit of competition so that superintendents, foremen, and workmen will strive to produce an accident record which will compare favorably with that of other divisions and with their own past record.

But every one of the arguments that can be urged to induce all construction companies to keep systematic accident records in accordance with any method which may suit their various individual ideas applies with vastly greater force when it comes to appealing to all members of the construction industry to compile and tabulate their accident statistics in accordance with a standard uniform method. This means striking in

unison at the very roots of the problem and ensures the maximum cooperation from the very start.

The advantage of standardizing accident statistics and having all construction companies tabulate their accident data in the same form are so self-evident as hardly to require stating.

This would be of value if for no other reason than that it would enable organizations to compare on the same basis their various accident records and let each one know how they stood with respect to others. The Dwight P. Robinson Company, for example, which the speaker represents, might compile and as a matter of fact actually does compile accurate accident statistics and knows just exactly its accident frequency rate. Yet unless other construction companies have compiled similar records on the same basis we cannot tell whether our record is better or worse than the average. We might believe it to be better, since we are obtaining the benefit of preferred insurance rates, but the actual fact of the matter is that without being able to compare it with the records of a sufficient number of representative companies of our own class to establish an average we are unable to know definitely just how we stand on the matter of accidents.

If we knew we did not stand as well as the average it would be a powerful stimulus to improve our standing. If we found we stood above the average it would be a matter of pride to us to retain and if possible extend our lead. There is no question but that the friendly rivalry that would thus be stimulated among various organizations would be of value in preventing accidents throughout the whole field. In a concern with a well developed "esprit de corps" it would simply be necessary to announce that a certain rival was able to do its work without as many accidents and all along the line the members of this company would become interested in the matter of bettering its accident experience.

But the real solid substantial argument for standardizing accident statistics and having all records on a common basis is that it would enable the combined accident experience of the entire construction industry to be readily analyzed in a scientific manner. Thus, in a very much shorter time than if each depended solely on his individual data, the principal hazards in the whole construction field could be fairly definitely ascertained. This would at once make it possible for all to devote their energies toward determining ways and means to eliminate the chief causes of accidents. In the pursuit of this object ideas and experiences could be exchanged to the most useful advantage.

#### STANDARD SAFETY CODES

The conclusions that it would be possible to draw from impartial studies of reliable standard statistics would afford a sound basis for concerted action by the members of the construction industry. Such concerted action might be taken in various ways, as for example in the preparing of standard safety codes for construction work. Frequently construction men are heard to complain relative to the provisions of certain state codes. But after all how can we expect to get to the most intelligent laws designed to promote safety, unless those who draft them have a



thorough knowledge of the facts, or in other words are in possession of complete statistics. Or another way in which concerted action based on broadly gathered facts could accomplish what individual action could not is in the bringing of pressure upon the manufacturers of construction equipment to induce them to provide adequate guards on their devices at the source, that is, in their shops.

Again, if we have standard accident data compiled from many separate sources it would make it possible for various valuable special investigations to be made in the way of scientific research having a great potential value. For example, it might eventually be possible to determine whether any definite relation and, if so, what relation exists between accidents and such other factors as overtime work, night work, labor turnover, industrial unrest, various types of construction and so forth?

Finally, many competent observers among insurance men are of the opinion that the classifications in the Compensation Insurance Manual relative to construction work are very much in need of revision. It is agreed that this can be done much more readily and intelligently after contractors have compiled accurate and comprehensive accident statistics.

Having agreed to the value in, and the necessity for the compiling of uniform accident records in construction, what are the practical steps required to bring about this standardization.

In the first instance, what are the records which should be regarded as essential. From the experience of other industries it may be stated with certainty that there are three distinct sets of data which all individual companies should tabulate. Every organization should compute first, its accident frequency rate; second, its accident severity rate; and third, should classify all of its lost-time accidents as to cause.

With respect to the first two mentioned there is little difficulty on agreeing upon a fixed standard. The basis of all accident frequency and accident severity rates is necessarily the amount of working time, which represents the amount of exposure to the risk of accident. Hence, since the working time varies it is simply necessary to decide upon a common unit of time for measuring accidents. The best opinion on this subject is now unanimous in defining an accident frequency rate as an expression stating the number of lost-time accidents occurring in any specified period of time per each one million man-hours worked. An accident severity rate for a given period is an expression stating the number of working days lost, due to lost-time accidents occurring in the period, per each one thousand man-hours worked.

Therefore, if the regular payroll figures of a company showed that during the past year their field forces worked 1,500,000 man-hours, while during the year there occurred on the work a total of 90 lost-time accidents the frequency rate would be computed by dividing 90 by 1.5. The quotient is 60. Hence, the accident frequency rate of this company for the past year is expressed as 60 lost-time accidents per each million man-hours worked.

In like manner if the above accidents caused a total loss of 6,000 working days the severity rate would be computed by dividing 6,000 by 1,500. The quotient is 4. Hence, the accident severity rate of this company for

the past year is expressed as four working days lost per each thousand man-hours worked.

This, then, briefly shows the standard method of compiling accident frequency and severity rates which all construction companies should adopt. Table I and Table II (See page 593, Appendix B, Report of Statistical and Standardization Committee, Construction Section,) display the standard forms which should be used in working up and recording this data. Any construction company whether or not a member of the National Safety Council that desires more detailed information relating to this method for computing their accident frequency and severity rates and to the proper uses of these forms can easily obtain it by writing to the headquarters' office of the National Safety Council, at Chicago.

Coming next to the third requirement that companies should tabulate as to cause all accidents involving lost time, we are at the present time facing a more difficult proposition. Table III shows the form which should be used in compiling this data. (See page 602, Appendix—Report of Statistical and Standardization Committee, Construction Section.) Obviously, however, the maximum value would be derived from data of this character if it were possible for all companies to adopt a standard list of causes for use in classifying their various accidents. Needless to say it will require considerable study to develop such a table of causes that will be sufficient to meet all reasonable requirements without being at the same time too cumbersome. The co-operation of as many representative companies as possible is absolutely necessary to evolve a satisfactory solution.

#### AIMS OF CONSTRUCTION SECTION OF N. A. C.

Fortunately for the construction industry a common meeting place for discussing and threshing out a matter of this kind is already established through the medium of the Construction Section of the National Safety Council. The development of such a standard list of causes for classifying accidents is one of the official aims of the Construction Section. All of us who are members of the Section should exert every effort to induce as many progressive construction companies as possible to join the National Safety Council and sit-in with us on this important matter. In any event, however, whether members of the National Safety Council or not, every construction organization in the interest of obtaining reliable accident statistics should classify all accidents in the manner shown in Table III on the basis of some suitable list of causes until such time as a uniform list has been agreed upon.

By way of recapitulation, then, we have sized up the situation of high costs in the construction field today and have discovered one vulnerable point to attack, that is, the factor of high insurance costs. Recognizing the reduction of insurance costs to be a question of reducing accidents it follows as a matter of course that the construction industry cannot afford to do otherwise than to institute a vigorous program for the prevention of accidents. The corner-stone of such a program must necessarily be accurately determined and properly tabulated accident statistics. Maximum results on a large scale cannot be achieved by individual companies playing a lone hand, but can only be obtained by the co-operation

of all. Thus, there exists the necessity for every progressive organization to compile standard uniform accident records. That is, every company engaged on active construction operations should regularly compile its accident frequency rate, its accident severity rate, and in addition should tabulate all lost-time accidents as to cause in accordance with the standard methods outlined.

In a word, therefore, let us enter upon the road which leads toward the elimination of the present tremendous waste in money, man power, and production due to accidents in the construction industry. If we are to reap the largest dividends from our efforts and are to make the greatest headway toward the realization of the high humanitarian ideal of no accident we must be satisfied that as we proceed forward step by step our feet are firmly planted on the solid ground of facts; that is, our progress must be based on standard dependable accident statistics.

CHAIRMAN WOEDTKE: There are two reports involved. One of them is on the question of standardizing frequency and severity methods of keeping your accident record; the other is that of standardization of causes. We do not hope to accomplish the end of the standardization of causes this year but I do hope to see the question of Report No. 1 dealing with standardization of methods for recording frequency and severity brought to some definite, final issue and following that to leave in your minds as much as time will permit the question of standardizing causes. Now, then, to that end let us devote the most of our time to the more important of the two reports, namely, that of standardization of frequency and severity recording.

MR. DAVIDSON: The Chairman gave the impression that the Committee has finished its work. The Committee feels that it has far from finished its work. It submitted what it called Report No. 1 of the Statistics and Standardization Report; the subject, about which there is more or less reasonable common agreement, has been covered in this report and we feel that it would be possible to submit this as a final complete report to be acted upon, to be rejected or accepted by the Construction Section and which will be regarded possibly in the nature of a guide or manual for any company to compile its records. When it comes to the matter of causes, as mentioned in the paper, there is still wide disagreement on the subject and we have to get together and discuss it. So, the Committee protected itself very carefully by submitting what it calls a tentative report, in which it announces its object as simply being that of setting up some sort of standard which the members gathered in session could attack and in order to have a real target to shoot at instead of talking in general.

#### REPORT NUMBER ONE OF THE STATISTICAL AND STANDARDIZATION COMMITTEE OF THE CONSTRUCTION SECTION OF THE NATIONAL SAFETY COUNCIL

##### INTRODUCTION

- I. Some reasons why it is necessary and advisable for all members of the Construction Section of the National Safety Council to adopt a syste-

matic plan of keeping accident records; and furthermore why a uniform method of compiling accident statistics should be used by all members.

A. The keeping of systematic records is of the greatest assistance in preventing accidents and is a fundamental factor in effective safety work.

1. By showing executives the number and the causes of accidents which are occurring and enabling them to grasp clearly the waste and loss of efficiency which accidents represent. Only when the facts regarding accidents are presented in a more or less exact, concise form instead of in a vague general way, can a busy executive be reasonably expected to realize fully the importance of the accident problem and its significant bearing upon the well being of his employees and the productiveness of his business.
2. By showing operating executives and safety men where accidents are occurring and from what causes, so that they may know where to concentrate their efforts for prevention.
3. By attracting the attention of foremen and workmen, and stimulating rivalry among different organizations or among different divisions or groups in the same organization, so that superintendents, foremen, and workmen will strive to produce a record with respect to accidents which will compare favorably with other divisions and with their own past record.
4. As a matter of fact in the field of accident prevention as a whole, not much headway was made in reducing the frequency of accident occurrence until some accident statistics were collected which showed the causes responsible for the greater number of accidents, and directed effective prevention measures.
5. The concerns which have been most successful in securing the interest and co-operation of executives, foremen, and workmen in accident prevention, are practically without exception those which have a satisfactory system of recording accidents and who have devised means for presenting these records in an interesting form.

B. A uniform method of compiling accident statistics should be adopted by all members of the Construction Section.

1. This would enable members to compare their various accident records and let each individual member know how his record compared to others.
2. It would stimulate friendly rivalry among different members to achieve good accident records.
3. Having the accident records of all members on a common basis would enable the combined experience of all members to be readily analyzed in a scientific manner.
  - a. Thus, in a very much shorter time than if each depended solely on his individual data, the principal hazards in the

whole construction field could be fairly definitely determined.

- b. This would make it possible for all to devote their energies to the solution of the most urgent accident problems in the construction field, and to exchange ideas and experiences to the most useful advantage.
- c. This would afford a sound basis for concerted action by the membership of the Construction Section as a body in such possible ways; for example, as assisting in the preparation of standard codes, in the bringing of pressure upon manufacturers of construction equipment to induce them to guard their devices at the source; that is, in their shops, etc.
- d. This would make it possible for valuable special studies to be made in correlating accident statistics with other phases of construction work, such as endeavoring to determine whether or not any definite relation exists between accidents and such other factors as overtime work, night work, labor turnover, labor unrest, special types of construction, etc.

#### REPORT PROPER

#### I. Report of Accident:

- A. Every accident, large or small, that causes any sort of personal injury, serious or trivial, whether or not it requires any medical expenditure should be reported and made a matter of record on a printed form provided for that purpose.
  - 1. The reason for this is that in the case of every accident there is a possibility of subsequent complications such as a serious infection. Consequently, it is advisable to have available the essential data relating to the case, such as the name of injured and the time, place, cause, and nature of the injury.
- B. There are various satisfactory systems for obtaining a formal report of every accident and any one which is suitable for the individual member should be adopted. Some of the following methods are in use.
  - 1. One method is to have the foreman make out a report of every accident on a prescribed form. One copy of this report is kept on file in field office and one copy is sent to home office.
  - 2. Where there is a medical station or field hospital on the job, a record of every injury is made there.
  - 3. Where there is a safety department on the job, a report of every accident is made by this department.
  - 4. One of the most advantageous methods is to use the standard state accident report forms prescribed by the state authority administering the compensation law in any particular state. Since at the present time almost all the states have compensation laws and most of them require a report on all accidents,

it save duplication of effort if the forms of the particular state in which the job is located are used for reporting accidents. A certain individual on the job, a clerk, or a first aid man can be designated to see that every accident is reported properly and promptly on the state accident blanks. A copy can be kept on file in the job office and a copy can be sent in to the home office.

5. Form I, Appendix A, shows a suggestion in the way of a form for use by foremen in reporting accidents and indicates the type of essential facts which should be made a matter of record in the case of every accident.

## II. Tabulation of Accident Data:

A. *Standard Definitions.* For statistical purposes the following have been adopted as standard definitions:

1. *Tabulatable Accidents, Diseases, and Injuries.* All accidents, diseases, and injuries arising out of the employment and resulting in death, permanent disability, or in the loss of time other than the remainder of the day, shift, or turn on which the injury was incurred, should be classified as tabulatable accidents, diseases, and injuries. Tabulatable accidents are commonly called "lost-time" accidents, although the former term is preferable due to the fact that in the use of the latter term there is danger that the idea might be conveyed that the occasional permanent partial disability with no lost-time connected with it is not to be counted. Tabulatable accidents are the only accidents which should be used for comparative or publicity purposes.
2. *Reportable Accidents, Diseases, and Injuries.* These include all tabulatable or "Lost time" accidents, diseases, and injuries and all non-tabulatable or "no lost-time" accidents, diseases and injuries.
3. *Compensable Accidents, Diseases, and Injuries.* These, as used in any report in accordance with the practice in any particular state, should be shown separately and clearly defined.
4. *Permanent Total Disability.* To this group should be assigned every accident, disease, or injury which is designated by statute as permanent total disability or which permanently incapacitates the workman from performing any work continuously in any gainful occupation.
5. *Permanent Partial Disability.* To this group should be assigned every accident, disease, or injury (less than permanent total disability) which results in the loss of, or in the permanent impairment of any function of the body.
6. *Fatal and Non-Fatal.* For statistical purposes, all accidents or injuries are to be considered non-fatal which do not terminate in the death of the injured employee within twenty-eight days of the date on which the injury was sustained. No subsequent correction of the original tabulation requires to be

made of non-fatal injuries as thus defined which terminate fatally after more than twenty-eight days of the date on which the injury was sustained.

7. *Days Lost Time.* Days lost time due to accidents should be expressed in terms of working days. Sunday is not to be counted as a working day. Saturday should be counted as a full day, even though only a half day is worked. Calendar days can be converted into working days by multiplying by 6/7.

#### B. Accident Rates

1. The basis of all accident rates is necessarily the number of men exposed to the risk of accident.
2. It is absolutely necessary to have a common unit for measuring accidents in all occupations, all industries, and all states or countries.
3. Therefore it is recommended that all members of the Construction Section adopt the unit of 1,000 hours exposure or 1,000 working man hours as the basis for calculating all accident rates.
  - a. This unit has been adopted by the U. S. Dept. of Labor Statistics and endorsed by the International Association of Industrial Accident Boards and Commissions and by many leading members of the National Safety Council.
4. There are two fundamental kinds of accident rates which it is recommended that all members compute:
  - a. Accident Frequency Rates.
  - b. Accident Severity Rates.

#### C. Accident Frequency Rates

1. An accident frequency rate is an expression stating the number of tabulatable or lost-time accidents occurring in a specified period of time per given number of 1,000 man-hour units of exposure. The accident frequency rate is generally stated as the number of tabulatable or lost-time accidents per hundred 1,000 man-hour units of exposure (per 100,000 man-hours worked) or per thousand 1,000 man-hour units of exposure (per 1,000,000 man hours worked).
2. *Method of Computing*
  - a. The number of tabulatable or lost time accidents occurring in any given period are known from the accident reports.
  - b. The number of man hours worked or hours of exposure during the given period are known from the regular records of any company.
  - c. Hence, the accident frequency rate for the given period is obtained by dividing the number of tabulatable or lost-time accidents by the actual number of 1,000 man-hour units of exposure. The quotient represents the number of lost-time accidents per 1,000 man hour unit of exposure

or per each 1,000 man hours worked. The accident frequency rate for the period as stated either as the number of tabulatable or lost-time accidents per 100,000 man hours worked or per 1,000,000 man hours worked.

3. A concrete example to illustrate the method of computing the accident frequency rate is as follows:
  - a. The Atlantic Construction Co. in the month of May had occur on their construction jobs a total of 10 tabulatable or lost-time accidents.
  - b. The total number of man hours worked on the jobs of the Atlantic Construction Co. during the month of May was 179,880, which is equivalent to 179.88 thousand man hour units of exposure.
  - c. Therefore divide  $10 \div 179.88 = 0.056$ . The quotient is 0.056, which represents the number of lost-time accidents per each 1,000 man hour unit of exposure or per each 1,000 man hours worked.
  - d. The accident frequency rate of the Atlantic Construction Co. for the month of May is, therefore, stated either as 5.6 tabulatable or lost-time accidents per 100,000 man hours worked or else as 56 tabulatable or lost-time accidents per 1,000,000 man hours worked.
4. A sample form recommended for use in tabulating accident frequency rates is shown in Table I—Appendix B. (Page 593.)

#### D. Accident Severity Rates

1. The purpose of accident severity rates is to compare the relative seriousness of accidents. The only stable, convenient, and satisfactory basis for measuring the relative seriousness of various accidents is by the time lost. An accident severity rate is an attempt to express in a standard uniform way the economic cost of industrial accidents in terms of time lost.
2. An accident severity rate is an expression stating the number of working days lost per each 1,000 man hour unit of exposure (or 1,000 man hours worked) due to the tabulatable or lost-time accidents occurring in a given period.
3. *Method of Computing*
  - a. The number of working days lost due to the accidents occurring in the given period are known in the case of all temporary disabilities.
  - b. Furthermore, the number of fatalities, permanent total disabilities, and also the number and degree of the permanent partial disabilities occurring in the given period are known. In order to derive an expression in the form of a rate the fatalities and permanent disabilities must be taken into account. Therefore, for statistical purposes.



to each fatality and permanent disability must be assigned arbitrary figures representing an equivalent number of days lost. The table of equivalents which is used by the U. S. Dept. of Labor Statistics, the International Association of Industrial Accident Boards and Commissions, the National Safety Council, and others, is shown in Appendix C.

- c. The number of days lost due to the temporary disabilities is added to the number of days obtained by taking the equivalents of the fatalities and permanent disabilities and thus the total days lost due to the accidents occurring in the given period are known.
- d. The number of man hours worked or hours of exposure during the given period are known from the regular records of any company.
- e. Hence the accident severity rate for the given period is obtained by dividing the total days lost by the actual number of 1,000 man hour units of exposure. The quotient represents the number of days lost per each 1,000 man hours worked. This figure is stated as the accident severity rate for the given period.
4. A concrete example to illustrate the method of computing the accident severity rate is as follows:
  - a. The Atlantic Construction Co. as cited above during the month of May had occur on their construction jobs a total of 10 tabulatable or lost-time accidents. Seven of these ten accidents were temporary disabilities, one was fatal, one caused permanent total disability and one resulted in the loss of the man's finger, which is a permanent partial disability.
  - b. The total number of days lost is determined as follows:

| No. | Kind                       | Days Lost | How Obtained                                                                                                                                                                                                                                                        |
|-----|----------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7   | Temporary Disabilities.    | 88        | From the actual records of the time lost by the individual injured men, supplemented possibly in some cases, where an individual has not returned to work at the time of compiling the record by an estimate as to the time lost by an expert industrial physician. |
| 1   | Fatal                      | 6,000     | From Table of Equivalents (see Appendix C.)                                                                                                                                                                                                                         |
| 1   | Permanent Total Disability | 6,000     | From Table of Equivalents (see Appendix C.)                                                                                                                                                                                                                         |

| No. | Kind              | Days Lost | How Obtained              |
|-----|-------------------|-----------|---------------------------|
| 1   | Permanent         |           | From Table of Equivalents |
|     | Partial           | 300       | (see Appendix C.)         |
|     | Disability        |           |                           |
|     | (One finger lost) |           |                           |

10 accidents 12,388

c. The total number of man hours worked on the jobs of the Atlantic Construction Co. during the month of May was 179,880 which is equivalent to 179,880—1,000 man hour units of exposure.

d. Therefore divide 12,388 by 179,880—  

$$\frac{12,388}{179,880} = 68.9.$$

The quotient is 68.9 which represents the number of days lost per each 1,000 man hour unit of exposure.

e. Hence, the accident severity rate of the Atlantic Construction Co. for the Month of May is stated as 68.9 working days lost per 1,000 man hours worked.

5. A sample form recommended for use in tabulating accident severity rates is shown in Table II—Appendix B. (Page 593.)

#### E. Classification of Accidents by Causes

1. This is one of the most important features of accident records and every member of the Construction Section should classify every table or lost-time accident as to cause.
2. Due to the fact that at the present time there is a wide range of opinion as to what should constitute a standard list of causes for classifying accidents, the committee is making this the subject of a separate report to follow later.

#### CONCLUSION

Your committee earnestly recommends therefore:

- I. That every member of the Construction Section of the National Safety Council adopt a systematic method of keeping accident records and a uniform method of compiling accident statistics.
- II. That every accident be made a matter of record on a suitable form provided for the purpose.
- III. That all members in their tabulation of accident data use the above-stated standard definitions.
- IV. That all members compute accident frequency rates and accident severity rates in accordance with the above stated methods.
- V. That all members classify all tabulatable or lost time accidents as to cause in accordance with any suitable list of causes, until such time as a standard list is agreed upon when all should classify their accidents in accordance with the standard list.

The above report is respectfully submitted for your consideration and action by the

STATISTICAL AND STANDARDIZATION COMMITTEE

(Signed) P. A. DAVIDSON, Chairman.  
 Dwight P. Robinson & Co., Inc., N. Y. City.  
 F. S. ROBINSON,  
 General Builders Ass'n., Detroit, Mich.  
 J. E. GRIFFIN,  
 E. I. du Pont de Nemours & Co.,  
 Wilmington, Del.

APPENDIX A

Form I is a suggestion in the way of a form for use by Foremen for reporting accidents.

Form I

FOREMAN'S REPORT OF ACCIDENT

Name: \_\_\_\_\_ Check No. \_\_\_\_\_  
 Occupation: \_\_\_\_\_  
 Date injured: \_\_\_\_\_ Hour of Day: \_\_\_\_\_ A. M.  
 P. M.  
 Weather conditions at time of accidents: \_\_\_\_\_  
 Place where accident occurred: \_\_\_\_\_  
 Injured person's immediate superior: \_\_\_\_\_  
 Where was he at time of accident? \_\_\_\_\_  
 Had employee been instructed in the work? \_\_\_\_\_ By whom? \_\_\_\_\_  
 Machinery, tool or appliance (if any) involved? \_\_\_\_\_  
 Is it in good condition? \_\_\_\_\_ Was safeguard provided? \_\_\_\_\_  
 Describe in full how accident happened. \_\_\_\_\_

Nature of injury: \_\_\_\_\_

Disposition made of injured: \_\_\_\_\_

Witnesses to accident or names of persons with knowledge of accident: \_\_\_\_\_

What can be done to prevent a similar accident: \_\_\_\_\_

Date

19

Foreman: \_\_\_\_\_

To accompany report number one of the Statistical and Standardization Committee of the Construction Section of the National Safety Council.

## APPENDIX B

## Tables Recommended for Tabulating Accident Rates

TABLE I

## A Table for Compiling Accident Frequency Rates

| Jobs or Depts. | No. of Man-hours Worked | No. of Tabulatable or Lost Time Accidents |        |                                    |                                      | Temporary Disabilities |                         |                          | Frequency Rate<br>Accidents<br>per 1,000,000<br>man hours<br>worked |
|----------------|-------------------------|-------------------------------------------|--------|------------------------------------|--------------------------------------|------------------------|-------------------------|--------------------------|---------------------------------------------------------------------|
|                |                         | Total                                     | Deaths | Permanent<br>Total<br>Disabilities | Permanent<br>Partial<br>Disabilities | Over<br>2 weeks        | Over 1<br>to<br>2 weeks | One week<br>Under<br>and |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
|                |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |
| Total          |                         |                                           |        |                                    |                                      |                        |                         |                          |                                                                     |

TABLE II

## A Table for Compiling Accident Severity Rates

| Jobs or Depts. | Man-hours Worked | Days Lost Due to      |       |                                      |                                    | Temporary Disabilities |                         |                          | Severity Rate<br>Days Lost<br>Per<br>1000<br>Man-hours<br>Worked |
|----------------|------------------|-----------------------|-------|--------------------------------------|------------------------------------|------------------------|-------------------------|--------------------------|------------------------------------------------------------------|
|                |                  | Total<br>Days<br>Lost | Death | Permanent<br>Partial<br>Disabilities | Permanent<br>Total<br>Disabilities | Over 2<br>Weeks        | Over 1<br>to<br>2 weeks | One Week<br>and<br>Under |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
|                |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |
| Total          |                  |                       |       |                                      |                                    |                        |                         |                          |                                                                  |

## APPENDIX C

## SCALE OF TIME LOSSES FOR DEATHS AND PERMANENT DISABILITIES

Its use is advocated by the International Association of Industrial Accident Boards and Commissions and by the United States Bureau of Labor Statistics.

| Nature of Injury                                                     | Degree of disability in per cent of permanent total disability | Days lost |
|----------------------------------------------------------------------|----------------------------------------------------------------|-----------|
| Death .....                                                          | 100                                                            | 6,000     |
| Permanent total disability.....                                      | 100                                                            | 6,000     |
| Arm above elbow, dismemberment.....                                  | 75                                                             | 4,500     |
| Arm at or below elbow, dismemberment.....                            | 60                                                             | 3,600     |
| Hand, dismemberment .....                                            | 50                                                             | 3,000     |
| Thumb, any permanent disability of.....                              | 10                                                             | 600       |
| Any one finger, any permanent disability of.....                     | 5                                                              | 300       |
| Two fingers, any permanent disability of.....                        | 12½                                                            | 750       |
| Three fingers, any permanent disability of.....                      | 20                                                             | 1,200     |
| Four fingers, any permanent disability of.....                       | 30                                                             | 1,800     |
| Thumb and one finger, any permanent disability of.....               | 20                                                             | 1,200     |
| Thumb and two fingers, any permanent disability of.....              | 25                                                             | 1,500     |
| Thumb and three fingers, any permanent disability of.....            | 33½                                                            | 2,000     |
| Thumb and four fingers, any permanent disability of.....             | 40                                                             | 2,400     |
| Leg above knee, dismemberment.....                                   | 75                                                             | 4,500     |
| Leg at or below knee, dismemberment.....                             | 50                                                             | 3,000     |
| Foot dismemberment .....                                             | 40                                                             | 2,400     |
| Great toe or any two or more toes, any permanent disability of ..... | 5                                                              | 300       |
| One toe, other than great toe, any permanent disability of .....     | 00                                                             | .....     |
| One eye, loss of sight.....                                          | 30                                                             | 1,800     |
| Both eyes, loss of sight.....                                        | 100                                                            | 6,000     |
| One ear, loss of hearing.....                                        | 10                                                             | 600       |
| Both ears, loss of hearing.....                                      | 50                                                             | 3,000     |

**Notes:**

1. Injuries not involving amputation should be rated as a proportion of the weight assigned to the entire loss of the member involved, in accordance with the degree of impairment.
2. The weighting for impairment of function of any member should be such percentage of the weighting for dismemberment as may be determined by the adjudicating authority in fixing the compensation for such impairment—i. e., if loss of an arm is compensated by 240 weeks indemnity, then an impairment of the arm for which 160 weeks compensation was paid, should rate as two-thirds of the loss of the arm in the above scale.
3. Hernia should be included only as a temporary disability on the basis of the actual time lost.

**DISCUSSION**

CHAIRMAN WOEDTKE: Don't confuse the question of causes in Report No. 2 with this one which deals only with frequency and severity. In-

stead of taking 3,000 hours as representing a year, or 300 days as representing a year, or twenty-five days as representing a month, or ten hours as representing a day as has been used in many cases, etc., we are leaving that aside—when I speak of we, I speak of the Committee. We are getting away from that question of days. That is one of the first principles that was laid down by the government bureau and the Industrial Accidents Board and the National Safety Council, to use rather the thousand hours of exposure. That is one of the most radical changes as outlined. I would like to ask Mr. Williams, who has gone over this matter, to give us what comment he has upon this.

MR. S. J. WILLIAMS (National Safety Council, Chicago): I have been very glad to see this Section and Committee take up this matter of standardizing accidents and statistics. This report is worthy of your adoption because it is in line with standards that have been recommended by other bodies and it certainly ought to prove practicable to you. It would be most unfortunate to adopt a report that was not in line with the standards other people are using. The only point in variance is using a thousand hours instead of 1,000,000 hours as a unit. That isn't so very serious. That simply means to change the decimal point. In speaking for the Council, I hope you will adopt the report.

CHAIRMAN WOEDTKE: If you will favor us with comments, Dr. Chaney, we will be mighty pleased to hear from you.

DR. L. W. CHANEY (Statistician, U. S. Department of Labor): I see from my standpoint no objection which can be urged against the tabulations which are suggested. Of course, the definitions and other items which have been mentioned by your Committee are in absolute accord with those which have been applied recently in the Federal Bureau of Labor Statistics.

As a matter of convenience in the determination of the severity rate I would find it convenient to have a more detailed table of the occurrences. All you need to have to determine your severity rate is your table of occurrences simply amplified. I am inclined to think that you would find it more convenient in getting the severity rate to amplify your table of occurrences so that you could get both your frequency and severity. The plan in use for a number of years in the Federal Bureau of Labor Statistics is the computation of the severity rate from the table of occurrences.

Then, of course, there is another thing you might do. You might amplify your table of occurrences so as to take in the different sorts of permanent disabilities. Then it becomes a very simple matter to calculate from that table your rate of severity. I can hardly explain it in a few moments but it is possible to do it so that you can very readily pass from that to a table of severity.

CHAIRMAN WOEDTKE: Doctor, when you refer to occurrences you mean the same thing which we call causes?

DR. CHANEY: No, I mean the number of cases that occur, that is, so many deaths, so many temporary disabilities that are classified to the length of disability, terminating to the second, third, or fourth week. That is what we use. You can derive a frequency rate table and a severity

rate table from that one table. That has been our custom for a long while and you will have to go through some process of that sort if you are going to get your severity rate.

I should be inclined to recommend to you the blank which we have used for a number of years and on which a large proportion of the reports that come into the Federal Bureau of Labor Statistics are entered. It involves no modification of the suggestions here made except that you would line up your causes in a little different form before you began to get to these final tables which are tables of rate. It is perfectly possible from the tables here suggested to pass to the standard form which we have used for a good many years, so I won't have the slightest objection to things coming out in this form.

You see what we are anxious to do in the Federal Bureau of Labor Statistics is to assemble a large body of well established facts in regard to occurrences on a national scale. At the present time there are three agents which are accumulating these standards, the International Association of Industrial Accidents, the Bureau of Mines and the Bureau of Labor Statistics with reference to a rather small section of industries. Our reports cover at the present time with practical completeness, the iron and steel industry and then we make occasional excursions into other domains of industry but no other have we covered completely. Now, of course, what we would like to have is records from the construction people in the country such as we can combine and get at a national record. If you adopt this plan we can get exactly that. We should be highly gratified to have something of this kind undertaken.

I had two things in mind in coming to this Section: One of them was to say to you that there is no reason that I can see why the compilation of these statistical matters for purposes of comparison should not be done by the Federal Bureau of Labor Statistics. If you will furnish us the data we will put them back into the form in which you can compare them. We will return them to you in our standard form, and you can have the facts with regard to your own company as a matter of confidential information. We will give you the facts in general for the entire construction industry, providing you come into it. If this varied very largely from the plan which we are using, I should take occasion to criticize it a bit earnestly because it would make impossible such a national presentation as we would like to offer it. We want to do it if possible and the adoption of the report as presented would make it perfectly possible for us to do exactly what we would like to do with it.

I am not sure, personally, that you might not find greater convenience in a somewhat amplified classification of your cases, that is, somewhat more spread out than is proposed in the report which is submitted to you. I don't think that is a matter of grave concern.

MR. BESSEY: I would suggest that a check be made with the National Council on workmen's compensation insurance, a method of tabulating the very same thing, so that you can compare on that point.

MR. DAVIDSON: Dr. Chaney has backed up the Committee and we very much appreciate it. He has gone one step farther by submitting to the

Construction Section a tabulation or form somewhat similar, as I understand it, to the very form which we have recommended here. Where we say temporary disabilities, we have three classes—less than one week, one week to two, and over two weeks. We might have carried that on to two to three, three to four, four to five, etc., or some limit which is at present used. I think that Dr. Chaney will understand that we are trying to bring into this thing people whose business is to construct and we are still in the stage of even securing their interest, so for us to submit at once a report with any refinements it would necessarily be a rather complicated looking proposition. We have even to avoid that. Over two weeks covers everything. Our report conforms to the Statistical Bureau report. It is simply a question of amplifying that table. That could be done very easily and it would be simply a matter of a concern. If a concern gets sufficiently interested in it, making an addition to this form. If I am not mistaken, Dr. Chaney, you mean that if this form were filled out completely, the Bureau could get all the data they needed.

DR. CHANEY: Yes, we are satisfied. I would call it an amplification in order to arrive at some other things more readily. When you use the form which I have in mind, all you have to do is to make a very simple calculation from that table to get your severity rate and I can't see as you have proposed that. You have simply amplified it.

MR. WILLIAMS: Isn't this just a question of who is going to do the calculating? I understand Dr. Chaney's suggestion contemplates that the person or company making the report would have the data sheet in which the severity of the permanent injury would be classified sufficiently in detail so that all that the reporter would do would be to make a tally mark in the column. He would not do any calculating. That would all be done by the office to which it was sent, or by some other one body in a rather wholesale fashion.

#### REPORT FORM PROPOSED BY THE COMMITTEE

I think what the Committee report contemplated was something a little different and I am inclined to agree with the Committee that their report would be easier to use at this time. I think that because of the fact that in the average construction job for a report covering any ordinary length of time, such as a month, very often you wouldn't have any permanent injury at all. It seems unnecessary to use up a lot of paper by presenting a vast expanse of paper with a lot of columns which they won't use at all. Therefore, it seems a little simpler where you do have a permanent injury to note down in that column, "One permanent injury," and then write at the bottom of the sheet that the permanent injury consisted of amputation or whatever it was. The man making up the calculation sees that and he makes his calculation accordingly. That kind of a report wouldn't do at all for the report of an operation of a steel mill where they report for a year, but it would do very well for a construction job covering two or three hundred men over a month.



CHAIRMAN WOEDTKE: I would like to get some opinions from the rank and file of the Section. You have heard talks from Dr. Chaney and Mr. Williams, now I would like to get the slant on this from some of you fellows who are ordinary laymen like myself as to your opinion regarding its practicability.

MR. WALSH: When you are compiling your reports, Mr. Davidson, you are compiling on two bases—up to a compensative period and beyond the compensative period.

MR. DAVIDSON: We say under one week, one week up to two weeks and over two weeks. We recognize that it would be utterly impossible for a report working over several states to ever hit upon one that would ever be uniform. We follow the standard practices of the Bureau which Dr. Chaney recommends and the standard forms which the National Safety Council have recommended in the Safe Practices pamphlet, No. 21, in order to get away from the idea of any particular insurance group. I should like to say this for Dr. Chaney's benefit. With reference to causes, report No. 1 simply says this in conclusion V. "That all members classify all tabulatable or lost-time accidents as to cause in accordance with any suitable list of causes, until such time as a standard list is agreed upon when all should classify their accidents in accordance with the standard list."

CHAIRMAN WOEDTKE: Let's clear this up. I am wondering, Mr. Paris, if you wouldn't be agreeable to disposing of Report No. 1 and withholding your recommendation as to causes until we take action on this report.

MR. R. E. PARIS (General Builders' Association, Detroit, Mich.): I do this purely for clarifying the situation. I make a motion that the Committee's Report No. 1 be adopted.

(The motion was seconded.)

MR. ALBERT S. REGULA (Liberty Mutual Insurance Company, New York City): Your Committee indicates no time table. Is the tabulation to be made monthly or quarterly or yearly?

MR. DAVIDSON: The Committee didn't recommend that because we left that to any individual company. Personally, I recommend a month because I use it by the month in sending it out to jobs.

MR. REGULA: I think that some mention of it ought to be made.

DR. CHANEY: You deal with hours of exposure and you don't have to pay any attention to time. Since you are using hours of exposure you don't need to bother in the least about how long a period it covers.

CHAIRMAN WOEDTKE: It is a question as to how often they should be made up.

DR. CHANEY: That should be left to the companies as to how frequently they want to cast it up.

(The motion was carried that the Committee's Report No. 1 be adopted.)

CHAIRMAN WOEDTKE: Mr. Davidson, will you proceed at once with Report No. 2. It wouldn't surprise me at all if we didn't finish with this because it is chock full of thorns. That is true not only in this construction industry, but Mr. Williams will tell you that the same problem pre-

valls among Industrial Accidents Boards and everybody that gets into this question. It is a tough proposition to get them to agree on this problem.

**A TENTATIVE REPORT OF THE STATISTICAL AND STANDARDIZATION COMMITTEE OF THE CONSTRUCTION SECTION OF THE NATIONAL SAFETY COUNCIL ON THE SUBJECT OF A STANDARD LIST OF CAUSES FOR USE IN CLASSIFYING ACCIDENTS ON CONSTRUCTION WORK**

- I. As stated and explained in Report No. 1 of this committee the classification of accidents by causes is of the utmost importance because it brings to light conditions and practices requiring correction and serves as a guide for accident prevention measures.
- II. The following list of fifteen causes is suggested as a standard list to be adopted by all members of the Construction Section in classifying their accidents as to cause:
  1. Handling of materials and objects
  2. Machinery and equipment
  3. Scaffolds—Stagings—Runways
  4. Falling—Tripping—Slipping
  5. Falling material or objects
  6. Flying objects or particles
  7. Protruding nails
  8. Using hand-tools
  9. Ladders
  10. Excavations
  11. Ropes, Cables, Chains
  12. Hot, corrosive and poisonous substances
  13. Electricity
  14. Fires and explosives
  15. Miscellaneous (Unclassified)

**III. Notes Regarding the List**

1. *Handling of Material and Objects*
  - a. This heading covers the actual physical handling of material and objects (loading, unloading, carrying, lifting, rolling, piling, etc.).
  - b. Under this heading also come the handling of hand trucks, hand carts, timber dollies, wheelbarrows, concrete buggies, etc.
2. *Machinery and Equipment*
  - a. This heading covers all power machinery on the job such as saws and other woodworking machinery, machine tools, compressors, pneumatic tools, boilers, motors, pumps, concrete and mortar mixers, conveyors, road machinery, steam rollers, graders, ditching machines, dredges, steam hammers, hoisting engines, construction hoists, cable ways, derricks, locomotive cranes, steam shovels, drag line scrap-

ers, locomotives, cars, tractors, automobile trucks, horse-drawn vehicles, etc.

3. *Scaffolds—Staging—Runways*

- a. This heading includes collapses of poorly constructed or overloaded scaffolds, stagings, temporary concrete towers, elevator shafts, overhead protection sheds, etc., also any accidents due to the failure of any members of such temporary structures.
- b. Under this heading also come accidents due to lack of proper railings, toe-boards, etc., on such or around such structures.

4. *Falling—Tripping—Slipping*

- a. This heading is self evident and applies whether the individual was on the ground or at an elevation with the exception of falls from scaffolds, etc., where proper rails and toe-boards were lacking, which if they had been installed would have prevented the accident so that the accident was really due to a defect in their construction and properly classifies under heading Number Three.

5. *Falling Material or Objects*

- a. This heading covers cases of accidents due to material or objects falling from above or from piles but does not include material or objects dropped while being carried by the injured himself, as such cases come under heading Number One.

6. *Flying Objects and Particles*

- a. This heading includes flying particles set in motion by drilling or chipping or other tools; flying nails; chips; particles blown by the wind, such as dust, cement, cinders, etc.
- b. This heading does not include flying objects set in motion by power machinery such as the case of a piece of lumber thrown by a rip saw, or the case of pieces of a broken emery wheel being thrown, or the case of fragments of an exploded boiler being scattered, etc., which are more properly classified under heading No. Two.

7. *Protruding Nails*

- a. This heading is self evident

8. *Using Hand Tools*

- a. This heading is self evident

9. *Ladders*

- a. This heading includes accidents caused by ladders or parts thereof collapsing or falling whether due to defective material or construction, or to abnormal overloading.
- b. Also under this heading come accidents due to ladders slipping or falling, also accidents due to men falling or slipping while using ladders.

10. *Excavations*
    - a. This heading includes accidents due to cavings; also falls of persons into excavations that lacked proper railing protection.
  11. *Ropes—Cables—Chains*
    - a. This heading includes all accidents due to the failure of ropes, cables, or chains.
  12. *Hot, Corrosive and Poisonous Substances*
    - a. This heading is self evident.
  13. *Electricity*
    - a. This heading is self evident.
  14. *Fires and Explosives*
    - a. This heading is self evident.
  15. *Miscellaneous (Unclassified)*
    - a. Under this heading is placed all accidents that cannot be classified properly under the other headings.
- IV. General Comments
1. Most accidents result from a combination of causes. However, it is agreed by competent authorities that for the purpose of classification accidents should be ascribed to the immediate cause, that is,—“To that condition or circumstance, the absence of which would have prevented the accident; but if there be more than one such condition or circumstance, then to the one most easily prevented.”
  2. The following example illustrates the above:
    - a. A laborer wheeling a barrow down a poorly constructed runway stumbles near the foot of the runway, which causes him to fall against a concrete mixer in operation and he catches his hand in a set of unguarded gears on the mixer which badly crushes his hand.  
Under the above ruling the accident is charged to the unguarded gears on the mixer and is classified under heading No. 2. Had the machine been properly guarded the man would not have sustained the injury which he did, viz., a crushed hand, although it is possible he might have been otherwise injured by his fall. It is regarded that it is an easier proposition to guard the gears of a machine on a job than to be certain that all runways at all times are properly constructed.
- V. In attached Appendix see Table III illustrating a suggested form for use in tabulating accidents as to cause.
- VI. The committee is still actively considering this subject of a standard list of causes for classifying accidents. It is not prepared as yet to recommend the list quoted herein for final adoption by the Construction Section. However, it is recommended that members who are not already using a list of their own or who are willing to change to this list, adopt the same and use it until a final standard uniform classification is agreed upon by the Section. It is the sincere wish

of the committee that every member who has any comments, criticisms, or suggestions to make regarding the above suggested standard list, will forward same without delay to the Chairman or other members of the committee for consideration by the committee, so that at the earliest possible date the committee will be able to submit a final report on this subject.

The above report is respectfully submitted for consideration and action by the

STATISTICAL AND STANDARDIZATION COMMITTEE

(Signed) F. A. DAVIDSON, Chairman,  
Dwight P. Robinson & Co., Inc., N. Y. City  
F. S. ROBINSON,  
General Builder's Association, Detroit, Mich.  
J. E. GRIFFITH,  
E. I. du Pont de Nemours & Co., Wilmington, Del.

APPENDIX

TABLE III

A Table Recommended for Tabulating Accidents Classified as to Cause

| Cause                                                              | No. of tabulatable or lost time accidents |        |                          |                            |                    |                   | Days lost due to |                 |        |                        |                          |                    |                   |                  |  |
|--------------------------------------------------------------------|-------------------------------------------|--------|--------------------------|----------------------------|--------------------|-------------------|------------------|-----------------|--------|------------------------|--------------------------|--------------------|-------------------|------------------|--|
|                                                                    | Total                                     | Deaths | Perm. Total Disabilities | Perm. Partial Disabilities | Temp. Disabilities |                   |                  | Total Days Lost | Deaths | Perm. Total Disability | Perm. Partial Disability | Temp. Disabilities |                   |                  |  |
|                                                                    |                                           |        |                          |                            | Over 2 Weeks       | Over 1 to 2 Weeks | 1 Week and Under |                 |        |                        |                          | Over 2 Weeks       | Over 1 to 2 Weeks | 1 Week and Under |  |
|                                                                    |                                           |        |                          |                            |                    |                   |                  |                 |        |                        |                          |                    |                   |                  |  |
| Handling Materials and Machinery, Equip., Scaffolds, Staging, Etc. |                                           |        |                          |                            |                    |                   |                  |                 |        |                        |                          |                    |                   |                  |  |
| Total                                                              |                                           |        |                          |                            |                    |                   |                  |                 |        |                        |                          |                    |                   |                  |  |

CHAIRMAN WOEDTKE: We are ready for you, Gentlemen.

DISCUSSION

MR. WILLIAMS: I have to leave this meeting in just a moment. May I be heard? I hope the Committee will make some little revision of this list before it is adopted even tentatively, because if you recommend any one company to use this now, in case they are not already using a list of their own, many will start using it and afterward will not want to change. If it is desirable to change this classification at all it could be done within a couple of months and be approved by your Committee.

The reason I suggest the revision is on the general grounds of standardization with other people. It is very true that the emphasis of accident causes is very different in different industries. In construction there are certain kinds of accidents that are high and in other industries the reverse would be the case. When I speak of using a standard classifica-

tion I have that fully in mind but I want to make a point that it is possible to take any list of causes that you want to adopt, that you think are the principal causes in your industry and fit those into a standard scheme. That is to say, you can recognize about ten primary groups of causes; some of them are some of the groups that you have here and others are not. I am not sure that there is absolutely an agreement even in the national groups. If there isn't I am going to suggest that it is Dr. Chaney's business to arrive at some agreement. But there is pretty close agreement in the government and state reports.

I would like to leave with you a suggestion that the matter be referred back to your Committee for consideration along that line with conference with labor statistics and state departments and, possibly, if you like, authority of your Executive Committee, to promulgate this Section and in the course of a couple of months give a report for some consideration.

DR. CHANEY: My objection to the list presented is that it entirely disassociates the Construction Section from other industries. There is in existence, as Mr. Williams has said, an agreed-upon classification covering nine or ten classes and the various states and the Federal Bureau and the Bureau of Mines and to some extent the Interstate Commerce Commission are all using that classification. It simply groups in about ten heads the different causes. They are all in here, but they are in here with such relation to each other that if your accidents were cast upon this basis, they would be absolutely of no value as to what is done in other states or in other industries. So, it seems to me the rational thing for the Construction Section to do is to adopt what has already become a main standard and then get at your particular problems with the varying sub-divisions. Now, I have quite different sub-divisions of those main causes that I use in the iron and steel business. There are some peculiarities to each particular form of industry. It is possible to group all things which happen with practical uniformity under this standard classification, and, as that classification has been in development for at least seven years, and has been thrashed over and considered from the top and the bottom and each side, it does seem to me highly desirable that that be the basis of all classifications of causes. Then you can go on in any way you choose for elaboration of that classification for the purpose of bringing out the peculiarities of your subject.

MR. PARIS: I would like to ask Mr. Davidson or Dr. Chaney if this getting together can be done in a few days or if it must be put over for another year.

MR. DAVIDSON: My idea is this: I think Mr. Williams made a good suggestion. If we can be persuaded here by Dr. Chaney's and Mr. Williams' and other comments which may come up that our list here is quite a ways off, I feel that we might do just as Dr. Chaney has suggested, work up possibly a list of standard ten causes and supply a number of sub-causes which, after all, would simply be a revision of this list and we could get that out in the form of a tentative report to be used temporarily in two or three months' time at the outside. In the meantime, we could continue on the proposition, to study the final side, which we might take

up next year. But if there is something here obviously out of kilter with this proposition, I think as Mr. Williams said, it would be very unwise to take it up. If Dr. Chaney or any other gentleman here can show us quickly that our classification needs a bit of rearranging, we could do that and send you within a couple of months' time a tentative report.

MR. PARIS: I move that the report be referred back to the Committee for its further deliberation and recommendations, assisted as it will be by Dr. Chaney and we abide by their decision.

(The motion was seconded.)

MR. F. L. HURLBUTT (E. I. du Pont de Nemours & Co.): I would like to ask Dr. Chaney if he would express himself as to whether the nine or ten primary causes which the Federal Bureau have adopted will cover the primary causes for the construction industry. It is my belief they will.

DR. CHANEY: I should be inclined to answer that in the affirmative. They will not bring out all the things which you people want to know but it is simply necessary to sub-divide those general classes into classes to bring out the things which you are interested in.

The standard list—perhaps I ought not call it that, but I will go right on—has two groups, the handling of material and the handling of objects and tools. For convenience, I have combined those for my own purposes into one group; the handling is the important thing, so I say handling objects and tools. That is one of my primary classes in the iron and steel industry. Then I go on into that to amplify different sorts of handling and so get at the peculiarities of the particular industry that I am trying to show up. What I want is something by means of which I can set alongside of the construction industry such an industry as the iron and steel, foundries, or anything else of that sort and say in the handling of objects and tools the construction industry shows so-and-so and this other shows so-and-so, as a general proposition. Then when you come to sub-divide that you see you make a very different sub-division in foundries. You might want to specify in foundries the handling of flasks, for example, because that is special and very dangerous. You will find that this group of ten will serve the purpose in a half a dozen industries.

MR. BESSEY: I hope this motion prevails. There is a movement toward the standardization of accident causes which has been going on for some time. The Federal Bureau of Labor Statistics might be called its father. The Industrial Accident Boards have been fostering this thing for some time.

CHAIRMAN WOEDTKE: Is there anything further on the motion? If not, all in favor signify in the regular manner.

(The motion that the report be referred back to the Committee for its further deliberation and recommendations, assisted as it will be by Dr. Chaney and that the Construction Section abide by their decision was carried.)

CHAIRMAN WOEDTKE: It would be in order, as a matter of record and publicity for the large number of construction members of the National Safety Council to put this Section on record as officially endorsing the Standard Report of No. 1 and making it the sense of this meeting that

all members of the Construction Section be requested to get in line and keep accident records, first; and, second, in conformity with Report No. 1. A motion to that effect will be in order.

MR. HUELBUETT: I so move.

(The motion was seconded and carried.)

MR. DAVIDSON: Since this Section has shoved a whole lot of work on to Dr. Chaney we should move a vote of thanks to him for assisting the Committee.

CHAIRMAN WOEDTKE: We will make that a rising vote of thanks.

(A rising vote of thanks was given to Dr. Chaney.)

MR. PARIS: I would like to have Mr. Davidson know that we all appreciate the efforts that the Committee has put forth in the Standardization Committee.

CHAIRMAN WOEDTKE: I know that is so but that simply expresses it verbally.

DR. CHANEY: I am coming after you along after the first of the year to get for the purposes of the Federal Bureau the statistics of the construction industry for the year of 1921. You are warned that we are going to be after you to get this material for the use of comparison with the materials we get from other sources and I shall hope that you will respond to that request with the utmost cheerfulness.

CHAIRMAN WOEDTKE: There is one thing we have to do and that is to appoint a Nominating Committee to bring in a list of names as officers for the ensuing year at the next session.

I will appoint on that Committee:

J. H. Schults, James E. Stewart & Company, New York City; F. R. Foster, Liberty Mutual Insurance Company, Philadelphia, Pa.; F. S. Robinson, General Builders' Association, Detroit, Mich.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

CHAIRMAN WOEDTKE: We are going to dislocate the arrangement of the speakers with your permission to suit the convenience of one of our members who has always been mighty good in backing us up. While he is not strictly a construction man, his interests are the same as those of contractors in the shipbuilding game. Of course, during the war period there were a great many shipbuilding industries and there was some considerable demand for the formation of a Shipbuilders' Section of the National Safety Council. It was found inadvisable, however, to create a Section for the time being until they saw whether the shipbuilding was to be a permanent or a war measure and it so proved following the armistice that the shipbuilding industry gradually waned so that there are not many left. There are still quite a number left, however, and out of consideration to the shipbuilders, we put on our program a paper covering the shipbuilding industry, and the speaker, Mr. Thomas A. Walsh, is well known to many of you.

MR. THOMAS A. WALSH (Merchants' Shipbuilding Corporation, Phila-



delphia, Pa.): The Chairman has just told you why shipbuilding has much depleted since the days of the war, but I think the Council in assigning this paper tried to figure in the past rather than in the future tense and I tried as nearly as possible to follow along those lines.

## THE PROGRESS OF SAFETY WORK IN THE SHIPBUILDING INDUSTRY

THOMAS A. WALSH, SAFETY ENGINEER, MERCHANTS' SHIPBUILDING CORPORATION, PHILADELPHIA, PA.

It was only recently that we read in the daily papers that "Old Glory" was again rapidly coming into her own in the shipping world. In other words the flag of the United States is now flying from the masthead of more Merchantmen in the numerous parts of the world than in any year in the past history of the country.

To set this high watermark in bottoms meant high-peaked production and in the minds of many old-time shipbuilders when speed is demanded, naturally her compensation is a definite toll of human life and it was only recently a foregone conclusion that a real ship was never built without the sacrifice of at least one unfortunate. Major and minor casualties were, to many, proud scars of industrial skill.

Such unfortunate circumstances are now being rapidly routed, in fact since the early days of 1918 when it was conclusively shown that avoidable accidents could be eliminated in the shipbuilding industry as successfully as the numerous other fields of livelihood in which accident prevention methods have scored marked success.

To accomplish this work meant only a detailed study of shipbuilding from the point of the construction yard to the repair plant and in doing so to grasp first the prominent causes of injury and set about to correct them systematically. To do this we have to consider the hull in its various stages from the setting of the keel blocks to her acceptance after the trial trip.

### STAGING

First let us consider staging in the modern yard, naturally one of the most important details of ship construction. This applies both to the shell and interior work. From this phase of work statistics have shown the greatest severity and it is a condition that can only be remedied by sound judgment in building and good supervision when set up that safe conditions are maintained.

The general type of staging found in steel yard on shell or outside work consists of a set of four uprights spaced on sixteen foot centers and diagonally braced. At the height of about 6 feet 10 inches on the vertical distance of these uprights are placed moveable cross logs or spawls upon which are set eighteen foot planks at least two in width and preferably three amidships while fore and aft on the shear this number should be increased to four with a solid staging directly aft or on the fantail.

It is important to bring out the fact that each tier of staging should

be supplied with at least one substantial guard rail set at a distance of 3 feet 6 inches from the face of the plank and in many instances two rails can be successfully provided through a consideration of the vertical distances between platform levels. In placing guard rails it is perhaps wise to suggest that they be bolted in place rather than nailed as has sometimes been found and that they be constructed of the heaviest material practical, namely a 3x6 inch timber in preference to a 2x4 inch. This fact is based upon the experience of men sometimes standing or jumping upon these rails in going from one platform level to the other, a practice that can only be minimized through the closest supervision and when detected treated with severe action.

While on the shell or outside staging it is no more than fitting that some consideration be given to the planking. Two planks is the least number that a man should be permitted to work upon and this is based on their location on the hull and the size of the berth in general. Due to the excessive vibration from crane movement and the action of pneumatic tools these planks have a tendency to creep which can be largely overcome through the use of countersunk bolts in their ends or cleats nailed to their under side. Both methods have proved effective and have been instrumental in reducing the tendency of employees in general from moving the planks.

In many yards, particularly where piece work is carried on, the matter of moving planks on staging by employees in general proves a serious one. This condition often leaves open gaps along the shell which form traps for employees working in their vicinity and unless immediately connected will lead to a serious accident.

It is perhaps fitting at this point to lay some stress on the importance of cross logs or spawls in their relation to accidents and on this point the bolted spawl is superior to that set in place through the use of a wedge as these wedges at their best become loose and drop down and where there is much shifting to be done are often neglected with the result that you have a spawl that is liable to creep and upset your working platform. The various stage levels are generally reached through the use of ladders and in every case these ladders should be of the best material, tied securely at the top, braced at the middle, and in some cases where middle braces are impracticable their backs should be cross-braced to take up any sway. These ladders should, from a point of standard practice, lean in one general direction and where there is any declivity of marked difference in elevation from shore line to bow or inboard end such ladders should lay in the direction of the grade.

Before leaving the matter of outside staging and ladders we should consider two more important features, they being the methods of approach to the hull on the ways. In this particular matter we have the inclined ramp and the stairway leading to the main deck. Through an investigation of this condition in numerous yards the inclined ramp seems to have proved the more efficient and more adaptable to the easy handling of personally carried loads. The second point is that of providing a safe and efficient method of reaching the lower decks of the hull without going up to the main deck, coming down on the inside, or as sometimes termed

"Up and Over." This is readily taken care of through providing a passage through a left off shell plate at the bow and sometimes midship section. Where this practice is carried on and the plate left off is high, temporary stairs have in every case proved the most efficient and safest. This particular point has proved not only a safety feature but a large production factor as it eliminates considerable time lost on the part of men working on the tanks going from the ground to the main deck and down through the hatch to their point of work.

Before leaving the shell staging perhaps it would be wise to mention the hazards often created on staging due to shoring where required. Frequently the work of shoring when carried from the upper sections of the shell causes the planks to be spread producing a bad working platform; this can be eliminated through the use of short planks carried on a spawl on either side of the shore to the main spawl on the upright; the result of which is to give a firm and solid working platform.

*Inside Staging.* The supervision over the safe maintenance of this staging should be as exacting as that on the shell of the hull. The general features to be considered are where practical to have all staging between web frames and hatches run fore and aft and that there is a sufficient number of planks provided, this varying with the type of construction and the ship's beam. This staging is supported in several ways, some of which are the wood spawl with upright from tank top, wood figure four bracket, liner bracket with clamp and loose rivet joint, angle bracket and hook bolt or swinging staging. The laying of planks should be so that the lap does not exceed eighteen inches or is less than twelve,—this to apply in general on all staging.

*Hatch Staging.* There is usually considerable work to be done on hatches and this can be more efficiently and safely carried on through providing at least a two-plank stage on each deck level with a substantial guard-rail set up. Occasionally the use of bracket staging is provided for hatch work, a method substituting the work of lowering or raising the main staging levels and under the most favorable conditions is a practice that provides a serious hazard and should not be carried on. In conjunction with hatch staging there is also the work of adjusting the platform to various working levels and in every case the guard-rail should be carried up when the platform is elevated. A simple and efficient method of controlling this feature is the setting up on the corners of hatch staging guard-rail uprights of about seven feet in length, a height that will take care of the raising or lowering of the platform under practically all conditions required on the job at that section of the hatch. No guard-rail is effective when if the platform is raised the rail remains stationary at a height equal to a man's shins exposing him to a greater danger than no rail at all.

Before leaving this section on inside staging we might consider the engine and boiler room hatches, two sources of many serious accidents during the period of construction. This staging is usually carried on tiers to the full height of the hatches and supported by uprights from the tank tops. Such staging should be at least two planks wide and carry standard guard-rails. Frequently the method of reaching the various

elevations of this staging is neglected and the men have to climb from one level to the other by way of uprights or spawls, a practice that creates a serious hazard and can be easily overcome through the installation of a ladder or the placing of strips on the uprights to serve as a means of reaching the various levels.

#### HATCH LADDERS AND STAIRS

It has been more or less a point of debate in ship construction as to the best method of hatch entrance or exit. Time studies and accident statistics have proved conclusively that the temporary hatch stairway is superior to the old method of the hatch ladder though there is a slight difference in cost in the initial installation of the stairs over the ladders. The stairs will very shortly pay for themselves in the direct reduction of accidents and the time saved by employees in their use.

#### DECK OPENINGS

The practice of providing efficient protection for all deck openings is an important one. The principal points of consideration in this respect are all hatch openings, ventilators, and manholes. Relative to the former, nothing has proved as efficient as a substantial wood guard-rail while in the case of ventilator openings, heavy sections of timber can eliminate the source of danger at this point. When the occasion requires manholes in tanks should be provided with temporary covers of either wood or metal and the hinged metal cover has proved the most efficient protection for this condition based on the marked difference in cost and maintenance charges. It might be added that good temporary metal manhole covers can be supplied for approximately \$1.50 apiece and when spotwelded to the tank top is a set fixture until the permanent covers are set in, while those of the wooden type can be made for a cost of about \$1.00 apiece but require in many cases as high as a dozen sets to a hull before its completion. This cost will amount to a considerable item on several hulls but one lost-time manhole accident will frequently offset the price of a good many covers either of wood or metal construction and it is a factor that should be considered when weighing the advisability of the installation.

In concluding this section on staging it is perhaps wise to mention the importance of eliminating warped, split, and burnt planks from use in working platforms and it may be stated that the elimination of such conditions and the assurance of safe staging can only be secured through the employment and co-operation of an efficient staging gang and when such a gang is operating efficiently statistics have shown that stage accidents are nil.

#### PNEUMATIC TOOLS

The extensive use of pneumatic tools in ship construction has introduced several hazards that should be given some consideration. Foremost among them are the eye injuries, a cause that largely affects the riveter, chipper and caulker, drillers and reamers, and which can be greatly reduced

through the supplying of an efficient goggle and nearly a positive assurance that it is being worn when supplied.

On this particular point there are two strong sources of assistance rendered, first in the design and in this should be considered the possibility of proper ventilation to relieve condensation and the tightness with which the goggle fits the eye. Secondly, many cases of neglect in employees not securing goggles can be checked through the co-operation of the Plant Surgeon with the Safety Department in insisting that when employees with eye injuries come to him for treatment that he checks up as to their use of goggles and in the event of not having any, reporting them to the Safety Department for their action. Often the question of special lenses for goggles is a feature that prevents men from wearing them and experience has shown that it is a wise investment on the part of the employer both from a humane and an economic standpoint to see that such cases are properly provided for.

Another factor in conjunction with pneumatic tools is the method of controlling air lines, particularly when carried down hatches. It has often been found in this respect that men using pneumatic tools have little consideration as to where and how the lines are taken care of in hatches. The result is that in many instances ladders and stairs are cluttered with air lines which create a serious tripping hazard to all using them and this practice can be eliminated through strict supervision on the part of the foremen and safety committee men and through the introduction of pipe lines down the hatches with manifolds at deck levels. Such an installation is not only a safety feature but one of plant maintenance economy in the reduction of air hose use and deterioration and produces easier access to manifolds for men on the job, adding materially to production.

*Tools.* All air and other tools should receive careful attention before redistribution and the use of mushroomed sledges, flatters, and mauls in conjunction with sprung wrenches and defective drift pins should not be permitted.

#### SHOPS

In the average shipyard there are numerous shops all of which produce hazards to a greater or less degree. Of the various shops in the average yard perhaps there is none that should receive more consideration than the Punch and Fabricating Shop. Here alone are found serious hazards from the quantity and weight of the material handled, the high speed and size of the machines operated, and the movement of numerous cranes. Shop accidents in most cases have been reduced to a minimum through the provision of efficient guards and the proper functioning of safety committeemen.

#### ORGANIZATION AND EDUCATION

As stated earlier in this paper, experience has indicated that the majority of accidents occurring in shipbuilding occur on hulls under construction and not in shops. The experience of several yards, both wood and steel, have shown conclusively that 96 per cent of these accidents occur as above mentioned on the hulls.

This being proven, it is further accepted that hull accidents can only be controlled through the development of an efficient safety organization combined with education through numerous and well placed Bulletin Boards. Such an organization should affect foremen and workmen and its activities carried on through regular meetings at which accidents and plant physical conditions as to betterment are carefully discussed and the recommendations submitted promptly acted upon. In practically every instance your accident frequency will be governed in direct proportion to the efficiency and co-operative spirit of the men serving on the committees. A truer reflection of this fact can not be found than in the teamwork of a ship carpenter department in one yard where special departmental meetings were held monthly, and this one department held responsible for the safety of several hundred men working on staging has gone one year without a single accident being charged to neglect of their work.

#### EMPLOYMENT DEPARTMENT

Before closing, should be mentioned the importance of the Employment Department to the Safety Department and its activities for through a careful and well balanced working force as maintained through this department much can be accomplished in eliminating needless accidents caused by placing tailors as carpenters, truck drivers and farmers as erectors, and non-English speaking employees in hazardous occupations or departments, which incidentally occurs far too often to recite and the results of which have been costly both from a humane and economic point of view.

Safety as applied to the shipbuilding industry in its short inception has won her stripes primarily from the great humane good and secondly, but of equal importance in these times of maximum production at minimum cost, through the large number of dollars earned in the direct reduction of accident cost.

CHAIRMAN WOEDTKE: Mr. Walsh has covered the shipbuilding hazards mighty well not only at this time but in our previous conferences. It is mighty gratifying to all safety men to know what the shipbuilding men have accomplished.

#### DISCUSSION

MR. W. J. GRAVES (Michigan Mutual Liability Company, Detroit, Michigan): I would like to ask Mr. Walsh in the event of accidents caused by falling objects from the scaffold generally if he thinks it possible to make any use of the hard boiled cap. Most of our expense in carrying three large shipyards arose from serious injury of that nature.

MR. WALSH: They have proved successful. We have had some tests of the hard boiled cap. The most successful is to operate in conjunction with the plant cleaning outfit and have them go out on the stage and clean it. Every hull has a set of cleaners on and those men are supposed to go out on the stage and clean up.

MR. J. H. WALKER (Pennsylvania State Department of Labor and Industry, Harrisburg, Pa.): Mr. Walsh, would not a large number of accidents

caused by falling objects from your working platforms or stages be eliminated if toe-boards were extensively used?

MR. WALSH: Yes, but again it is just a method of educating the old time shipbuilder to something modern and it is a hard job on two bases: First, the average big yard today is 90 per cent to 100 per cent piece work and in that respect your scaffolding gang have their hands full in moving the scaffold to suit the gang. The toe-board there should be practically eliminated because they won't pay any attention to it. I think the best way is to supervise the cleaning on the stage.

MR. WALKER: As a matter of fact, in Pennsylvania, the state I represent, we had the scaffolding codes recently revised, which, I believe, takes care of the accidents due to falling objects, necessitating the use of the toe-board as very practical. It is my misfortune not to have found a lot of our scaffolding codes that I had arranged to be shipped out here. I hope before the week is over to locate them so that each one of you may have a copy, but I think after the scaffolding code and rules which have just recently been revised is placed in operation and proved satisfactory the state department in Pennsylvania will see that enforcement takes place.

CHAIRMAN WOEDTKE: The time is used up for the paper and discussion on shipbuilding and I am obliged in the interest of what time is left to move right along.

Before we go right on with the next speaker, there are one or two things which we should have disposed of at the beginning of the meeting. Yesterday we appointed a Nominating Committee to bring in a list of names for consideration as officers of this Section for the coming year. Is that Committee ready to report?

#### REPORT OF NOMINATING COMMITTEE

MR. SCHULTS: Yes. The Committee after due deliberation has decided, due to the fact that the Section is still more or less young and appreciating all the hard work and interest that our Chairman has put into it and tried to keep it there, that he was the logical man to keep at the head of it.

As Vice-Chairman, they have decided to renominate Mr. F. L. Hurlbutt of the E. I. du Pont de Nemours and Company. As Second Vice-Chairman, Mr. A. P. Greensfelder of the Fruin-Colnon Construction Company, St. Louis. As Secretary, Mr. F. A. Davidson of the Dwight P. Robinson and Company, New York City.

CHAIRMAN WOEDTKE: In order to get this thing up for some discussion, what is your intention with that report?

MR. H. F. WEBB (E. I. du Pont de Nemours and Company, Wilmington, Del.): I move that we accept that report.

(The motion was seconded.)

CHAIRMAN WOEDTKE: If Mr. Hurlbutt will assume the Chair from where he sits for a moment so I may speak on this, I wish to say I was rather in hopes that we could get rid of your humble servant in the capacity of

Chairman. I took a keen interest in the formation of this Section back in New York some five years ago and tried unsuccessfully in getting a Section started. We finally got started in St. Louis and I suffered the penalty to start the ball rolling by having to keep pushing it. In Cleveland, last year, they put me in again on the theory that the Section was very young and it was unwise to start off all over again until they got on their feet and got going. I hoped by this year we should have enough real construction members present and in our membership from which to create new timber. I had hopes that we could take the officers in line below the Chairman and bring them up to the point of being Chairman. We have developed some mighty good timber in that connection. We are mighty glad to have at all times insurance men, labor men, and state officials with us. They bring a lot to us, but for the best interest of the Construction Section purely as a Construction Section we should aim to have this Section manned by the men who are in the construction industry and, of course, the Section is growing. It is beginning to get growing pains, in fact, and I rather hoped, as I said, to see some one else take the leadership. I have a very keen interest in the Section and if it is for the best interests of the Section that I stay in there for another year, and if we can develop timber to carry on the work, of course, I would put myself aside. It means quite a lot of work and quite a bit of sacrifice but it is a worthy object and after all if we can get it on its feet so that it can shift for itself, all the work will not have been in vain.

The Nominating Committee, I suppose, has weighed all these matters. If, in the minds of the gentlemen, they can dig up some other timber who are purely construction men for that position, of course, I would very much desire to see them go in. I will say frankly I have had my fill for being Chairman and all that goes with it. The honor and glory mean nothing to me.

I thought I would state that to you so you may not have any embarrassment in your minds so far as I am concerned if you prefer some one else for that position.

The question before the house is that we accept the report of the Committee. That doesn't give you any particular action. That is the motion and I put it that way. Is there anything to be said on the question in accepting the report of the Committee? If not, all in favor signify in the usual manner.

(The motion to accept the report of the Committee was carried.)

MR. SCHULTS: I move that the nominations be closed.

CHAIRMAN WOEDTKE: It would be in order that a motion be made that the Secretary cast one ballot for those people who are nominated.

MR. SCHULTS: I will include that in my motion.

CHAIRMAN WOEDTKE: It has been moved that the nominations be closed and that the Secretary cast one ballot for the names on the Report.

(The motion was seconded and carried.)

CHAIRMAN WOEDTKE: I was notified by Mr. Price a month or so ago that if we desired it, he would arrange to have Dr. Payne to give us a few minutes gist of the work being done in schools along the lines of public



safety. You know as well as I do that one of the most important levers we have in the safety game is through the education in schools. Dr. Payne started in St. Louis two or three years ago and became a regular safety man, heart, soul, and body. Dr. Payne, we shall be mighty glad to hear from you.

(Dr. E. George Payne, Principal Teachers' College, St. Louis, explained the method adopted in St. Louis for teaching accident prevention to children. Statistics and charts were shown to illustrate the remarkable results accomplished in reduction of accidents to children while in school, on the streets, or in the homes. For full report of Dr. Payne's address, see Education Section, page 200 and also Public Safety Section, page 377.)

CHAIRMAN WOEDTKE: The next speaker that we are going to present to you has a very difficult problem to handle. I don't know of anything in this Section that is more of a problem to us than how to interest a small contractor in safety. It is said so often when a middle-sized contractor is approached, "This safety game is all right for the big fellow and it is all very good for the firm that has bright, young men or some men in their organization who can devote part or all of their time, but it is not for us. We can't see where it interests us at all." It is not a very difficult matter to get the big fellow interested in safety. He would come in any way because he has lots of time and money and he can take care of it, but the little fellow has to be shown and convinced and educated and he has to come to the realization that there is as much in this for him as for any contractor, and as much responsibility and duty for him as for any contractor.

#### HOW TO INTEREST THE SMALL CONTRACTOR IN SAFETY

O. H. ULBRICHT

SECRETARY, MASTER BUILDERS' ASSOCIATION OF WISCONSIN, MILWAUKEE, WIS.

How to interest the small contractor in safety, undoubtedly would seem, at first glance, an easy matter to one not familiar with the general disposition or inclination of the average or middle size contractor. Yet, it is the one problem which has confronted us for years.

Most of these contractors just "grewed," like Topsy, and they are here, because they're here. This is not to be construed as speaking disparagingly of them, but simply as emphasizing a condition.

The average small contractor usually had his beginning in a modest way, having risen from the ranks of his fellow-mechanics because of his superior qualifications in his particular branch of trade, or of his greater ability, mentally or physically, or perhaps for one or the other of a thousand and one other reasons. At the time of his gradual evolution, and probably for some years thereafter, safety work was not on the general program and was not preached and practiced as it is today. He usually had to hustle to make ends meet and to maintain his position as a contractor, and he therefore paid little or no attention to the new-fangled

doctrine of Safety First, the use of modern safety appliances, and the like. It was probably with considerable reluctance and misgiving that he would even listen when such matters were brought to his attention.

In most instances, we must take the small or middle-size contractor as he is, not as we would like him to be, yet experience has taught us that constant preaching and teaching of safety methods has already effected some wonderful changes and improvements in him. All this, as a rule, does not apply to any great extent to the large contractor, because, generally, his business organization and method of doing things is along well studied and defined lines and principles, often in charge of practical men or safety engineers whose main duties and efforts are the minimizing or elimination of hazards and accidents.

Through my many years of practical training and experience in the contracting business and my close intercourse with builders and contractors generally, I have developed the decided opinion that the first and most essential thing to arouse the attention of the average contractor and to enlist his interest in safety methods is to demonstrate its practical side and thereby prove to him that it pays to be careful. Show him that Safety First and Always is not a vague theory or a notion, but that it actually will bring more dollars and cents to him in his business operations and also to his employees.

Illustrate to him that when an accident happens in his shop, or among any of his men, even though it results in no bodily injury, it will, for the time at least, interrupt or stop his operations, causing more or less of a loss of time, production, and money for which neither he nor any one else is compensated. And, in case the accident should prove to be of a more serious nature; if one or more of his employees are badly injured, perhaps fatally, it will at once disrupt the morale of all of his men, not only those at the immediate job, but also all others in his employ. For they all knew Jim, or Jack, and some are acquainted with his good, little wife and his nice family, and for days, yes for months, the sad accident will again and again be uppermost in their minds and it will be brought out and discussed by them at every little hint or opportunity, often when the foreman is away or not looking, and many hours or days may be wasted in that manner. A little personal attention, a little precaution on the part of the contractor might have sufficed to prevent the accident.

#### PRECAUTION IS THE PRICE OF SAFETY

Little defects, or little things neglected at their beginning, may gradually become larger and more dangerous, and if not remedied at once but permitted to continue from day to day, they will soon be ignored entirely by the men regularly on the job, because, as is well known, "familiarity breeds contempt," but it also produces neglect and carelessness, and after a while a bad crack in a plank, or a break in a strand of rope, will not be noticed any more. An old ladder, with one rung missing or poorly patched, will do service until the inevitable happens; two or three workmen will venture onto an improperly built scaffold, or

which is intended to carry the load of one only; and so on. Every piece of equipment or tool should be carefully examined before being used.

One of the most frequent and also most dangerous injuries are those resulting from nail punctures, yet such accidents can be almost entirely eliminated by the use of common sense and ordinary care on the part of both the contractor and his men, and both should familiarize themselves with the method of treatment of puncture wounds. It will be of interest to contractors to know that where immediate and proper treatment is given a man so injured can be back on the job with little loss of time, and no infection or its after result, lock jaw, need be feared. During the wrecking of the enormous exhibition buildings after the Chicago World's Fair about 1,800 cases of nail punctures were treated by the medical staff on the grounds, and not a single case of infection or lock jaw developed.

Lack of proper material for a scaffold, hoist, or gang plank often compels the men to use materials of inferior quality or strength, and therefore the conscientious contractor will anticipate his needs for such equipment and thereby prevent accidents which otherwise are liable to occur. Of course, the men themselves are often to blame for injuries due to the use of material of insufficient strength. But they will take a chance. Recently, in this city, a carpenter took a chance in crossing over a wellhole on a piece of common 2x4. He was precipitated a distance of ten feet, and he broke both ankles. Who really was to blame, and who suffered the consequences?

Again I say: "Constant Precaution is the Price of Safety." These words should be the slogan of every employer and every employee. In no case, however, should the contractor leave the promotion or execution of safety methods entirely to his employees. He should personally practice what he preaches, and should lead and show the way, but in any event he should at least go fifty-fifty in the matter.

Through the introduction of workmen's compensation insurance—practically made compulsory to every employer, especially to the small one whose limited financial ability will not permit him to carry his own risks—employers have quickly learned that it pays to be careful. Not only can they secure a reduction of their individual premium rate through the so-called merit rating system, also through a downward revision of basic rates applying to their classification, whenever for a sufficient period the loss ratio of their particular group or branch of trade is below the officially fixed standard or minimum, but the law will also penalize contractors and other employers if they are guilty of negligence in failing to provide suitable safety appliances, guards, or other required safety devices. And on the other hand, the same law will penalize the employee for his failure to use safety devices provided by his employer. Drive that home to both employer and employee as an illustration that it pays to be careful.

Another most effective method of interesting the contractor in safety is through constant agitation of the matter. This can be accomplished to a large extent through bulletins, pictures, and lectures, but also most

successfully through discussions and reports at his association meetings and conventions.

We feel that the Master Builders' Association of Wisconsin, of which I have had the honor of being secretary since its organization eight years ago, has to a very large extent solved the problem of, How to Interest Contractor in Safety. Our State Association consists of over 100 members, who are located in over 100 cities of Wisconsin; we issue a monthly 12-page publication, "The Builders' Bulletin," devoted to the interest of the members and to the building trade in general, also to safety propaganda, but our crowning achievement, one which has accomplished more than anything else for the contractors of the State is educating them to observe safety measures in all of their undertakings, and which has demonstrated to them in a substantial way that it pays to be careful—that is our own "Builders' Insurance Company." The loss ratio of this Company, as well as its premium rates, are the lowest of any similar company in Wisconsin. It writes compensation and automobile liability insurance for builders only, who are members of the State Association, and in addition constantly to preaching and spreading safety and accident prevention information, undoubtedly thereby saving many a life and limb, it has saved its members thousands of dollars by providing for them insurance at cost.

There is and there can be no one fixed or definite rule as to How to Interest the Small Contractor in Safety, or any contractor, for that matter, but the favorable experience of the members of the Master Builders' Association of Wisconsin seems to indicate that it is purely, or largely, a matter of education, and that it can be successfully accomplished through association work, by discussions at meetings, by lectures, bulletins, and other literature preaching the gospel of safety, carefulness, and precaution, and also by everlastingly holding before all employers of labor the one fact that it is to their personal interest and financial gain to make their job, shop, or other operation a safe place for the employees and for the general public.

Safety First and Always Pays.

CHAIRMAN HURLBUTT: It was the hope of the Committee which arranged the program for the sectional meeting this year that a paper on "How to Interest the Small Contractor in Safety" would bring a few constructive suggestions before us on the part of the men who are here, that is, those men who are actually contractors and builders themselves. We would like to hear from you men who are actually contractors and builders and perhaps those of you who are not with a large company which has service branches can tell us exactly how you feel about the introduction of safety in your own organization.

#### DISCUSSION

MR. PETER C. SPENCE (Department of Labor, New York City): I do not happen to be a construction man, and in view of the remarks of Mr. Ulbricht that a large percentage of accidents are due to the carelessness

of men, I was wondering if there couldn't be an educational program conducted for the workmen among the trade unions in view of the fact that the trades are pretty well organized. It strikes me that if they would take that up as active propaganda in teaching the unions, that a large percentage of these accidents could be prevented.

CHAIRMAN HURLBUTT: You have hit upon a point that has been very interesting to me. I had an instance out in Detroit, that a master bricklayer, who had been an executive in the bricklayers' organization in that state, told me that they had strict rules in their organization regarding the type of scaffold upon which their men would go. Their men were instructed not to go upon scaffolds which did not conform to the ones their organization had set. Frankly, I have not come into contact with any other unions that show such activity as that.

MR. WALSH: I might say that we have had some experience with the trade unions relative to safety. In the shipbuilding industry, the Iron Workers' and the Boiler Makers' Unions is a large union and has very hazardous work. In going over our statistics, we found that a lot of these tradesmen were affected and we went right into their union and carried on some safety propaganda with the result that we were very successful in our effort. Today in one of our plants we have 100 per cent protection in all trades in eye protection. Our staging hazards, as I stated in my paper, have been practically eliminated and a large degree of it has been with our co-operation with our unions.

MR. A. E. DAVIDSON (Chesebro Whitman Company): I think that is a very important point just brought up. Ever since the formation of the National Safety Council in 1913, I have made it my business over the country to tell all sorts of people about this safety movement and I have made it especially my business to go among the heads, leaders of the trades organizations. There is no class of men that can be easier approached on anything that will be of benefit to the workmen and there is no class of men that have more power to put what they want across. So, I believe that the time has come actively to pursue that line of thought and educate the leaders in the labor trades, educate them in safety. That is all they need, a little education.

I remember, for instance, seven years ago I took one of the leaders of the organization and taught him as far as I knew the safety game and he is well known to some of our best men in the National Safety Council and they know he is a true safety man.

MR. ULBRICHT: I believe in Wisconsin we are working under very favorable conditions all throughout the building industry. I am told by others and we know that from our own experience that the Industrial Commission of Wisconsin is a pretty live organization. We have safety requirements, safety devices, and the closing of well holes, that is, the guarding of well holes and scaffolds with railings all prescribed. It has to be so and if it isn't the employer will be penalized. The employee will be penalized if he fails to use the guards. I presume that is true in other states. I do know that they take a keen interest in everything and we work, as I said before, hand in hand with them.

While I am on the floor, I want to say that we are constantly preaching safety and carefulness to our members through that bulletin of ours which goes out every month. I happen to be the editor of it and I know whereof I am talking. Our next annual convention will be in Janesville, Wisconsin, January 12, 13, and 14. We always have a good program.

(Mr. Woedtke resumed the Chair.)

CHAIRMAN WOEDTKE: I thought I would make our Vice-Chairman do a little work and get into the harness so he will know how when he has to steer the ship.

We have one speaker left, who is surely qualified to deliver the paper on his subject if any man is. This gentleman has lived at both ends of the game. He knows the employer's side of it and all the angles of human relations and he knows the employee's side of it, because that has been his life work and he has been a sort of a human bumper and shock absorber between labor and capital for many years. He was with us last year and took a very active part in discussion and he is going to bring to you some very pertinent data and information on a subject that ought to interest every man in the Section, namely, the "Possibilities for Co-operation Between State Labor Boards and Contractors in Promoting Accident Prevention." There is a very strong link between the State Labor Boards and the contractors on the one end and on the other end of the chain the link of labor, and it is a vehicle we shouldn't lose. I am going to introduce to you Mr. J. H. Walker, who is Chief of the Bureau of Inspection, Department of Labor and Industry, Harrisburg, Pennsylvania.

#### POSSIBILITIES OF CO-OPERATION BETWEEN STATE BOARDS OF LABOR AND INDUSTRY AND THE CON- TRACTOR IN PROMOTING ACCIDENT REDUCTION

JOHN H. WALKER, CHIEF, BUREAU OF INSPECTION, DEPARTMENT OF LABOR  
AND INDUSTRY, HARRISBURG, PA.

In the vast field of accident prevention work which has been opening so rapidly during the past ten years there is one great industry which for various reasons has not received as full attention as has been devoted to other lines. The industry, or group of industries, to which I refer is usually known as the building trades. It is my intention in the short time which has been allotted to me to dwell first on the reasons or difficulties for that lack of attention, and then to offer a few suggestions toward overcoming those difficulties.

##### THE BUILDING TRADES

Under the classification "Building Trades" are usually included the following occupations:

1. Brick, cement, and stone work
2. Building construction
3. Painting and decorating
4. Plumbing and heating

5. Roofing and sheet metal works
6. Structural iron works
7. Electrical construction
8. Paving and road construction
9. Railway construction

It will be readily understood that the very nature of these trades sets them apart from the ordinary industries which are generally subjected to State supervision and inspection. The ordinary and usual inspection work is performed in industrial plants and mercantile establishments which are of a fixed and permanent nature and to which as many visits as necessary may be made by the inspector for the purpose of checking up on the work of safeguarding. With the building trades this is not true. Their work is not confined to any one building, or any particular locality, and the length of their stay in any one location is only a matter of a few weeks or a few months at best.

In most states the individual inspection district is rather large so that at any one time there are bound to be numerous contracting and building operations scattered throughout the district which it is a physical impossibility to inspect. The inspector can only inspect those operations which are being conducted in the vicinity in which he is working, and any operations in other sections of his district which are started and completed before he reaches them are entirely out of his supervision.

This brings us to my next subject, namely, the suggestions of methods to overcome the obstacles confronting the inspector in his task of reducing the accident total in contracting operations.

There are two methods which present themselves to me as means to the desired end. First, the increase of inspection forces, and second, a fixed and definite policy of co-operation and education with both the employer and employee in the building trades.

Inasmuch as statutory or other conditions prevent in most states any appreciable expansion of the inspection forces we shall have to disregard that proposed method and confine our attention to a campaign of co-operation with the contractors and workmen.

Although at the present time a great number of states have enacted constructive laws or safety standards for the safeguarding of life and limb in the occupations now under discussion, I shall presume that there are some states represented here today where this has not been accomplished, and for their benefit I will describe briefly the manner in which the present safety standards governing the building trades were evolved in Pennsylvania.

#### WORK OF PENNSYLVANIA INDUSTRIAL BOARD

The Act of 1913 which created the Pennsylvania Department of Labor and Industry contained provisions for the formation of a body to be known as the Industrial Board, the functions of which were to formulate and promulgate general rules and regulations necessary for applying the provisions of the state laws to specific conditions and to prescribe means, methods, and practices to carry into effect, and to enforce the provisions

of those laws. In accordance with the power vested in it by the Act, the Industrial Board proceeded to formulate and publish various safety standards among which were several codes governing contracting operations. Those completed and published to date include the Electrical Code, Scaffolding Code, and the Ladder Code. I have distributed in this session a number of copies of the Ladder Code and Scaffolding Code with the hope that they might be of some assistance or information to states other than my own.

The object of our Department of Labor has, from the outset, been to co-operate with those who come under its supervision. Therefore, the committee formed by the Department to work out the Scaffolding and the Ladder codes was composed of representatives of the leading contracting firms and labor unions effected, acting in conjunction with members of the State Bureau of Inspection, the Secretary of the Industrial Board and with a member of the Industrial Board as Chairman. The result was a practical set of Safety Standards acceptable to employer, employee, and State Governmental Agency.

I might digress at this point to compare the accident totals in the building trades in Pennsylvania for the year 1919 with the figures for the year 1918, from which you may draw your own conclusion. In 1918 out of 3,403 fatal accidents, 221 occurred in the building trades; and of 53,783 serious accidents, 3,069 are charged to the same trades. In the year 1919 there were 127 fatal accidents out of a total of 2,569, a reduction of 94; and 2,274 serious accidents out of a total of 38,942, or a reduction of 778 over the previous year. It is needless to say that the above decrease in accident totals was most gratifying to Department officials.

But Safety Standards are of little value unless they can be brought into practical application in the occupations which they cover. I referred above to the difficulties which exist in properly applying safety codes to construction operations. My remedies for these difficulties are, as stated, co-operation and education.

#### BUILDERS EXCHANGE

In Pennsylvania, and I presume in most states, there are organizations of contractors which are known as Builders Exchanges, or some similar title. Inasmuch as it is impossible for the inspector to cover all construction operations during the course of erection, the only solution is to insure, before the work commences, that the state laws and regulations will be complied with. The inspector should arrange to have a meeting with the members of the Builders Exchange in his district as he reaches it in the course of his inspection work, the object of this meeting being to make each contractor fully acquainted with the provisions of the said laws and regulations. Let him explain to them the purpose and importance of those regulations, furnish them with copies of the laws, and secure their promise of co-operation and support in his work. After the inspector has met the contractors of the town, let him next arrange for safety meetings with the various workmen's local organizations, interpreting and explaining to them the laws and regulations which have been enacted for their benefit. These meetings should be conducted in accord-



ance with the present procedure followed by the National Safety Council in the industrial plants and establishments throughout the country, and my purpose in suggesting these meetings with the workmen's organization, is to reach a class of workmen which the industrial plant meetings never touch.

Let the inspector follow this same course along the same lines in one town after the other throughout his entire district. Let him conduct follow-up meetings on his re-inspection tour of his district. In addition to this, I would suggest that he immediately investigate any serious or fatal accident occurring in any of the trades, and if he finds it to be due to gross negligence or wilful disregard of the law by the employer, that he immediately institute prosecution against that employer as provided by law. You will note that I recommend that prosecution be brought only where the accident is due to gross negligence or wilful disregard. Such a prosecution is only in accord with the spirit of co-operation and tends to prevent dissatisfaction on the part of those employers who are honestly trying to co-operate with the inspector and obey the law.

It seems to me that a campaign of education and co-operation by each individual inspector in each individual inspection district is the only solution of this most perplexing problem. Let the inspector do this work faithfully and sincerely. Let him follow it up conscientiously and he will get results as gratifying and as astonishing as those which have been attained in some of the campaigns instituted by the National Safety Council, and which are today a matter of history.

I want to leave with you the thought that the Pennsylvania Department of Labor and Industry believes that the surest way to accomplish results is by co-operation, and in every line of work our first purpose is to secure results by this means rather than by resorting to the power of drastic action conferred upon us by law.

In conclusion I want to state to you members from Pennsylvania who may be here today that our Department of Labor wants to help you in every way and will at all times welcome your co-operation in our work for the safeguarding of the life and limb of the citizenship of our great state.

#### DISCUSSION

MR. SPENCE: I belong to that guilty body of State Labor Boards. I am sort of a competitor of Mr. Walker. In the state of New York, we haven't a State Building Board, but we have just promulgated building codes in New York City. Various cities have building codes and these codes usually do not safeguard life in building operations. Our experience in building operations in New York state is very short-lived. I would like to get from Mr. Walker some of his experiences.

Now, if those rules and regulations, as your Chairman intimates, are sometimes quite drastic and inimical to your interest, the best way to help out is to give us some information that will show us the right way and help us to draw up rules to prevent accidents and at the same time not hurt the parties interested.

CHAIRMAN WOEDTKE: I want to say this to show you the kind of thought I would like to get out of you men for the benefit of these labor men. I will cite an instance. Through some source I have mailed to me from California, a paper called "California Safety News" and it is a mighty good product. The Commission out there turns it out and I was very pleased to see in there a two-page announcement referring to certain building codes applied to construction industry and stating that the Commission had found upon investigating complaints from contractors that the code was not a fair one and did not accomplish the purpose it set out for and, in fact, did an injustice to the contractor and, therefore, they banished that code and in its place established a new one and announced it. There is a fair-minded Board that admitted they were wrong.

I have heard some of these labor industry men damned up and down in good style and I have assisted in some of the damning, and then I realized that if I would use the same amount of energy to assist some of these fellows we would get to the point quicker.

MR. F. A. DAVIDSON: I want to say that I am familiar with the new code in New York State which was just put out. Our company feels very glad to get such a well-drawn code. The original one and the promulgated New York state code have recently been sent to every one of our superintendents and there are some thirty-odd. They are very glad to get it because it contains the data they want.

I have understand that Mr. Spence had completed a tour of the cities of New York in trying to explain this code to the contractors.

My word before was advising to get close to the labor men, now I would say get close to the State Boards. I have just been as leary of the State Boards as anybody else and in some way was invited over in 1914 to sit in with the Board in making some rules on ladders and scaffolds. There, I found a bunch of earnest men just as anxious as I was to do what was right for everybody. Then, of course, I was quite sure that the State Board of New York was all politics and a pretty slick bunch and I was afraid of them but I was also invited to come in there and sit with them and I found they were very earnest, able-bodied men, seeking advice from people that know and taking their advice.

CHAIRMAN WOEDTKE: What I would like to bring out if I can is what do you think about the work of the state labor men? Is it rotten? Is it unnecessary? Are they stepping on your toes? How and why?

MR. EDWARD MILLER (Carpenter Contractor, Milwaukee, Wis.): When the state of Wisconsin started their code here several years ago, they had a meeting here at the Republican Hotel and all the contractors were invited and they all got their views on how to build scaffolds and what planing, bracing, rails, and everything to use. I think they got pretty near as good a code in the state of Wisconsin as I hear of anywhere in the United States, that is, from what I hear from other states.

I think if some of the other states would get together with their contractors they would get a good code. We had the plumbers, painters, and plasterers there and whatever they objected to, they would cross out and

rearrange the thing so as to make it as safe a code as they possibly could.

MR. WALKER: Pennsylvania wants to be placed on the same plane with New York and Wisconsin, as mentioned by Mr. Davidson. In the formulating of codes, briefly, the Industrial Board of the State of Pennsylvania, made up of very able men, have a Commissioner as Chairman. The plan or practice used by this Board to get data is, first, to formulate a Committee of representative men of all fields—a small Committee of possibly ten. They meet and formulate a tentative code. After their work has been accomplished, public hearings are held in various cities of the State, from east to west and center, where the contractor and those affected by the codes are invited to attend to present suggestions, to criticize the work of the Committee on the tentative draft. The result is that we have at the completion of the work a code that cannot help but work out successfully. It is a code that is of the making, you might say, of all parties interested.

CHAIRMAN WOEDTKE: Can you tell us, Mr. Walker, what fault you have to find with the contractor? I took the liberty of speaking for the Section here, and if there is any criticism let us have it.

#### TROUBLE WITH SMALL CONTRACTORS

MR. WALKER: I think I have your point. The big contracting firms come across. Our big trouble is with the small contractor.

CHAIRMAN WOEDTKE: Are we weak?

MR. WALKER: Yes, in not following up closely the safe practices as enumerated in the codes, the work or creation of your own body.

CHAIRMAN WOEDTKE: Why is that so? Is it deliberately done, or carelessness?

MR. WALKER: In some instances, wilfulness is shown. In a large number of instances, it is carelessness. If we had a case where wilfulness was shown we took drastic action. Speed in production seems to be the dominating feature in governing the work. If the contractor would only realize the importance of the safety work in the replacement of a high-grade man! I recognize it as one of the most hazardous occupations of all trades. I followed building work for a number of years prior to my part in labor industry and I know whereof I speak. There is a certain amount of recklessness on the part of the employee that is not to be found among members of other trades.

CHAIRMAN WOEDTKE: Circus stunts.

MR. WALKER: Yes, and speed to get the work out. If the smaller contractors and all would realize that it is for his benefit and for the workman's compensation, that the old application of an ounce of prevention is the means of bringing about that which state officials desire.

MR. BESSEY: I think it is almost impossible for the small contractor to give the same interest to the safety code as the large contractor.

MR. WALKER: I don't see why it should be as hard.

MR. BESSEY: Because he hasn't the time. The big contractor has the

money and time and capital to train an organization behind the men for the work and specialize and see that his construction organization or the construction operations of such companies as the Fred T. Ley are safe. The small contractor has a thousand worries and he will not give the same interest to a technical service that a large contractor can by expert service.

MR. WALKER: It is of just as much value to the small contractor. Safeguarding is very simple. For an example, instead of using a ladder, some one will run up two boards and an unskilled workman will use that with the result that somebody will fall.

CHAIRMAN WOEDTKE: Do you suppose that the foreman working for the small contractor is any different than the foreman working for the big contractor?

MR. BESSEY: In a sense, I think he is.

CHAIRMAN WOEDTKE: He shouldn't be.

MR. WILLIAM F. TUBESING (Wm. F. Tubesing Company, Milwaukee, Wis.): I don't know what you call the small contractor. I believe that we are following the State code and we do jobs from \$60,000 to \$300,000 and I find that it is not a great hardship for the superintendent to get after the foreman and barricade all operation and put on the proper ladders.

CHAIRMAN WOEDTKE: In other words, you conform with the building code of Wisconsin.

MR. TUBESING: Yes.

CHAIRMAN WOEDTKE: Do you think it is any harder for the smaller man to conform with the building code?

MR. TUBESING: A man smaller than our firm should be able to make those barricades after working hours. He ought to be more careful than the big man who has a building 380 feet long and 40 feet high.

MR. BESSEY: My answer to that is: He can be just as interested and he probably will be if he takes the time to study this code, but the point is that experience shows that he isn't.

MR. SPENCE: I think I show in this paper some of the questions brought out.

#### PROGRESS OF THE NEW YORK STATE INDUSTRIAL COMMISSION TOWARD SAFEGUARDING BUILDING OPERATIONS

PETER C. SPENCE, MECHANICAL AND CIVIL ENGINEER, DEPARTMENT OF LABOR,  
NEW YORK STATE

In 1916 Commissioner James M. Lynch of the New York State Industrial Commission called the attention of a safety congress held in Syracuse to the alarming accident experience in building operations. Records showed that in the 4 years following October 1, 1910, there resulted 1641 deaths. Approximately 4 times as many are employed in manufacturing in this State, yet including 204 fatalities due to 3 large factory fires, the total number of deaths in the manufacturing industries were but 1,285

in comparison for the same period. Annually for each of the years 1914, 1915 and 1916, there were approximately 1,000 casualties due to ladders, and for the same years, 1,000 accidents resulting from scaffolds. The physical results from scaffold accidents, judging by the fatalities and permanent total disabilities appeared to be twice as serious. Including the above, and adding the accidents due to construction hoists, derricks, and jib cranes, together with the falls and tripping hazards, there occur yearly in the State of New York, from building operations between 5,000 and 6,000 compensable accidents.

We have laws on the statute books since 1885 requiring mechanical devices used in building construction to be safe; with an amendment in 1891 calling for a safety rail on outside scaffolding. Another addition to the statute in 1896 provided that the floors of a building should be covered; and since 1899 hoistways have been required to be protected with fences 8 feet high and adjustable barriers during construction.

Through ignorance of the law or indifference to its purposes these statutes have been constantly violated.

Responsibility for enforcement has lain with the State Department and again with local authorities, and at other times with both. In the case of scaffolds, action could only be instituted after complaint was made; and this has not proven a potent nor reliable factor in securing compliance. Then, too, the state legislature has seen fit to limit and also cut down the amount of appropriation for inspectors, so that the work of the Department of Labor has been limited almost entirely to factories and mercantile establishments.

**"BULLETIN NO. 23"**

The Labor Law provides that whenever the Commission finds any industry, trade occupation, or process involves such elements of danger to the lives, health, or safety of persons employed therein, as to require special regulation for the protection of such persons, the commission shall have power to make special rules and regulations, to guard against such elements of danger. Taking advantage of this and other sections, a committee composed of representative employers, employees, and experts was appointed; and members of this committee worked assiduously, giving up considerable personal time without recompense, studying the conditions, the necessities of the situation; and finally evolved a set of rules relating to the construction, alteration, repair, painting, cleaning, pointing, and demolition of buildings. These rules known as "Bulletin No. 23" clarify and amplify the statutory provisions, and also have the force and effect of law. In order that nothing might have been unwittingly or otherwise framed up, so as to be too drastic or inimical to the interests of the employers, or too loose, so as to be unsafe for the lives, limbs, and health of the employees, public hearings were held in various cities of New York state, after due notice by publication.

Accidents may be due to mechanical, physiological, or psychological causes.

You can correct the mechanical deficiencies by applying guards, building

in a skilful and orderly manner and using sound and sufficient materials. The Travellers Insurance Company in its publication "Scaffolds" concludes that the majority of scaffold accidents listed, could have been avoided if guard-rails and other protective devices had been provided and the platform planks had been properly laid.

Physiological causes may be due to fatigue, mental worry, formerly to intoxication, dizziness, faintness, disease, etc. Men with nervous ailments suffering from rheumatism, defective eyesight, unless corrected by glasses, should never be assigned to work where the hazards would be materially increased by such physical defects.

The psychological causes of accidents are ignorance, inexperience, carelessness, recklessness, lack of discipline and careful supervision. Horse-play, scuffling, ill-feeling between men or different gangs, sliding down ladders, jumping from higher levels onto scaffolds, throwing material recklessly, are all causes that have their toll in casualties and fatalities. The foreign-born, unskilled laborer in building work, constitutes a distinct problem, because of his lack of acquaintance with the hazards of his work and his inability to understand the instructions given him.

These rules regulate the conduct of the employees on the job in so far as such would injure him or his fellow workmen.

The different kinds of ladders and scaffolds are defined and minimum standards of construction scheduled.

Machinery on a construction job should be guarded in a manner similar to that in a factory, and it is so required. A slippery standing place for a steam engineer or operator of any machine or device constitutes a dangerous condition.

Much discussion was given to that requirement for testing all ropes of a swinging scaffold before every operation, and periodically thereafter every 30 days, keeping a record with the names of the witnesses. The law provides that every scaffold should be capable of sustaining 4 times its maximum load capacity. It is no hardship to stand 8 men on a scaffold, if it is the intention to employ 2 thereon, together with a barrel of sand, cement or other material, and hoist a few feet from the ground. The 8 men and the loading of material will be about equal to 4 times the weight of the 2 scaffold workers and the weight of the paints, tools, etc., used. Defects in their manufacture, knots, splices, rough usage such as allowing trucks to ride over, splashings of muriatic or other acids, kinks in wire ropes and chains make such supports weak; and defects are not always readily detected by visual inspection.

Since the floor beams of buildings during construction are required by law to be filled in between or covered, floor openings or stairwells can be similarly protected; or if needed for the process of building, they can be guarded by means of railings and toeboards or warnings.

The 650 compensated accidents due to elevators and construction hoists in New York state during the year 1915-1916, which were increased to 809 in 1916-1917, were mainly due to falls down the shafts and from tools and material dropping down. It is reasonable to assume that this accident experience would be considerably reduced if enclosing partitions 8

feet high, with adjustable barriers where material is taken on or off, were placed on every floor around material hoists; and similar enclosures with locked doors at the openings, on every floor where an elevator is in use.

Building operations are more hazardous than manufacturing, because conditions are ever changing, and usually the personnel of the employees changes as well. It is however very undesirable to increase the risks by the absence of sufficient illumination. Light is a tool that adds to the safety and efficiency of every other tool, and should be supplied in fluxes of sufficient intensities to mitigate the tripping and stumbling hazards.

The absence of toilet facilities in construction work and the use of excavations and cellars as receiving vaults for human excreta is a deplorable condition, from the standpoint of public welfare and detrimental to the health of the individual. Typhoid fever, dysentery, tuberculosis and such are often increased by the spreading of this waste. Infection has been traced to its presence in water through surface or subsoil seepage to dirty hands and clothing, to flies and other insects, to dirt carried indoors on the feet of men or animals such as dogs, fowl, and vermin. Poorly constructed or improperly maintained privies or none at all where cellars and excavations serve as open cesspools, are not only a menace to the health of the workmen by increasing the damage of contamination, but they encourage the formation of irregular habits, that are disastrous to their health and longevity. The functions of elimination cannot be postponed or neglected with impunity. Chronic constipation is a frequent result of such neglect and many ailments that occur later in life are directly traceable to these causes.

Permanent and temporary toilets on construction work should be maintained in a cleanly and sanitary condition, so as to encourage their use. Where sewerage facilities are available, a connection should be made at once, together with the installation of fixtures and enclosures. If running water only can be used, a modern type of flush closet can be installed and a cesspool constructed which can be periodically emptied, or better the contents incinerated. If a cesspool or septic tank will be a part of the completed property, there is no reason why it should not be built in advance of the main work and used during the progress of the building.

The regulations in regard to the inspection of boilers, the equipment of hoisting engines and electric hoists; the protection of operators, particularly in freezing and wet weather; and the substantial construction of platform hoists and derricks are much needed safety requirements.

Making a hoisting signal code standard throughout the state, should eliminate casualties due to a misunderstanding of the signals by a new man on the job.

Existing local building laws in various cities of the state aim at safety for the occupancy after the structure is completed. Its design, materials, and equipment are inspected and the developing construction supervised. The use of materials within their safe carrying capacities are regulated. Such are very necessary and responsible functions, but generally speaking these codes contain no provisions for protecting the workmen during construction.

Be it said to the credit of the employers that these rules for building operations are principally theirs. Although representative employees were on the committee and took active part in the discussions at the general meetings, most of the constructive formulation adopted was the work of employers representatives.

#### RULES FOR BUILDING OPERATIONS GIVEN PUBLICITY

In addition to the public hearings and in order to give them further publicity the Industrial Commission sent a representative into 20 cities of the Empire state to explain and illustrate with lantern slides, the guards, the protection, and the substantial construction of mechanical devices required. Newspapers along the route published over 7 columns of reading matter on this subject, and from circulation statements, information concerning this movement to make building operations safer, should have reached over 400,000 people. Under directions of Commissioner Lynch who is keenly interested in the success of this departmental activity, I made a brief survey of the building situation in Niagara Falls and Buffalo last week, in order to determine what co-operation is being given the Industrial Commission by the contractors. Apparently no attention whatever is paid to these rules.

Spliced, makeshift, unsecured, sub-standard ladders were in use. Improperly braced, unsubstantial built-up scaffolds, with nails not fully driven, broken braces; and quite evidently not constructed by men skilled in scaffold building were on the jobs. In a new church, one upright of a 35-foot high, interior built-up scaffold was resting on loose bricks piled up on the floor. A material hoist was in active use on another job, with no enclosing partitions or barriers. On the outer walls of a large reinforced concrete job, a continuous "outrigger scaffold" was in place, the platform planks hung from "thrust-outs," on sheds nailed to these cantilevers; guard rails, toeboards and wire netting specified in the rules were missing. In a partly constructed fireproof building, unguarded stairways were in use; and floor openings and stairwells were not protected; the floor beams were not as yet filled in between with arches. Buildings other than alterations or additions had no toilet facilities for the men.

From what I have seen, I am of the opinion that the Industrial Commission in order to secure compliance will have to take drastic action and prosecute the offenders in the courts.

It is my conviction that not only are properly constructed and protected mechanical devices safer, but as an investment they pay. In a well conducted job, their use enhances the morale of the men, stimulates their confidence and zeal, and speeds the construction—dividends far in excess of a fair income from the paltry difference in first cost between deficient and safe practices.

The enactment of this code on building operations is an important step forward in accident prevention. If given the co-operation of the Contractors and the Employees, splendid results can be anticipated not alone from the humanitarian standpoint but from the commercial and economic as well. It is not contended that these rules are the last word in this



direction. They can be revised in the same manner they were created; revision will depend upon our experience with accidents in the future.

CHAIRMAN WOEDTKE: I want to say that is one of the best delivered papers I have heard in a long time. It has the punch and delivery there.

It has occurred to me that we have several important matters that ought to come up in a round-table discussion. We have only had a few minutes to discuss these papers and we have had to cut them off just when it was getting to the best point. Mr. Spence has just delivered a very fine paper and has hit the nail on the head, and I think some of the things need discussion but the time doesn't permit it. I don't know what you fellows are going to do tomorrow morning but I think it would be well worth your time to come in here tomorrow morning. I will be glad to arrange for it if you so desire. Do you want to hold a meeting tomorrow morning.

MR. A. E. DAVIDSON: I would like very much to see another session on this round-table and I hope the men who can will stay.

CHAIRMAN WOEDTKE: Those who want to have a meeting tomorrow morning raise your hand.

(A show of hands indicated that quite a number wanted to have a meeting.)

CHAIRMAN WOEDTKE: All right we will hold it.

#### APPOINTMENT OF CHAIRMEN OF STANDING COMMITTEES

I will appoint the Chairmen of the Standing Committees for the following year. We tried that a year ago and got as a result your statistical forms which were presented yesterday, a good program, and a number of other things. I am only going to appoint the Chairmen of the Committees and I will confer with them later, or they can name the members of their Committees, if they choose.

I am going to leave Mr. F. A. Davidson on the Standardization and Statistical Committee. As Chairman of the Membership Committee, I will appoint Mr. Greensfelder, who is from the mid-west and we have elected him as Vice-Chairman here today. I will make Mr. J. H. Schults of the Stewart Company, Chairman of the Program Committee. As Chairman of the Bulletin Committee, I am going to name Mr. Ames of the McClintic-Marshall Company, Pittsburgh, Pa. I want to meet with these men before we leave Milwaukee to give them assistance, if I can.

#### ADJOURNMENT.

(When the Construction Section adjourned Thursday Morning it was decided to have a hold over meeting on Friday Morning.

The reporter was present at the session but the number of members present did not justify the holding of a meeting.)

## **Electric Railway Section**

**September 30—October 1, 1920**

---

**R. N. HEMMING, Chairman**

Chairman, Superintendent of Transportation, Indiana Service Corporation,  
Fort Wayne, Ind.

**JOHN H. MALLON, Vice-Chairman**

Vice-Chairman, Assistant General Superintendent of Transportation, The  
Metropolitan West Side Elevated Railway Company, Chicago

**JOHN H. COX, Secretary**

Adjuster, Cleveland Electric Railway, Cleveland, Ohio

---

### **THURSDAY MORNING SESSION**

**T**HE First Session of the Electric Railway Section was called to order at 10 o'clock, Thursday, September 30, by Mr. John H. Mallon, Vice Chairman.

**CHAIRMAN MALLON:** I am very sorry to announce that Chairman R. N. Hemming was prevented from attending and officiating during the two sessions of the Electric Railway Section. The Secretary will read his report.

#### **REPORT OF CHAIRMAN**

My Dear Fellow-Members and Friends:

It is with the deepest regret that I am, through unavoidable circumstances denied the pleasure of being with you at this meeting of the Electric Railway Section of the National Safety Council. I have been hoping against hope that matters would so adjust themselves that I could come and preside as your Chairman and mingle with you, and renew the many splendid acquaintances of the past, as well as the pleasure of meeting many others.

Certainly, there is no organization in the world today that is so abounding on every side with the good fellowship nor that has a greater interest for the preservation of humanity and the conservation of life and limb, than the National Safety Council. And those contributing their time, their dollars, and their personal interests to its support, are doing so in the interest for the greatest good of mankind today.

We are sowing that seed which will reap a harvest in the return of

less heartaches, less suffering, more happy homes, and a happy issue out of life. Certainly that is something worth while to accomplish and work for.

The Electric Railway Section has made slow progress compared to what it should, in view of the fact that we only have 120 Electric Railways in the United States, out of a possible 943 that belong to and are supporting the National Safety Council. Certainly there is no industry that should be more vitally interested and concerned in Public Safety, as well as spreading the safety propaganda, than the Electric Railway Industry.

It is that one industry, that stands out more prominently and alone above all others, that has been used as a political football by the demagogues.

The Electric Railways can never expect to eradicate, or secure the assistance and co-operation of reducing accidents by law enforcement of traffic rules, until they lend their personal, financial, moral, and undivided support, to the inauguration of a Local Safety Council in each one of their respective communities.

We have had some membership cancellations during the past year. I have received numerous communications from those to whom I have written, relative to joining the National Safety Council, and it is surprising to note that their excuse was, "we could not afford it". There must be something wrong when, above all things, the last thing that should be sacrificed and put on the non-essential list of expenditures is *Safety*.

There is no other institution or organization that can do as much for so little expenditure as the National Safety Council. It behooves each of us individually and collectively, to secure the membership of those properties that are not now members of this section.

In conclusion, I wish to say that it has pained me deeply, because I have been unfortunately incumbered in the past year, in a way that I could not do justice to the honor which you conferred upon me by making me your Chairman for the past year. However, I have attempted to accomplish some things in a big way, and I hope before the next Congress convenes that all of us will have the pleasure of realizing the end sought.

I stand ready and willing to be of further assistance to this Section and to the National Safety Council in any way in which I can be of service.

I want to take this opportunity of expressing my appreciation to the Executive Committee of the Electric Railway Section for the assistance they have rendered during the last year. I think we are especially indebted to the Chairman of the Bulletin Committee for the splendid work he has done, also to the Chairman of the Program Committee for the splendid program which he has provided.

R. N. HEWING,  
Chairman.

(The report was adopted.)

CHAIRMAN MALLON: The next is the Secretary's report.

SECRETARY'S REPORT

(Secretary Cox reported that during the year he had handled the usual routine business of the Section which had involved no outstanding features as most of the business of the Section had been transacted by the Chairman. The number of members of the Section at the time of the 1919 meeting was 119. As the result of new members and withdrawals during the year the number of members at this time is 120.)

(The report was adopted.)

CHAIRMAN MALLON: We will now have the reports from the Committees. The first is Mr. Harry Reid, Chairman, Membership Committee.

(Mr. Reid is absent.)

MEMBER: I think Mr. Reid's report is included in Mr. Hemming's report.

CHAIRMAN MALLON: Mr. H. O. Allison, Chairman, Bulletin Committee.

I might say that Mr. Allison has done more toward securing Bulletins than the previous Chairman did. I was that man.

We will have the report of Mr. C. E. Carpenter, Chairman of the Program Committee.

REPORT OF PROGRAM COMMITTEE

MR. CARPENTER: We have been able to secure some very excellent speakers, and through their co-operation we are hoping that you will get a great deal of good.

CHAIRMAN MALLON: It is very gratifying, indeed, to see the large representation here today, as compared to the representation we had in Cleveland last year. It shows that the Electric Railways, in this vicinity, at least, have a keen interest in the safety campaign. I don't think there were any meetings in Cleveland last year where we had to exceed thirty persons, although our programs were attractive. It shows that the Electric Railway employees in the vicinity of Milwaukee have a keen interest in the safety movement.

The first paper, "The Enforcement of Laws and Ordinances Relating to the Operation of Self Propelled Vehicles," J. A. Van Osdol, General Attorney, Union Traction Company of Indiana, Anderson, Indiana, is a paper we will be especially interested in.

THE ENFORCEMENT OF LAWS AND ORDINANCES  
RELATING TO SELF-PROPELLED VEHICLES

J. A. VAN OSDOL, GENERAL ATTORNEY, UNION TRACTION COMPANY OF  
INDIANA, ANDERSON, IND.

When this subject was assigned, it was with the request that it be discussed from the standpoint of the effect which proper enforcement of laws will have in reducing crossing accidents. This view-point reveals the automobile a conspicuous figure in the foreground as one of the

factors to be dealt with in this problem of accident prevention. The automobile has its uses and its abuses, and whatever may be said regarding its demoralizing influences, or the charge that it is a useless extravagance, a breeder of idleness, and a menace to safety, we must recognize the fact that it has come to stay, and its uses are so many and so varied that it is now regarded as indispensable in our daily life. So the problem is not that of eliminating the automobile, but how to make its use as safe as possible. It is at the grade crossing where its abuse is attended with the most disastrous consequences and, distressing and expensive as they are, there may be some compensation to society in the fact that they may have the effect of hastening the day when the public at large will unite in support of measures looking to their prevention. Meanwhile we anxiously inquire: How great is the price this generation must pay in human life and human suffering before we will awake to this awful waste and take more intelligent and vigorous measures to put an end to it?

Probably no phase of accident prevention presents greater difficulties than the one that deals with the automobile; the diversity of interests encountered; the fact that practically every law or regulation looking to safety in this particular field impresses the individual upon whom it is intended to operate as an encroachment upon his personal liberty, serves to make progress in the direction of safety extremely difficult; this is especially true when the class to be restrained is composed so largely of persons of immature judgment, or of little or no responsibility.

#### GRADE CROSSINGS

While the grade crossing is not the scene of all of the accidents of this class, it is the place where the great majority of these tragedies are staged, and while they cannot be entirely eliminated so long as we have the crossing at grade, their number can be greatly reduced.

It is not the purpose here to discuss how or when, if ever, grade crossings can be eliminated; certainly not until the general public acquires a higher appreciation of the duty which rests on it in this matter, and is willing to bear a larger share of the expense which such an undertaking involves. Moreover, any plan which could possibly be adopted for their elimination would require years to carry out; but the establishment of new grade crossings, where it is practicable to avoid them, and the clearing up of the view at these crossings, is receiving more careful consideration than formerly at the hands of railroads and public authorities, and this is some improvement. Grade crossings we will have for years to come. In the meantime we must deal with the danger which these crossings present and endeavor to find the most efficient means of reducing them to the minimum. Law enforcement is regarded as an efficient means to this end, but law enforcement is more than the mere matter of laws, courts, and police officers; these factors are essential parts of our social structure, but they will fail to produce the desired results if left to work out the problem alone. We must bring to their support every agency that is calculated to put behind law enforcement the proper public sentiment.

## THE LAW AND THE COURTS

Let us for the purpose of this discussion consider the term "law" in its more comprehensive sense, not merely statutory law and municipal ordinances, but also the rules which by mutual consent or custom have so far established their efficiency as to be recognized as proper in the regulation of human conduct.

Courts are often criticized for failure to enforce the law, when it is in no wise the fault of the courts; and likewise the law is often condemned when the law is all right, if enforced; but law is not self-enforcing, nor can the courts take cognizance of its infractions, except they are brought before it by the methods which the law provides for that purpose.

We are not claiming infallibility for the courts. Those tribunals are presided over by human beings, and it is human to err, and while there are probably instances where judges either corruptly or from lack of ability fail in their duty, such is not the rule. The great majority of our judges are men trained to a high sense of justice, who from professional pride, if nothing more, would endeavor to administer justice impartially, and while the result in the instant case may appear a perversion of justice rather than an administration of it, possibly in that case all the facts were not before the court, or perchance were so perverted that no other result was possible under the law. Let us bear in mind that the true office of the court is to administer the law and not to make the law; thus, a little reflection should convince that the responsibility is not wholly with the courts.

Legislation is of first importance in this connection, for laws will be observed and enforced so long as they are respected by those living under them. One evil to be avoided is the enactment of useless and at times foolish laws. Hasty and ill considered legislation can very properly be charged with much of the spirit of indifference which today exists toward law enforcement. It has long been a popular notion that if there is an evil to be combatted the proper thing to do is to get a law passed forbidding it.

## FALSE NOTIONS OF INDIVIDUAL LIBERTY

Laws designed to regulate or abridge habits and customs which have become fixed with a large number of people are apt to be looked upon as invasions of what we are pleased to call individual liberty, and the difficulty of their enforcement is because of this popular though erroneous opinion. No better illustration of this is needed than the difficulty encountered in enforcing the present prohibition laws. Today, many people friendly to the cause of temperance, and who recognize the necessity of laws to bring it about are fearful that the recent legislation for that purpose may have been too far in advance of public opinion, and fear a reaction which will be harmful to the cause. This trait of human nature is probably most manifest when the law is applied to regulate the individual in pursuit of his own pleasure.

Laws which undertake to tell the individual how, when, or where he

shall drive his vehicle, how he shall proceed to travel on or across the highway are usually resented by those upon whom they are intended to operate, and that individual, in convincing himself that the law is wrong, entertains the same false notion of individual liberty that the one does who resists the temperance laws, health laws, traffic laws, and other like police regulations. He resists the law because he sees in it an attempt to abridge his individual liberty, although in both cases the law is for his benefit, his safety, his well being, as well as for the general welfare. He sees it only as an interference with his immediate comfort and pleasure. It is easy to get an exaggerated idea of individual liberty, because we naturally think in terms of self. When more of our people get it into their minds that individual liberty ends where the general welfare begins, law enforcement will be less difficult.

#### PUBLIC OPINION A DETERMINING FACTOR

In all this, public opinion is a determining factor, and legislation must not keep too far in advance of it, for if laws are enacted before there exists a demand for them, and before the people are prepared by education to receive and support them, they will become dead letters.

Useless and foolish laws debilitate those that are necessary; useless laws do not command respect and lax enforcement follows: This invites disrespect for all laws, since many persons fail to discriminate between laws that are useful and those that are not.

We, no doubt, often make a mistake in condoning the lax enforcement of some law because that particular law is useless and foolish, when it might be better to enforce it and thereby hasten its repeal. It is a safe proposition that the fewer laws we have upon our statute books, which can be pointed to as dead letters—especially laws of police nature—the better off we are.

Respect for the law is the strength of the law, and respect begets obedience. Ours is a democracy and the equal enforcement of our laws is essential to our national existence. Wise laws backed up by public opinion, command respect and are easy of enforcement. With such a state of society, the penalty of a law need not be so severe, since it is the certainty of punishment, rather than the severity of it, which deters the would-be offender, but we are not claiming that society has yet reached that ideal state. The chief offenders against society in this matter are persons who pursue their own pleasure and convenience with such an utter disregard for the rights of others that laws which carry a penalty which really hurt are the only laws they will respect. The indifference and often the open contempt with which most drivers of vehicles view modern traffic laws and safety rules cannot under present circumstances be accepted as evidence that these regulations are unnecessary, but is evidence that real law enforcement is needed. These persons would be more impressed that the law means what it says if there was less of the present day tendency to let the offender off with slight punishment or no punishment at all. The liberality with which paroles and pardons are granted in some jurisdictions, instead of pre-

venting crime, condones it to the extent that it multiplies the chances for escaping the penalties once the law has been violated. The lawless are invited to take the chances. The advocates of that policy comfort themselves in the belief that they are tempering justice with mercy and helping the offender to reform, when often this misnamed humane rule only contributes to these delinquencies by removing from punishment first, the certainty of it, and second, any terror it may have if inflicted. While well meant, this reform idea is often carried so far that it is nothing but sentimentalism gone to seed. Justice must be of sterner stuff than this. The class under consideration here, must be made to fear the law before they will respect it, and its enforcement must be impartial, constant and consistent, and not spasmodic nor sporadic.

TRAFFIC AT PUBLIC HIGHWAY CROSSINGS CHECKED BY INDIANA PUBLIC  
SERVICE COMMISSION

A test made by the Indiana Public Service Commission, in 1919, is instructive. Through its inspectors, the traffic at thirteen public highway crossings over steam roads in as many different parts of Indiana, were checked with a view to observing whether engineers were careless in giving signals, and the manner in which drivers of vehicles approached and passed over these crossings. Here is the result:

During that period a total of 172 trains passed over these thirteen crossings, of which 163 gave the proper highway crossing signal. During the same period 1,924 vehicles crossed over these crossings, of which 625 drivers did not look nor listen. Of the thirteen crossings checked, five were operated by bells or wigwag signals which were found in perfect condition. Of these crossings, 46 vehicles passed over the tracks when the warning signal was operating indicating that a train was approaching.

The inspectors report that the driver of the horse-drawn vehicle in most cases looked and listened, but that the automobile drivers as a rule did not look nor listen until directly upon the tracks, and in many cases the speed of the automobile was so great that it could not be stopped should a train be approaching.

From the foregoing it is seen that while approximately 5 per cent of the engineers failed to obey the law at these crossings, 32 per cent of the drivers of vehicles failed to obey. We take it that the result of these tests are practically on a par with like tests that have been made by others on grade crossings in various parts of this country, and may be said fairly to indicate the relative failure of duty as between the engineer and the driver of other vehicles. The recklessness of these drivers imperil not merely their own lives, but likewise the lives of the other occupants of the automobile, the train crew, and passengers on the train. It is in situations like the above, when after one of these accidents, the railroad is compelled to respond in damages under the passive guest rule when often the so-called passive guest was equally to blame with the driver.

If more individual offenders were held responsible in civil damages



for the results of their own negligence, the cause of law enforcement would be greatly promoted, and the reckless would have more respect for the law. The disposition of juries to set aside the rule of law which forbids one to profit by his own neglect, and the reluctance of some of our courts to interfere with verdicts which are contrary both to the law and the evidence, serves to put a premium on negligence, and to bring the law into contempt.

#### PUBLIC SENTIMENT MUST SUPPORT THE LAW

Whether the law to be enforced is some federal or state statute, some municipal ordinance, or the rule prescribed by some commission, or by some employer, or merely that particular rule of conduct which has the sanction of experience, public sentiment must back it up, if it is to be properly observed or enforced. But, let us not at this juncture deceive ourselves with the idea that these accidents which are now under consideration can be wholly prevented by any sort of laws or rules which operate only to regulate the conduct of the individual; the personal equation is in this problem and must be taken into account. We cannot absolutely regulate human inclination or human judgment by any set of rules, but we can influence them by a course of wise and persistent education, to the end that systematic accident prevention should become a part of our national life.

Assuming that the public will become sufficiently awake to this subject, that we will have only wise and useful laws enacted and these laws will be backed up by sufficient public sentiment to insure their enforcement, we are then in a fair way to realize the promises which this safety movement holds out to humanity.

#### THE PUBLIC MUST BE EDUCATED

The same influence which operates to educate the public, will at the same time educate those who are charged with the immediate duty of enforcing the law. Our courts and police officers will be found responsive to this influence. All of this means that more care will be exercised in selecting our representatives who make these laws; too often we leave that feature of government to persons who are wholly unfitted for that important duty. When we see the type of citizens that are sometimes chosen to make the laws, we wonder why they are chosen, but we cease to wonder at their failure, when we remember that we do not gather grapes of thorn nor figs of thistle. But, fortunately, in every legislative body there are some who do appreciate the needs of the day, and who have the ability to legislate wisely, and their counsels many times prevail, otherwise the results would always be disastrous.

The program adopted to carry on this work of general education must be sufficiently comprehensive to reach all classes, and sufficiently practical to arrest the attention of the man of affairs; this program must be applied constantly; we must not expect its accomplishment with a single effort. Knowledge is not attained with one lesson, rather it is line upon line, and precept upon precept, here a little and there a little.

The methods by which the public can be sufficiently attracted to this subject to insure real interest and a desire for its accomplishment are numerous and must be varied to suit the conditions.

Industrial managers are coming to see that the industrial accident problem can never be solved until accident prevention is incorporated into our community life. The great problem of dealing with the general public, and especially the rural community, can scarcely be touched until it is induced to organize with a view to drilling into every intelligent mind the rule of due care, and make this campaign of safety education take on something of the zeal and ardor of a crusade. The attention of the rural community must be arrested sufficiently to give it a fair view of this problem before we can expect a general desire for its solution, and a willingness to help in it.

Whether viewed alone from the economic or humane standpoint, the loss of human life, and the amount of pain and suffering that is annually charged up to negligence in this country, is so striking that merely to state the facts is all that is necessary to convince any fair minded person of the crying need for some reform which will stop this slaughter.

#### AUTOMOBILE FATALITIES

We turn to the automobile, since of all instrumentalities used and useful in our daily life, it has the most fatalities to its account. Facts gathered by this Safety Council, show that of the 91,000 lives lost in civil life outside of industry during the nineteen months our country was engaged in the World War, 15,800 of these deaths were caused by automobiles or auto trucks, while during the same period only 47,949 of our soldiers were killed by the enemy. Thus, while the enemy, who was organized for the purpose, and whose daily business it was to kill our boys, succeeded in putting 47,949 of them to death, the automobile and the auto truck which were supposedly engaged in peaceful pursuits, killed one-third as many of our people during the same period.

Your Mr. Price makes a comparison of automobiles and deaths due to automobile accidents in this country through four separate periods, as follows:

In 1910 there were 400,000 automobiles and 2,300 deaths; in 1917, 4,941,276 automobiles and 9,000 deaths; in 1919, 7,523,664 automobiles and 10,000 deaths. In 1920, it is estimated we will have 9,500,000 automobiles in use. If the ratio of fatalities for previous years holds good, this would mean 12,600 deaths chargeable to that instrumentality during this year.

The foregoing covers deaths due to automobiles under all circumstances. When, however, we view the automobile and its fatalities as related to railroad grade crossings, the figures published by the Interstate Commerce Commission comparing 1917 and 1918 furnish some comfort, for notwithstanding the fact that while the number of automobiles during that period increased 26 per cent, the total number of automobile accidents at railroad grade crossings increased only 9.5 per cent, and the number of persons killed in those accidents increased but 4.2 per cent,

and the number injured increased but 3.6 per cent. If these figures are correct they may be accepted as evidence that safety work is bearing fruit.

#### SOME RESULTS OF ORGANIZED SAFETY WORK

We all know that the railroads of the country were quick to see the value of safety as an organized effort, and to incorporate it into their organizations, and we might expect favorable results to appear first in connection with automobile accidents at railroad crossings, because these locations were naturally regarded as points of extreme danger, and there the safety movement placed most stress.

Here is another fact just ascertained through inquiry made by the Indiana Public Service Commission, and sent to corresponding commissions in all of the states, asking for data on crossing accidents, and for their experience during the last two years. This is the result to date: A total of thirty-one states answered, of that number twelve either had no data on the subject, or had not yet assembled it. Of the nineteen states which had such data at hand, fourteen reported a decrease and five an increase in crossing accidents. While in some the decrease was but slight, the tendency in that direction in view of the increase in automobiles, is interesting and invites investigation. Texas makes an interesting return to the inquiry. Reports from that state show that railroad accidents at highway crossings from January 1 to December 31, 1919, compared with the corresponding period in 1918, decreased 29 per cent, and that deaths resulting from such accidents had decreased 53 per cent. For the same period Michigan shows a decrease of 29 per cent in number of crossing accidents, and a decrease of 18 per cent in deaths from that cause. Ohio for same period reports a decrease of 17 per cent in deaths from such accidents. We have not attempted to analyze these figures; we simply give them to you for what they are worth.

If more convincing proof were needed that your safety work is yielding the desired fruit, you have only to call upon those cities where safety has been organized as a community effort, or turn to any of the larger industrial concerns where a systematic course of safety education and inspection has been followed for any length of time.

Here are cases in point: The United States Shipping Board claims as a result of organized safety, a saving in accidents of more than ten million dollars for the year ending June, 1919; and the railroads claim a saving through safety of eight million dollars for the same period. The Interstate Commerce Commission reports that in the nine years from 1911 to 1918, inclusive, the operating expense on account of injuries to persons in Class 1, Steam Roads, averaged approximately thirty million dollars per year.

In some of the states where the safety movement has been put on as a community effort, equally striking results have followed. Thus, in Pittsburgh, during the first year of the work, time lost from accidents from all causes was reduced 33 per cent. In Rochester, N. Y., 35 per cent. In St. Louis, in two years, the total accidental deaths were reduced

31 per cent, industrial deaths 61 per cent. In Cleveland, the last six months of 1919 compared with the corresponding months of 1918, accidental deaths from all causes were reduced 36 per cent, and deaths from automobiles alone were reduced 51 per cent.

You will pardon this digression into what might appear the field allotted to other papers before this body. It is only done with a view to reinforcing the statement that intelligent and persistent work in this educational campaign is bound to bring the desired result.

Thus far the effort has been exerted in the urban centers, but before we can bring all the people to the proper appreciation of this work, and before we can expect a healthy public sentiment, so general as to insure law enforcement, the rural side of the problem must receive attention. That is a field practically untouched up to this time, and while results there must not be looked for so quickly as in some industry where instruction, inspection, and supervision in safety work is a matter of daily routine, rural life stands ready to respond with community effort whenever it can be made to see the need for it. Rural response to the work of the Red Cross and other war activities is proof of this. The development in transportation and communication, in farm machinery and the application of scientific methods in agriculture, are all serving to put the rural community in daily touch with world affairs and world problems to an extent undreamed of a generation ago. The vision of the rural citizen has wonderfully expanded in that time, and the fact that he today shows so decided an inclination to drift to the city, while in itself a problem with which our country has to deal, may be accepted as evidence of the social instinct in humanity, which seeks a closer contact with its fellows. If so, this fact should invite the leaders in this movement to get in touch with the rural citizen as soon as possible. Go to the rural community with a real cause, put it in a convincing light, and you will get the right response.

#### SAFETY EDUCATION IN SCHOOLS

Of all the channels selected through which it is now planned to reach the general public and induce it to take up this cause as a community effort, nothing offers more promise than that of the public and parochial schools. No more effective means exists for getting safety incorporated into the community life, than first to get it incorporated into every school curriculum, when you have the school children talking Safety at the table and the fireside, in an intelligent and practical way. When the parents see them interested in something so practical, so essential to their personal safety, and so related to the daily life of that household, then the work of these little missionaries, while serving to fix in their own plastic minds principles for after life, will at the same time yield results in a cumulative way in helping to drill into the minds of the parents, the principle of safety which they have heard in the factory, the shop, the store, or other places of business or social resort.

Through such a systematic course of general education, we shall be made to appreciate the rights of others and understand and obey that

fundamental law of society which requires us to pursue our own activities with a due regard for the rights and the safety of others.

When we have cultivated that respect for the law which begets obedience on our part, we shall then be in a position to enforce obedience on the part of others. It has been said that one of the ways to vitalize our public schools is to teach real needs. One of the real needs in this country, is a more wholesome respect for the law; the place to begin is with the child, and here is where the school and the home work go hand in hand. Safety work intelligently directed through these channels will soon create the desired public sentiment and then, and not until then, shall we have law enforcement in the comprehensive sense that meets and averts the evils against which you are today directing the activities of this great safety organization.

CHAIRMAN MALLON: The paper just read by Mr. Van Osdol gives us food for thought. I would like to hear from some of the members, as to what they have done to reduce accidents.

#### DISCUSSION

MR. F. C. PERKINS (Commissioner Public Affairs, Buffalo): I would like to ask the speaker if he has not postponed the grade crossings a little too far. In Buffalo we are going to ask for six subways across the most congested points where there is a great traffic during rush hours. The idea is to place across the street a small subway, porcelain or white tile lined, electric lighted, so women and children can get across at congested hours. The street railways are supposed to bring forth safety devices and are doing wonderful things, and it seems to be the municipalities should join hands with them for safety. Is not this a reasonable request to make of the cities? Cannot you, as Electric Railway men, urge those things in your different cities, particularly at "dead men's crossings?" The automobiles are also making some such precaution necessary.

CHAIRMAN MALLON: I can see, in congested crossings, the benefits that could be derived, but you are causing the pedestrians to do something a little out of the ordinary in climbing up and down stairs. You might have a congestion of passengers going through the subways. And in so many of our large cities we have conduits and water pipes that you would have to remove.

MR. PERKINS: We found that the sewers were far enough down, and that the conduits are nearer the surface.

MR. H. SCHOMBER (Henry L. Doherty & Co.): On Fifth Avenue, in New York, we have the police tower system, which is a great advantage. No accident can possibly happen, such as a vehicle going in one direction and a street car in another, at the same time. The traffic all travels in one direction. Nothing crosses the street when traffic goes North and South. The police towers are erected in the center of the street, and there is no possibility of one vehicle running into another.

MR. B. D. HASKINS (Chattanooga Ry. & St. Co.): Has the National Safety Council a Legal Department? We have some of these questions coming up in our legislature in January, and I would like to have the

best bill that any of the states has prepared to present to our legislators, and I would like to know if I can get that through the Safety Council.

CHAIRMAN MALLON: I am not in a position to answer that. Mr. Talbert could probably tell you.

MR. TALBERT: Only in an unofficial way. There happen to be on the Executive Committee a number of well qualified lawyers who have given their advice and help along general lines.

About a month ago the National Traffic Officers' Association in San Francisco had a meeting with a fairly good representation, and called for another meeting in Cleveland, on November 10.

We have taken as a basis what is known as the National Traffic Code, and we are going to undertake to formulate a law, having there the representatives of about fifteen different National bodies, including the National Safety Council. It is hoped that out of that will come definitely a national traffic law which will be given all the prestige that all those National Traffic Organizations can give to it.

MR. VAN OSDOL: The National Safety Council has a very complete file of all the traffic laws of the leading cities of the country. As far as the traffic is concerned on rural highways that has not been largely attempted as far as regulation is concerned. That is going to be a serious problem when they tackle it.

CHAIRMAN MALLON: I overlooked the report of one of the Committees established at Cleveland, with which I was not familiar. The Committee was appointed to establish a closer relationship between the National Safety Council and the Central Electric Railways. Mr. James Harmon, of Louisville, Kentucky.

REPORT OF COMMITTEE TO ESTABLISH CLOSER RELATIONSHIP

MR. HARMON: A resolution was presented by Mr. Reid to direct that something be done to bring the Central Electric Railway Association into closer contact with the National Safety Council. I presented that at their meeting in Louisville, and it was accepted and adopted, and there was a Committee appointed by this Association, of which I am Chairman. At the next meeting of this Association there shall be a speaker. I think the speaker will be Mr. Price, of your Association.

CHAIRMAN MALLON: The next paper is by Mr. Charles B. Hardin.

ADVERTISING CAMPAIGN TO REDUCE AUTOMOBILE  
AND STREET CAR ACCIDENTS

CHARLES B. HARDIN, GENERAL CLAIM AGENT, UNITED RAILWAYS OF ST. LOUIS

In planning a campaign to reduce the number of street car accidents through the medium of advertising, obviously the first question to be determined is the amount of money to be spent on the campaign, as this necessarily determines whether it will be a long or short one, the number of newspapers and magazines, and the amount of space in each you will

utilize, and the frequency with which the advertisement will appear, and the extent of other character of advertising you will do.

After the amount to be expended has been decided upon the first general principle to be observed is *intensity of effort*. Our advertising and publicity experts state as a general rule that sporadic advertising brings poor results. It is the daily repetition of a particular idea treated from many angles that goes home to the reader. It is the old principle of drops of water falling on a stone, and I may add that you will find it requires many drops of water to impress the average motorist with the truth that a trolley car cannot leave its track and dodge him.

Make your campaign a Safety Drive during a given period of time, preferably a month. Call it the Motor and Trolley Safety Month, or use some other catch phrase that will impress the public, and every day during the selected month attract the public eye with Safety Slogans and other carefully prepared subject matter.

Some of our managers may raise the natural question why spend much money for an advertising campaign in buying expensive display space in the newspapers? Why not have our publicity agents work up a campaign which the newspapers might treat as "news matter" gratis? Why not have the automobile clubs and other civic organizations meet and "resolute" and give out statements which the newspapers would be almost compelled to print, as the matter of life and limb protection is of such great public importance it should be treated as the news of the day. Well, it is my experience it can't be done—successfully. The effort becomes sporadic and has little permanent effect. It lacks intensity. With the present plethora of news and paid advertisements and scarcity of print paper it is impossible to induce the newspapers or magazines to devote any fixed and continuous amount of space to Safety matters, or give them due and impressive prominence, unless the same is arranged on a cash business basis.

In connection with the advertising campaign it is advisable to have our civic organizations and leading clubs addressed by some good speakers on the subject of prevention of street car accidents and resolutions passed endorsing the movement and thus arouse particular interest in it. By so doing, the newspapers would be impressed with its "news" value and give you the publicity you could not hope otherwise to obtain and which emphasize and supplement the paid advertisements and would lend an additional punch to the movement. However, this cannot take the place of paid advertisements for several reasons.

#### REASONS FOR PAID ADVERTISEMENTS

First: the very fact that we were contemplating an advertising campaign would impress the newspapers and other publications most favorably. It would show them that we realize the great importance of doing everything possible to reduce the trolley accidents. And just here I wish to say that while newspapers are somewhat sensitive to "box-office returns," while they like and probably need the money, they are not moved entirely by mercenary motive. To the average City Editor the

very fact that the Traction Company proposes to spend money on a Safety Campaign would be "news" and would be so treated.

Second: We doubtless would get as much, or more, free space as we would have to pay for. In other words, our publicity man would find little difficulty in getting the newspapers to comment daily in their news columns on the subject matter carried in the advertisements. The advertisements themselves would be the theme for the "stories" and all this could and should be supplemented by proper meetings of various organizations concerned in the campaign heretofore mentioned.

Third: The advertising itself would say just what we want it to say, and appear in a selected part of the publication where the reading public would soon learn that it was to be found. It would not be garbled, lost, or wasted.

In negotiating with the newspapers, or other publications, I would first have your publicity agent unfold his plan to the publisher direct and enlist his co-operation. This is naturally easier to get when there is money coming in over the counter. Thus the manager could be induced to talk about your campaign, not only to the news editors but to the editorial writers as well, and assure team-work in putting over the drive. Friendly support in all probability would be enlisted, no matter what the previous attitude of the publication toward the traction interests may have been. The subject of Safety is one on which no quarrel could be picked, and the result of co-operation on this scene might tend to heal some of the old wounds, due to changes in rates of fare, or other disputes. I am sure it would create better feeling.

#### AMOUNT OF SPACE AND POSITION

In determining the amount of space to be bought in the newspapers and the position of the advertisements permit me to suggest that while a large advertisement is more effective than a small one, the small one may get splendid results if it be *properly* placed. *Position*, therefore, is very important and in this case is determined by the people one desires to reach. And who are they? Among the first are the automobile owners and drivers. And what part of the newspapers are they most likely to read every day? My answer would be the automobile news columns. Why? Most men and women who own or drive cars are always figuring on turning in their car and getting another one, and those who do not own cars now are hoping to buy one at some early date. We thus best reach the present and prospective owners and drivers through the automobile news columns. Place our Safety Slogans in these columns and they will bring good results.

In line with the reasons I have just given, I would not limit the advertising campaign to the daily newspapers. I would extend it to include publications which make a specialty of automobile news and comment. The automobile club journals should come first on the list of supplementary publications, always bearing in mind, however, that our largest and best medium is the automobile news page of the daily newspapers. By placing the Safety Slogans on these motor car pages they are sure



to be read and remembered, even though lack of funds compels us to purchase small space. The main thing is to get them there in as impressive size as possible, but get them there and keep them there daily for a month. You will receive the hearty co-operation of the owners of garages and gasoline filling stations in the display of appropriate bulletins issued by the National Safety Council. Every automobile driver has to go to one, or both, frequently and the mental picture he retains of the bulletins just seen will influence him to drive safely. for a while at least, and it may eventually become a habit.

#### SIGNS AND SLOGANS

Another medium that has become recognized as one of the most valuable in advertising is the dashboard sign on the front end of street cars. The usual size is 22x28 inches and the copy can be changed frequently at a relatively small expense and the card be made more general in its application. The school children can be reached through the use of the bulletin boards in the schools for display of *Safety Slogans* and original drawings by pupils depicting *Safety ideas* and the *distressing results of carelessness*. These to be changed at least once a week during the campaign. In the smaller communities where the number of school children do not make the cost prohibitive, the distribution of pencils and small buttons, with appropriate *Safety Slogans* printed thereon, and distributed through the schools will be found very effective, particularly if the distribution is accompanied by a *Safety talk* either by the teacher or some *Police Officer in uniform*. Then prepare a bulletin, combining safety on the streets with safety in the homes, with a receipt on the bottom that can be detached, and distribute it to the parents through the school children, asking the child to have its parents read it to him and bring back the receipt to the school teacher. This will provoke a discussion at home of every phase of safety and the result cannot be but beneficial to all. I cannot refrain from stating here that the best plan I ever studied to reach the school children is set forth very clearly in "Education in Accident Prevention" edited by Dr. E. George Payne, Principal of Harris Teachers College, St. Louis. These children will carry the message home to their parents very effectively.

Our trolley poles at the curb line can be used for the display of *Safety Slogans* printed on cardboard and placed about 7 feet above the sidewalk level. This method of advertising is particularly valuable where you are endeavoring to stop the practice of "jay-walking." These same cardboard signs can be utilized by the team and truck owners and retail merchants, by placing them on the side of their wagons and trucks. All these various interests can be favorably influenced through their respective associations, and the retail merchants can give additional strength to the movement through attractive window display depicting *Safety First ideas*.

The space on the back of the destination sign boxes, on the front end of our cars is a splendid place for the display of our advertisements and practically every passenger will read them.

I would strongly urge the enlistment of your City Courts and Police

Department in the strict enforcement of the Traffic Ordinances. The necessity and the desire for Safety which you are creating in the minds and hearts of the public by your advertising campaign, will strengthen the arms of these two great forces.

Last, but not the least, is the work to be done among "ourselves" and I include in that word every employee. The Safety idea must be sold to us, which means that we must have meetings of the employees before the active campaign begins and our aims and objects clearly placed before them and their active co-operation enlisted. No campaign can be successful if every one does not enter into it thoroughly determined to make it a success. If there appears any evidence of luke-warmness on our part, the public will not support the movement and our efforts will have been in vain.

CHAIRMAN MALLON: Mr. Hardin brings out a number of ways in which we can advertise safety. I would like to ask Mr. Thompson, Assistant to the President of the Chicago, Milwaukee & North Shore Railroad, if they have not done something in that line.

#### DISCUSSION

MR. THOMPSON: We have tried a number of schemes of advertising in order to get before the public the necessity for care and to enlist their co-operation in the prevention of accidents. In the Monthly Bulletin, which we issue, we try to have something every month to bring before the people who read it the idea that first we are attempting and devoting every energy we have toward operating our road safely; that the first idea of the management and the employees is that the road shall be operated safely. We try to encourage those who use the road and the crossings to do their part and co-operate with us in the reduction and prevention of accidents, in connection with the employees. We frequently run advertisements in the newspapers along the lines of safety, connecting them with the idea of safety and service. We think this has brought very beneficial results. We have also tried to reach the school children in the villages and towns and cities along our line, and have had splendid co-operation from the teachers and the children and their parents.

I would like to hear from others with reference to ways and means that they use to advertise safety to reduce accidents.

MR. TURNER: We have had great results with direct-by-mail advertising, particularly to automobile owners.

MR. CARPENTER: When we have had accidents from truck drivers, we have found that a letter addressed to the Secretary or the President of the Company owning the truck, asking for their co-operation and calling attention to some of the details, has not only reduced the number of accidents, but it instills in the minds of the drivers the necessity for carefulness at other points.

MR. HUTCHINS: It seems to me that cardboards placed on trolley poles create a hazard for the linemen, who are compelled to use the spurs sometimes. Drastic legislation should be enacted against the practice.

**MR. C. B. HARDIN** (United Railways Company, St. Louis): These are iron poles.

**CHAIRMAN MALLON:** I was at a meeting of the Chicago Telephone Company two weeks ago. Some one had received a bad fall. He went to enter the spur into the pole, a tack was there, and he went down.

**MR. S. W. BALDWIN** (The Connecticut Co., New Haven): Mr. Hardin has stated so many good methods of conducting and bringing to the public's attention the elements of safety in a campaign, that it is rather hard to think of any more. I do pride myself, however, that we have one that he did not mention. We obtained very good results from it.

The first place to start is to sell a safety campaign to ourselves, among our employees. The second richest field is among school children.

#### **SAFETY WORK WITH SCHOOL CHILDREN**

I organized a little campaign that combined these two. I got out some little cards with the number of trips that a motorman on his schedule went by a certain schoolhouse. I asked him to note each trip, picking out motormen who had trips about the time of the opening and closing of the schools, the number of children who apparently carelessly stepped into the street. I got the motormen keen on that little report. After I had those reports for one day, that was all that was necessary for the purpose. I got in touch with the Superintendent of Schools, and told him that we had that record upon all of the schools. I had it announced to these various school children that they had been watched in the past, and their record taken, and that at some date in the future that record would again be taken, and that there was something good coming to the school that improved its record the most. The teachers were enthusiastic about it. I used those same cards a couple of weeks later, and checked up again.

With the co-operation of the Superintendent of Schools, we obtained for the two schools having the best record, an afternoon off. We sent around some trolley cars, and took the children down to the shore and gave them each a bag of peanuts and a ride on the flying horses. I think the results were very noticeable for fully the next six months.

**CHAIRMAN MALLON:** That has a two-fold purpose, among the children, and among the motormen. In our campaigns we have run along in a certain rut. We may change the literature a little bit, but we put it back in the same place. We want to get our employees to read the Bulletins. Then we shall have to put in things that will arouse their interest. The Bulletin Board down the hall has some interesting suggestions, some cartoons of Ty Cobb making a slide or some other fellow turning a somersault. Then the employees will go and look at the Bulletin Board to see what is new for that day.

I will appoint the Nominating Committee: Mr. Carpenter, Mr. Hodson, and Mr. Hardin, with the request that they get together this afternoon and report tomorrow morning.

The next paper is "Public Safety," Mr. C. M. Talbert, Chairman, Public Safety Section, National Safety Council.

**PUBLIC SAFETY**

C. M. TALBERT, CHAIRMAN, PUBLIC SAFETY SECTION, NATIONAL SAFETY COUNCIL

Mr. Hardin's report covered very clearly the conditions existing in St. Louis, and I want to say that he has done all of those things which he read about.

Two weeks ago we had a "jay-walking" campaign in St. Louis, in which the advertising donated by the United Railway Company was perhaps the most effective force of the entire works. I think the slogans he put on the poles were somewhat the best. You can nearly always get the value of an advertising feature by the returns you get from it. Two days after the feature started we had an entire page in the *Globe Democrat*. Across the top were cartoons illustrating "jay-walking," jay pictures, jay policemen, jay tennis players, jay golfers. As an advertising feature I don't think it could have been beaten. You could not have gotten it by paying for it, but there was an active public sentiment behind it. The newspapers will take whatever you give them if you create the public force behind it.

I was rather interested in getting some figures on what accidents you had, and what they cost you. These were compiled from sixteen cities, averaging one million people. These were the years 1914, and 1918. The number of accidents per million passengers were 51 in 1914, and 48 in 1918; number of reports, 1914, 13,811; in 1918, 13,025; number of claims, 3,895 in 1914 against 4,519 in 1918; the percentage had increased from 22 per cent to 33 per cent; the total expenditures from claims was \$48,988 in 1914, and \$590,662 in 1918; increased from \$35 to \$45 per accident; and the per cent of claim costs in 1914 was 4.5 per cent as against 4.9 per cent in 1918; the number of suits pending increased from 13,411 to 20,203.

Mr. Hardin further tells me that 90 per cent of all the claims paid by railroads are to what might be classified as the public, and that only 10 per cent of the claims and costs come within your organization and might be classified as industrial claims, that 90 per cent of your troubles may be classed as public safety work.

That brings the direct relation between the Public Safety Section of the National Safety Council and this particular section.

There are two phases of what can be done in protecting the public in accidents with your companies: those you can do, and those which you cannot do. It is hardly worth while for me to list those you can do yourselves because you are more familiar with them than I am. They are educating motormen, collecting statistics as to the most dangerous points on your lines, cautioning the motormen to be particularly careful. It might be worth while to prepare a map of each particular street car route, showing on that map the crossings at which the most accidents happen, cautioning your motormen to be particularly careful at that point. Mr. Hardin says that is bad, because the public take advantage of the fact that you, yourselves, recognize that and will use it in presenting claims to you.

## STATISTICS ESSENTIAL IN ACCIDENT PREVENTION

I have found in controlling street car accidents one of the most vital points has been in the knowledge of what is occurring there, the number of accidents that occur at that point, and a study of how and why they occurred. The value of the work you do can only be shown by a comparison. It does not mean much to the public or your own railroad company to say that in 1920 there were a number of accidents at a certain point. You want to know the conditions that existed there before you undertake to correct them. Statistics are essential to any program you may lay out. They can always mark the trolley poles and at home we have adopted the black and white stripes as being the most effective.

We found in our accident report a tabulation of fatalities, and on the map were certain unexplained large dark spots, which indicated where the greatest number of accidents occurred. There were six or seven spots that stood out very prominently, which we were unable to account for; why there should be more fatalities there than any other place. We found they were near a car shed, or some other unusual condition. Then it was easy to eliminate those accidents.

Statistics of what is happening at spots like that are very valuable and very vital.

Three years ago the National Safety Council undertook to formulate, as one of the Sections, Public Safety, looking up statistics as to the increase in fatalities. To my surprise I found an average of one person every thirty-two minutes of our sixteen hours of waking life was killed by an automobile. We have not yet worked out the per cent of collisions between street cars.

## CHAUFFEURS' SCHOOLS

Chauffeur schools have been formed and the National Safety Council has formulated twelve lessons for the schools for the coming winter. They are divided into two sections: the first is on the mechanical part of the automobile, and the other half will be taken up in operating the vehicle on public highways, with traffic regulations, what to do and what not to do, signs and signals. All this has been worked out very carefully.

If the men in charge of the Utilities will give that their support they can do a good deal of good to the Public Safety in that community.

We have paid secretaries in sixteen cities, organizing and conducting all public safety work in those communities.

Too much stress cannot be placed upon continuous effort. Sporadic effort will do but very little good. If you men ran an advertisement, the first of every month, or the first of every week, it would be very helpful. But back of that you must get some definite system to carry on the campaign.

We have for two or three years been putting on Safety Campaigns. To my mind they are largely ineffective unless you can follow that by something else at some definite time, so you have before the public constantly and continuously this phase of public safety.

## PUBLIC SAFETY COMMISSION OF ST. LOUIS

In St. Louis our Public Safety Commission is composed of men who have to do the formulating, passing, and enforcing of laws. The most active are the police. Judges, the Chief of Police, and the Lieutenants are active members, the Aldermen, The Automobile Club, Truck Drivers' Association are also active.

On the first Tuesday evening of every month we have a meeting of our Public Safety Committee. The last one was attended by sixty people, in all walks of life. The session lasted the entire evening, with a discussion of nearly every phase of Public Safety that could be mentioned. We have had that for about a year and a half. My first idea was that it would be rather difficult to have people attending and getting personally interested. The opposite has been the result. If you can show that you are doing constructive work and have a definite plan, most people in public life are willing to give their time and energy.

The result, then, of our Public Safety study for the past three years has been that public safety can be controlled just as definitely as industrial safety, that it can be done by, and only by, organized, persistent, consecutive effort.

We are going to ask definitely for the support of every Public Utility member, not so much in this Convention, but when you get back home.

My principal object in coming here is to say to you that we have a definite program, and we are doing a definite work, and we think we are getting definite results, and we ask that the men of this Section, when they get back into their own fields, give it all the help they can, and give it in such a way that will lessen the burden of those attempting to work for Public Safety.

I was very much interested in the discussion on Mr. Hardin's paper, and am sorry I could not have been here the entire morning, because after all, 90 per cent of your accidents are on public safety lines, and to my mind, the Public Safety Section and the Electric Railway Section should be very closely identified.

I should like to have this Section take some action before you leave, by resolution or by-laws, suggesting every man go back to his own town and give the Public Safety Section a little backing. If there is anything the Public Safety Section can do to strengthen the position of those of you who are directly connected with your Utilities, and make your positions stronger with them, and emphasize the value of the work you are doing and can do, let us know what it is, and we shall be only too glad to do it. I know your help is valuable, and I know sometimes it is difficult for you to get the support of your own company. If we can help in any way to present the circumstances to them, what the Public Safety Section is doing in the various parts of town, and make your work any easier, and help along your Public Safety work, we should be very glad to do it.

CHAIRMAN MALLON: I would like Mr. Scott to tell us something we have not heard from these papers.

MR. C. B. SCOTT (Bureau of Safety, Chicago): Mr. Van Osdol brought

out a point the difficulty of reaching the public in rural communities. That problem has been solved in the larger cities. We have grasped how to reach the schools and public, but I can see the difficulty in the smaller towns. Would it not be a good idea, at the next Congress, to have a paper on the subject of reaching the public in the smaller communities?

The same conditions don't apply in the smaller towns that apply in the larger cities, and this will have to be studied out in a different manner.

My only contribution after all this effort is that this Section, at its next meeting, might profitably have a program designed to help the fellow in the smaller town to get the co-operation of the public.

#### SAFETY BULLETINS

CHAIRMAN MALLON: We shall have a few minutes to discuss plans for making the bulletins more helpful to the members. I would like to hear from Mr. Hodson on that.

I want to say that if there is any particular hazard you want covered in these bulletins or a condition that you want covered on your property, and you can select a cartoon or a photograph that would be applicable, not only on your own property, but on a different property, bring it out; they will get into the bulletins and will circulate to others who possibly have the same difficulty, and we can build up the kind of a bulletin we ought to have.

MR. H. J. HONSON (East St. Louis & Suburban Ry. Co.): I happen to be a member of the Bulletin Committee, and we sent out several letters, and the results have not been at all satisfactory. Very few suggestions came in from the member companies. I personally sent in fifteen bulletins, and nine of them were used during the past year, but they were drawings, and the great question in our minds is whether we should use drawings or photographs. We want to get the opinion on this for the next Committee. Or maybe we should use other types of bulletins.

CHAIRMAN MALLON: I am of the opinion that the photograph is more effective, if you can get the conditions, than anything else. We have a photographer now who takes the wrecks, and we are going to put the cause underneath. We will place our own cause. It might be looking at a chicken crossing the road or a chicken on the sidewalk (laughter) or a fog or conversing with a passenger, but we are going to show the result. I think that way we shall be able to bring it out more effectively.

MR. MCCULLOUGH: The one thing that impressed me more than anything else has been the lifting of the responsibility for wrecks and accident prevention from the shoulders of the workmen and the Safety Supervisors and laying it on the foremen. I do believe the foreman is one of the vital factors in the Bulletin Service, the man on the job in contact with various unsafe conditions, regardless of the efficiency of the Safety Department. I believe if the foremen are taken into confidence with the men who prepare the bulletins, that much good material can be obtained.

As regards the relative value of photographs or drawings, that depends

largely upon the type of bulletin that is being issued. I think, where possible, photographs should be used, because that illustrates an actual condition, which cannot be done with the cartoon.

A number of points were brought out yesterday in the Bulletin Luncheon which I believe should be taken into account. It took up the relative value of general bulletins and specific bulletins, cartoons and photographs, and one point which was a good one, getting the bulletin out at the proper time. Too many of us are prone to send out a bulletin after an accident has happened. The accident will suggest the bulletin. They brought out the point of using fore-thought and getting the bulletins out before the accidents happen, and in case of issuing a bulletin after the accident has happened, to get it out as soon as possible. A representative of the Eastman Kodak Company told how they got bulletins out in an hour and a half to their five plants at Rochester. They take a photograph of the condition, develop it, print the bulletin, and in an hour and a half they have the bulletin out, hot from the press.

#### RESOLUTION

MR. BALDWIN: I move that it be resolved by the Electric Railway Section of the National Safety Council, that in view of the fact that approximately 90 per cent of the accidents caused on the electric street railways are caused by public accidents, that it be the sense of this Section that each individual company should co-operate financially and energetically with the Public Safety Section in organizing and carrying on Safety Campaigns in the locality of each and every electric street railway company.

(The motion was seconded and carried.)

MR. HARDIN: Our Bulletin Service has been more directed at the employees' accidents than the public accidents. In the bulletins I received 90 per cent of them illustrated shop accident and internal accidents. I think we ought to reverse the orders, and have 80 per cent of our funds go to the public accidents and 20 per cent to the shop accidents.

ADJOURNMENT.

#### FRIDAY MORNING SESSION

THE second session of the Electric Railway Section was called to order at 9:55 a. m., Friday, October 1, by Mr. J. H. Mallon of The West Side Elevated Railway Company, Chicago, Ill.

CHAIRMAN MALLON: The first order of business this morning is the report of the Nominating Committee. Mr. Carpenter was appointed Chairman of that Committee.

#### REPORT OF NOMINATING COMMITTEE

MR. CARPENTER: Your Committee reports the following: For Chairman, Mr. John H. Mallon, Assistant General Superintendent of Transportation, The Metropolitan West Side Elevated Railway Company of



Chicago. For Vice-Chairman, Mr. James Harmon, Safety Manager, Interstate Public Service Company of Indianapolis and Allied Companies. For Secretary, Mr. John H. Cox, Cleveland Electric Railway, Cleveland, Ohio. (The Report was unanimously adopted.)

CHAIRMAN MALLON: Before we proceed to the reading of the papers that will be discussed I would like to say a word with reference to the confliction of days that the interests of the Electric Railways and the Steam Railways are presented. I notice by the program that the Steam Railway Section had a number of papers that were of vital importance to members of the Electric Railway Section, and I think that arrangements should be made at the next session of the Congress to have the hours and dates so arranged that there would be no conflict.

In looking over the program, before the Congress, I found so many papers of interest that a number of our employees were asked to come here during the railroad meetings. Of course, that was principally due to the fact that we could not release all the men on the days that the Electric Railway Sectional meetings were held.

I would like to hear the sentiment of the members here as to what they think about that.

MEMBER: You bring up the Steam Railway question but quite a few of us are vitally interested in the Public Safety end of it and they conflict—all three of those conflict. We are missing some of those this morning from the Public Safety Section. I think it is just a question of rearranging the program and sending out proofs of the program to all the Chairmen. I do not think that was done this year.

CHAIRMAN MALLON: Has that previously been the practice?

MEMBER: I understood they were going to do that but I don't think they did.

SECRETARY COX: I think that is a very good suggestion and I think the newly-appointed Program Committee ought to bear that in mind and see that it is brought about because they can undoubtedly arrange it. Our Program Committee would just say what dates they wanted and give the dates of the other section, to fit in so that we could take them all in.

I move that that matter be referred to the newly-appointed Program Committee for instructions.

CHAIRMAN MALLON: The point that they should be instructed on is to try to eliminate the confliction of dates between the Electric Railway, the Steam Railroad, and the Public Safety.

(The motion was carried unanimously.)

CHAIRMAN MALLON: The paper that will be presented this morning is divided into three sections, the topic being, "The Necessity for and Importance of Observing Operating Rules"—section A being "Safety Department" which will be discussed by Mr. Hugh Wilson, Safety Department, Northern Ohio Traction & Light Company, Canton, Ohio; section B, "Claim Department" by Mr. F. T. Holliday, Claim Agent, Gary Street Railway, Gary, Ind.; section C, "Transportation Department" by Mr. C. E. Thompson, Assistant to the President, Chicago, North Shore, and Milwaukee Railroad, Highwood, Ill.

## THE NECESSITY FOR AND IMPORTANCE OF OBSERVING OPERATING RULES FROM THE STANDPOINT OF THE SAFETY DEPARTMENT

HUGH WILSON, SAFETY DEPARTMENT, NORTHERN OHIO TRACTION AND LIGHT  
COMPANY, CANTON, OHIO

In all clean athletics the rules are faithfully interpreted and rigidly obeyed, and no single factor adds so much to the enjoyment of the game on the part of the spectators and players alike as strict conformity to the rule book. An inefficient umpire and lawless participants quickly demoralize any contest. Only an enemy of the game will tolerate nullification of the rules. And so with the electric railroads no single factor adds so much to the welfare and prosperity of the road as strict conformity to the rule book, and no single factor will put a road on the rocks faster than non-conformity to the rule book; hence the necessity for an importance of observing operating rules. After a careful study of this subject I feel safe in saying that ninety-eight per cent of all accidents are caused by disobeying rules or man-failure—failure on the part of employees to put into practice the rules laid down by the company. And rules are violated mostly by the new men, men who have only been in the service a short period, perhaps two or three months and what we might call "The new man's self-confident period" and it is during this period that most accidents occur. Frequently the new man disobeys rules through ignorance, by not being familiar with the rule book and again through wilful negligence. This then brings us face to face with an unsafe condition, a condition that is the cause of untold human suffering and also involves the needless expenditure of large sums of money, and so we say in the language of one of old "Is there no balm in Gilead." Yes there is a remedy. Two things suggest themselves to my mind which if carried out will go far toward eliminating this great evil, the disobeying of rules, and do a world of good. First, The hiring of men. Second, Going over the rule book with the new man before he takes his first run out.

### HIRING THE MEN

*The Hiring of Men.* Before a man is hired to operate a street car there should be an investigation made relative to his home life, habits, and former working place. If he comes from a home where his parents are careless, shiftless, and indifferent, nine times out of ten the boy will be the same,—like father, like son. If he is careless and indifferent about his own affairs it is not likely he will observe the rules and be efficient when working for some one else.

*Habits.* If he spends his spare time in questionable places, gambling and playing cards, don't hire him for a conductor.

*His Former Working Place.* If his former employer could not depend on him, could not tell whether he would work tomorrow or the next day, I say there is no room for such men in the street car business. But

I hear some one say an investigation of that kind would take too long and cost too much. The time would be of short duration and the cost would be nothing compared with what it is costing now for not having made an investigation; but over and above all what it would cost, the investigation should be made for the same cause and reason that America entered the World War—for humanity's sake and to make the road safe. The hour is at hand when in hiring men to operate street cars we must go further than judging them by their personality, the clothes they wear, and two or three references. We must have clean men, men of strong character and who feel responsibility, yes, we need men who have caught the vision of the great need of carefulness and who see the necessity for and importance of observing operating rules. If we spend a little more in selecting men to operate street cars we will spend less in the settling of claims and in perfecting safety devices, for there never has been nor never will be a safety device perfected that will take the place of a careful man. Better to leave cars in the barns, than send them out to be operated by careless and inefficient men.

#### TEACHING THE RULES TO NEW MEN

*Going over the rule book with the new men before they take their first run out.* After having hired a man we should do everything possible to give him a good start in his new line of work. As stated before, frequently rules are disobeyed and especially by the new men through lack of knowledge. We put him on a car to break in; soon he learns to operate the car and knows the stops, is turned in, and takes a car out by himself without ever having seen the inside of a rule book. Is it any wonder then that most accidents are caused by disobeying rules or man-failure? Hence, the need of an instructor, one who can take the new man and explain to him in detail the rule book. The instructor should be a man who has had a number of years road experience and should be able to leave impressions on the new men that will result in much good. We must treat the new man kindly, gently, tell him he is the kind of man we have been looking for, get him to feel that the position he is about to take is a responsible one, for I believe the more responsibility we make a man feel the more initiative and loyalty we will get from him. The superintendent should early get acquainted with the new man, learn a little of his personal history and his name, for it is but natural if the employee is flattered by a personal remark from the superintendent it makes him think that he belongs, so to speak, and that instead of being hired merely for motorman or conductor he is really a part of the personnel of the organization; then there is something within him springs up and he is ready and willing to put the best that is in him into his work. That is what I call "Giving the new man a good start."

The instructor can have a large field to work in; when not actively engaged in going over the rule book he can follow up the new man, ride with him, watch him closely, and in so doing he will discover his weak points; then at the opportune time in a kindly, tactful way show him his weakness and help make him strong. He can also do personal work with

the men whether they be on or off duty, talk with them heart to heart impressing upon them the necessity of observing operating rules. The writer has held the position of instructor for the past year and along with other methods in doing personal work with the men I relate to them a touching incident wherein a passenger sustained serious injuries due to the disobeying of rules. I find that a great many men are like diamonds in the rough. The outside is the roughest and when you relate to them a touching incident the real man shines out, you touch his heart and the unbidden tear rolls down his cheek, and you leave impressions that are lasting. We should also tell the man about the unsafe and dangerous places a claim agent has to go to investigate and settle claims. To illustrate just what I mean let me give you a little of my own experience.

#### EXPERIENCE OF A CLAIM AGENT

I was assigned to investigate a case relative to a young girl who fell from a moving car. She lived in the heart of the lowly foreign settlement. After some difficulty I found her home, went up to the door and knocked. A big stalwart man opened the door, said something that I did not understand, and beckoned me to come in. I entered. He led me through two rooms and into the third where, seated on boxes, for there was no furniture in the house, was a woman and a girl about fourteen years of age. There was also a baby playing on the floor, almost nude and dirty. I asked kindly if any one of them could talk English. The girl replied, "yes." Just then I noticed that the man became very angry and said something to the girl that I did not understand. He looked at me with a frown and left the room. He returned in a few seconds with a heavy leather strap in his hand, hit the girl on the head a heavy blow, knocking her down. She started to scream and he hit her again. He then fastened his eyes on me like a mad man and I expected every second that it would be my turn next. It was my move and I had to do something quick. This is what I did. I picked up the babe that was playing on the floor almost nude and filthy, kissed it on one cheek, then the other, watching my man at the same time. As I kept on fondling the babe I saw his countenance change. I saw a tear roll down his cheek, he reached down and lifted the girl from the floor, put his arms around her, and kissed her. He then came and put his arms around my neck sobbing as if his heart would break. I had conquered him by showing kindness to his child. He then allowed the girl to talk to me. She told me all about the accident. I settled with her, shook hands with them all, and left. A few years later some one called my name while walking on the street. I turned around and there to my surprise was this same family. They were all dressed nice and clean and the girl had grown to be a beautiful young lady. Anna, for that was her name, reached out her hand to me and this is what she said: "Mr. Wilson, our home is far different now. Father is a different man. A few days after you left us that morning, a few years ago, Father joined the mission, and we all belong and have a happy home." My heart filled and I turned my head to wipe the unbidden tear.

## KINDNESS PAYS BIG DIVIDENDS

In relating this incident to the men we can use it for a two-fold purpose: The dangerous places a claim agent has to go, and also that kindness pays big dividends—a faculty that all street car men should be in possession of. I remember, though but a small boy in Scotland, father used to tell me that along the coast of England, Ireland, Scotland, and Wales there were many rough and dangerous places. Ships were at times driven by high winds and dashed to pieces against the rocks; so to eliminate the danger and make it safe they erected a lot of tall houses called lighthouses. The lights in these houses were never permitted to go out in the night season but were kept brightly burning and whenever the captain of a ship with his cargo of human freight would spy the lighthouse lights he would urge his ship on with confidence for he knew he was safe, at least as far as the rocks were concerned; and so if we look around we can see plenty of rocks and dangerous places and what is needed is more lighthouses. You and I are the lighthouses and we must keep our light brightly burning so that we may be able to light the other fellow out of the darkness into light, out of carelessness into carefulness, out of danger into safety, and so when we go back to our men if there be any among them who haven't caught the vision of the need of carefulness, of the great need of the Safety Movement, let's tell them how they can catch it. If they will start to think safety, practice safety, talk safety all the time, they will soon catch the vision, then the reward. Yes I am glad there is a reward goes with it. We will all go through life happier and I am sure that is worth a whole lot. Then when it comes our time to cross over we shall have no remorse, knowing and realizing deep down in our individual heart that we did all we could to lessen accidents, alleviate suffering, preserve life and happiness, all of which comes under the head of this grand and good movement, SAFETY FIRST.

CHAIRMAN MALLON: The different divisions of this article hinge on the main subject. Therefore I feel that we should go through with the various sections of it and discuss them as a whole because I feel that we will have a repetition that will give us an opportunity to discuss them all in a more general manner.

We will now hear from Mr. F. T. Holliday, Claim Agent, Gary Street Railway, Gary, Indiana.

### THE NECESSITY FOR AND IMPORTANCE OF OBSERVING OPERATING RULES FROM THE STANDPOINT OF THE CLAIM DEPARTMENT

F. T. HOLLIDAY, CLAIM AGENT, GARY STREET RAILWAY, GARY, IND.

Operating rules are the regulations and methods established by a Railway Company for the operation of its cars, or trains. They are self adjustive and adapt themselves to the amount and kind of traffic handled. However, they compel the employee (in this case, trainman) to operate his car or train efficiently, while they prohibit the reckless and

careless trainman from manipulating his car, or train, in an indifferent and negligent manner. Rules are necessary and they must be enforced uniformly and consistently.

The strict observance of operating rules is essential and imperative to any Railway Company. They are based on natural and physical laws, statutory laws and city ordinances governing in the locality in which the railway is operated. Besides these rules it is necessary for the trainman to be familiar with numerous other things, such as, grades, crossings, stations, signals, and all of the natural and unnatural characteristics of the line. The regulations and the features last named should be impressed so vividly upon the mind of the trainman that it would be almost a sheer impossibility to be able to forget them.

The violation of an operating rule usually terminates into one of the most melancholy features of railway operation, namely, the accident. It results in the expenditure of huge sums of money for the repairing of damaged property or the compensating of injured parties. There is absolutely no return on the money so spent, though in some cases it may be an investment of good will. The amount may be trivial or appalling: it of course, depends upon the severity of the case. The liability of the railway company, in such cases, however, cannot be questioned and there remains only one solution—to pay for the damage and to strive to pay as cheaply as possible. Many times the non-observance of some specific rule has eventuated into a calamity on some railways, and placed them near the verge of a receivership, or, perhaps, accumulated such a far-reaching debt, that it seemed almost to crush the very life of the road. It is paramount, then, from an economic standpoint, that operating rules should be observed.

#### IMPROVEMENTS DEMAND MORE INTELLIGENT TRAINMEN

Increasing improvements on electric railways demand more intelligent and alert men. These improvements, or appliances, may, or may not be, more complicated than less modern equipment. Nevertheless, for their effective and efficient use trainmen must have skill and knowledge. An excellent example of this is the one-man safety car. Here the operator's duties are increased. However, the operator must have knowledge of the operating rules. The automatic opening and closing of the door and step eliminates the "step accident". But there is no safety device on the car to prevent an operator from not heeding a safety or positive stop, such being resultant in a collision with a vehicle. Nothing to prevent him from colliding with another car wherein passengers were injured and a great amount of damage was done to the property of the company. With the increasing of safety appliances, it is still pre-eminent that the stringent observance of operating rules is necessary.

The safety of the passenger is the supreme consideration of all trainmen and it must be recognized that, in as far as possible, passengers must be protected from harm. This undoubtedly requires trainmen to obey the existing regulations. In not fulfilling them, the lives of all pas-

sengers are thereby jeopardized. Few trainmen realize the responsibility invested in them by passengers on cars. The public engages the Railway Company for rapid transportation to some destination, and they expect to reach it with the least possible delay. Absolute trust is placed in the trainmen as to their integrity, skill, dexterity, and fitness for the position that they hold. In other words, they are supposed to be men who know what they are doing and to be alive to every emergency that may arise. For this reason alone, if the trainmen do not adhere to orders, that trust will surely be broken, or on the other hand injury or damage will be the direct result. Such a conclusion will mean that the public will determine that the safest mode of travel is by foot or, if the distance be too far, to engage other transportation or make use of another railway, having a reputation for observing operating rules. One can easily determine that the most important and primary function of electric railway operation, the safety of the passenger, is the most momentous. Constant care and consideration must be exercised at all times to prevent personal injuries occurring to passengers. To reach this high degree of care, the trainmen must be held responsible for the disobeying of operating rules. This observance can in no way be too rigid.

The number of accidents occurring through unfitness, lack of experience, deficient appliances and faulty operating rules is not available in statistics. However, their number must be terrifying to the management of any railway, if such a record was kept. Of the above causes, one of the most prevalent and expensive results is the collision. In such an accident the ultimate outcome is extensive damage to the company's property or some of the passengers incurring a personal injury. Either of these causes is a financial hardship to any Railway Company. There is little or no excuse for an accident of this character and upon investigation, the usual surrounding circumstances is the disregard for an operating rule.

#### THE PUBLIC ARE CARELESS

One of the unsurmountable obstacles to a railway company is the want of care and caution on the part of the public. We find some people who seem to find joy in taking a chance. A large percentage of accidents can be attributed to this cause alone. There is a remarkably small amount of legislation in this respect to protect the railway company, and when one of these chance-takers is injured on or by a carrier, we find the public prone to criticize and condemn, regardless of whether there was any negligence displayed on the part of the carrier. The general attitude of juries is to regard the railway company as a charitable institution whose coffers are overflowing with gold. In many cases verdicts have been rendered against the railway company, wherein not one iota of negligence was proven, but since a man was injured and because a certain amount of wages were lost, the jury deems it advisable to repay the man from the supposedly unbounded wealth of the railway company. This situation prevails generally through the United States. So, if this situation exists, we must have our operating rules obeyed.

## DIFFICULTIES IN ENFORCING OPERATING RULES

There are assuredly many difficulties that the Operating Department meets in striving to enforce operating rules, such as, the necessity of employing untrained men, frequent changes of service, and men who are chance-takers. The latter, naturally, are governed solely by the occasion. When an emergency arises, they choose the convenient rather than the safest side. The difficulties of different situations sorely tempt them. Sometimes they must wait and perhaps for a great length of time the weather is inclement and, consequently, they are tempted to take a chance and they do. Such men create a disregard for operating rules among other men. Wherever there is a lack of discipline for such occurrences, and the changes in the service frequent, we find that accidents increase accordingly. When the violation of an operating rule becomes a common occurrence, and no accidents follow, or there is no disciplinary action taken, we have sometimes a disastrous result. Perhaps the rule so violated may be trivial; however, it must be essential, or it would not be a rule. The trainman violates the rule repeatedly, however, and, so to speak, gets away with it. This man is soon a liability on the hands of the railway company, because this trainman could not discriminate between the essential and the non-essential rules.

It can be understood that accidents arise from causes that are remote from the reasonable control of the management, that every management is anxious to co-operate and give the public the best service possible, that is available within their means. These, however, are a few of the features that are met almost daily. Trainmen should be chosen carefully and taught that rules are necessary for the maintenance of the service. Also, that the results shown by their operation is intelligently interpreted and that the faithful shall receive the advantageous reward.

CHAIRMAN MALLON: This subject has now been covered from the Safety and Claim Department side and the next speaker, Mr. C. E. Thompson, will speak on the Transportation Department end of the subject.

THE NECESSITY FOR AND IMPORTANCE OF OBSERVING  
OPERATING RULES FROM THE STANDPOINT OF  
THE TRANSPORTATION DEPARTMENT

C. E. THOMPSON, ASSISTANT TO THE PRESIDENT, CHICAGO, NORTH SHORE, AND  
MILWAUKEE RAILROAD, HIGHWOOD, ILL.

In the year 1491 B. C. when the children of Israel were wandering in the wilderness in search of the promised land, God gave them, through Moses their leader, ten written rules to guide the conduct of their lives. From that day to this men have been governed, in every phase of life, by written rules.

Whether we are in school or on the playground, in our own home or in our neighbor's drawing room, on the country highway or on the city



street, in our business office or on the golf course, we are governed by established rules.

We find from study of the Book that so long as the children of Israel obeyed the rules given for their guidance, they were a happy and prosperous people; that when they disregarded the rules they were in grave trouble. So in our own time, so long as we abide by the rules we are in good standing, but as soon as we break the rules we are expelled from the game.

We all appreciate that wherever a task is to be accomplished by the united effort of many people, rules must be established in order that there may be concerted action or "team work." I hold in my hand a book containing some five hundred rules governing the employees of the transportation department of the Electric Railway with which I am connected. With a few exceptions the rules contained in this book are the same as those in use on most of the Electric Railways of this country and are known as "Standard Rules." These rules are designed to cover the general details of railway operation and may be considered in four general classes:

1. Those governing the physical fitness, appearance, and personal conduct of the employee
2. Those governing the instruction and training of the employee
3. Those governing the operation of trains
4. Those governing the attitude of the employee towards the public

The fact that "Standard Rules" have been carefully prepared and have been generally adopted proves conclusively that Electric Railway operators appreciate the necessity for Operating Rules.

I think however that we may, with profit, emphasize their importance.

#### SELECTION OF MEN

I consider of first importance those rules governing the selection of men. I speak of these first because the selection of men is the very foundation and the corner-stone upon which an operating organization is built. It is obvious that men who are defective in sight or hearing or have other physical defects should not be chosen. And so these rules require a certain standard of physical fitness and a certificate from a competent medical examiner. It is even more important that the prospective employee have proper mental equipment and high moral standards. The operating of Electric Railway trains requires skill and close application under trying conditions. Whether the operation is in crowded streets or on the private right of way of the high-speed interurban, the men must be wide awake and alert at all times. A lapse of a second and a collision results. In selecting men for this work it should always be borne in mind that men of special physical and mental fitness are required.

#### INSTRUCTION AND TRAINING

Having used due diligence in the selection of the man, the next important step is his instruction and training. He is first required to study the rules until he knows thoroughly what his duties are and how they

are to be performed, how the equipment is operated, how to take train orders, how to give the hand signals and the lantern signals, and how to make out and turn in the various reports. Having learned all the rules in the operating code, all the special rules in the time-table and all the current bulletins he is not yet competent to take charge of a train. Before he can be considered competent, he must be trained to do the things as he has learned from the rules they should be done. To get the necessary training he is placed under an experienced man who can train him in the actual application of the rules. It is very important that the new employee be instructed by men who are not only experienced and capable but who will see that the rules are fully understood and completely carried out. After he is familiar with the general rules governing the operation, and knows the names and locations of stations, sidings, etc., he is then instructed in the specific duties of his position in the operation of motor if he is to be a motorman or in the collection, registration, and accounting for fares if he is to be a conductor. When the new employee is turned in as capable of performing the duties of his position he should be carefully examined as to his knowledge of the equipment he is to operate, the condition of the railway over which he is to operate, and as to his knowledge of all the principal rules governing his duties. This examination should be conducted by the superintendent or his assistant and should be made a matter of record. Important special rules which are issued from time to time should be signed for by each employee interested. This for the double purpose of first knowing that those interested have received the order, and second impressing upon them its importance.

Conditions on every railway are changing from day to day which makes necessary changes in the rules. It is therefore very important that the old as well as the new employee be examined as to the rules at frequent intervals. Much can be accomplished by having group meetings where the rules can be discussed and the reasons back of the rules given to the men.

More, however, is required of trainmen than physical and mental fitness and their knowledge of, and experience in operating their trains. They are the point of contact between the public and the company. They must therefore be students of human nature and so conduct themselves that the public will feel they are having personal attention and know the aim and object of the company is to serve its patrons in every way possible. The real problem of the Electric Railway today is to train its employees so that they know the aims and needs of the company and realize that the company's success is their success, and that the company can only be successful when it serves the public in a courteous and efficient way.

The observance of operating rules is essential to the safe and efficient operation of a railroad. The intelligent selection of men and their careful instruction and training make it possible to maintain discipline and to see that the rules are strictly observed. Where this is done it results in regular service, safe service, popular service, and successful service.

Most delays to service are caused by failure of the human element; orders are forgotten or rules are broken. Whether the failure results in damage to equipment or facilities or injury to passengers or not, the delay is serious. Passengers are abroad who are depending on the schedule being maintained in order that they make connections with other carriers or keep their business appointments. When the failure results in injury to passengers not only those who are injured but all who know about the accident are caused to doubt the safety of the service and hesitate to use it. Delays to service can be rectified, damaged equipment can be repaired, personal injury claims can be settled, but it is much more difficult to regain the confidence and good will of a disappointed and dissatisfied patron.

Upon the popularity of any enterprise and especially a public utility enterprise, depends its success. Popularity can only be retained by efficient service and efficient service can only be where correct rules are religiously observed by capable, intelligent, trained employees.

CHAIRMAN MALLON: The papers that are presented at the various sectional meetings are for the benefit of those attending the meetings and the companies they represent. This subject has been covered from three different angles and I presume that a number of the Electric Railways have the company represented by men in the Safety, Claim, and Transportation departments which were covered by these papers. We want ideas brought out, in discussion, we want your personal experiences. At these meetings you get what the other fellow puts into execution and many, many times it is something that you have never thought of yourself.

I want you to tell how you have reached men and corrected them when you have found them violating rules. We are now open for discussion.

#### DISCUSSION

MR. C. B. SCOTT: I hesitated to open the discussion because I felt that on this occasion it would be better if we had the discussion of this subject from the new men and from those who have not been in the habit of talking at these meetings. But, as I sat in my chair I couldn't resist the temptation to say what is on my mind.

We have here a number of men, who came here from the properties with which we are connected for the purpose of learning something that would be helpful to us in the work in which we are engaged and which will make our work, the operations of our property safe. We have had an experience covering many years in a business that requires men to be practical. Three phases of this subject have been brought to our attention, each one in a masterly way. Without unconsciously or intentionally referring to the merits of the three views, all of which I said were good, I want to put one question to these practical men that are here to learn something. I hesitate to do this. I want to know for my own information. I want to know and I want you to be perfectly honest with yourself how many of you are drawn and pulled and feel

that your greatest interest in this work was expressed by the first speaker and I want you to hold up your hands because I will tell you the purpose of this when I get your vote. How many of you feel that that is the thing that pulls you into this work, that that is the motive that prompts you to proceed with the work that you selected—accident prevention. I mean how many of you are impressed that the conservation of life, the sentimentalism of safety, appeals to you more than any other force.

Now, I anticipated that it would be almost unanimous. The point I want to make is this: I believe that in a traction company, in the steel works, and in the mines, the great asset of safety work is the heart of man, and I believe that the thing that has caused the National Safety Council to grow and to bring these thousands of people together has not been the executive ability of the men connected with this Council but the spirit of this movement. And if you are here to learn something, something that you can take back and put into your property it is this: that the greatest force in this safety work has been expressed by Mr. Wilson in reaching the hearts of the human beings that are connected with your organization.

And I sometimes wonder if I am an exception to man and if the maimed child and the dead motorman and the crippled person that is run over, if the horror of that kind impresses me on account of my sentimental nature, as I sometimes think I have too much of it, more than it does other people, yet, when I get with a group of men and a subject like this is presented in the way Mr. Wilson presented it I go back on all my past resolves to be more practical and I get down to the same old thing that we are all at work for the sake of the suffering of these people and that the financial part of it and the efficient part of it are only very minor details of the work in which we are engaged.

And I believe that if this session broke up with this thought that Mr. Wilson planted thoroughly into the hearts of you people and if you put it into your work and into your organization, that everybody who is concerned in your being here will be ten thousand times repaid for the time and the money expended.

MR. E. C. CARPENTER (Northern Ohio Traction & Lt. Co): Regarding the importance of observing operating rules, I am a stickler for the observance of these rules, not only the rules pertaining to the operation of the car from the standpoint of the motorman and the conductor, but also from the standpoint of the operating official. I think it is just as important and just as vital that the operating official should have correct supervision over the man and see that the men do observe the rules as to give them the first instruction. And I think in this connection we should have schools of instruction not only for the new men but also examinations so as to see whether or not the operating rules are being held in mind and retained by the employee as he continues in the service, and proceeding farther, that we should have a committee, either one or more, representing the various departments of the service to pass upon the infractions of operating rules. I think many companies while

they administer discipline to employees for the violation of rules where severe conditions occur and bad accidents occur, they are not paying enough attention to the minor infractions of the rules, permitting them to go almost unnoticed and they lead into more serious conditions.

So that if this committee will look after these minor infractions it will probably save some of the more serious conditions.

Mr. J. W. STEPHENSON (Chicago Elevated Railways): It has been said that operating rules are a written record of our mistakes. I cannot take the time to refute it except to say that it is clever but it is not true.

I have a hobby. I collect books. I have been called a bibliomaniac. I collect rule books. The first rule book I ever got from the Northwestern Railroad I got when I was a kid. I was watching some trackmen take out a frog on the Northwestern Railroad in Evanston and I saw them pulling some wires out and I knew old Hank Hoffee the foreman and he explained to me it was part of the signal system and I thought it was wrong and I tried to talk to the fellow but he didn't understand English and I told Hank and he went down there. Old Hank gave me a rule book and I started collecting. The other day I got the revised book of the Northwestern Railroad from Hank. The book is supposed to be borrowed. I have it. It is borrowed. The rule book that I prize the highest is a little red book called, "Safety Rules" issued by the elevated railroads and I hope I am not overlapping now when I tell you that in the Maintenance Department with which I am connected the general foreman has a meeting which is planned ahead.

For instance, on the Northwestern it will be the first Wednesday in the month and he gets his men in there and they talk over these rule books, and our track engineer told me that one of the by-products of these safety meetings is just exactly the point that Mr. Wilson touched on and Mr. Scott in getting at the hearts of the men. They will tell you things in the meeting that they will not tell you out on the job when you are there as an official. They will open up their hearts. This safety movement gets right down into the souls of the fellows. There was a time when a fellow could take a signal on the yard in the morning and it would last them all week but the fellows are playing the game according to the rule now and I hope we are playing it square.

CHAIRMAN MALLON: Mr. Hodson, may we not hear from you?

Mr. HODSON: What I want to find out from this meeting is on the question of rules and instructions, whether or not any of you are holding regular schools of instruction, operating rules for your city men. That is one of my objects in coming up here this morning. I agree with Mr. Wilson and I agree with Mr. Scott all the way through. I think each one of us can go out and find some one to reach each one if we had the time. It is a pretty hard proposition.

CHAIRMAN MALLON: Our conditions on the elevated are somewhat different from the city street car line, due to the fact that our men are promoted from a lower to a higher class. They go from a brakeman to a conductor and from conductor to motorman, but the system that we use is as follows:

## EMPLOYEES ARE TRAINED

After the employee has been hired, carefully selected, he is given a course of instructions before he is put on a car at all. That is, he is taken into the yard and given a number of fundamentals, such as handling the bell and gates, where the emergency cord is, where it can be found in case of emergency, and things of that kind. Then he is put on the road with a competent conductor and he works for possibly a week or ten days until the conductor, who has him in charge, is thoroughly satisfied that he can do the work in accordance with the wish of the company.

Then he is allowed to go to work for himself. The inspectors, of which we have a number on each line, are familiar with these new men when they are put to work, and they endeavor to keep a watch on them.

After a period of three to six months we feel that that man should be then capable, if he has been studious, to do the work of a conductor. The only difference, however, between these two positions is that the conductor is in charge of the train—it is being operated under his jurisdiction—the manual work is practically the same as the brakeman or guards.

Before he is qualified to act as a conductor he is given thorough instructions on the equipment. He must learn the air, the routes of travel, what to do under various conditions, how to cut out a car, how to cut out the brakes and how to do those various things that it is very necessary to know when you are hauling a five or six car train.

After a period of six or eight months, if he shows ability, he is given permission to learn the duties of a motorman. Usually his student work is done on his off time, and we are very careful in selecting the best men we have and the best instructors, the most careful men, with whom we place these men to break in.

Now, it takes them on this off time three to six months before we allow this motorman to operate a train himself, and before he is permitted he must be O. K'd by the man with whom he is breaking in and he must go before a competent instructor and satisfy him that he is thoroughly capable of handling a train or a car just as well as the oldest motorman we have in service. We don't stint on giving them instructions. We have an inspector who is at liberty every day between certain hours where the men who are breaking in for those higher positions may come and get those instructions. The school is constantly going on. Sometimes on some of the roads we use an ordinary car, trace the various electric wires through the car from control to motor and so on and the air in a like manner. That is about the system we use on our properties.

I would be glad if any of the other representatives of the railways would speak on this subject for the benefit of the other members just how they arrange to train their men.

## ONE-MAN SAFETY CARS

Mr. ROY J. THOMPSON (Chicago Elevated R. R.): We operate a small city line in Waukegan and a few months ago we turned it over to one-

man safety car operation in that town. Our assistant superintendent who is directly in charge of the service in Waukegan is here and I think it might be profitable if he would explain the system we use instructing the men in the operation of this plan of equipment and before we started the operation and what he has been doing since that time to instruct the new men that have been added and just how he is trying to reach the men in getting their full co-operation in this type of work in a small city. I would like to call on Mr. Burke.

MR. T. J. BURKE (M. W. S. E. R. Co.): February 22 last year we adopted the one-man safety car at Waukegan. At that time I was Assistant Superintendent of that city line.

Prior to that time we had a two-man operation, a very large and heavy type car, and we had a considerable amount of interurban men who held the rights on the interurban and seniority list who were working there at Waukegan. When those cars went into operation we lost all of those men. They went back to the interurban line. The next thing was to get timber to operate the one-man safety car.

There were several men on the property who did not hold rights on the interurban and seniority list but they were conductors, and taking over the one-man operation we had to break those men in as safety car operators.

A man might be a good conductor on a two-man operation who will not be of any use to you as a safety car operator. That has been proven on our property. So the first thing you have to do as I find out in safety car operation, before you can ever let a man go to work at all, you have got to impress upon his memory the responsibility, not only just the responsibility of operating the car, but he has a double responsibility on a safety car. He has got to be a man who is alert, quick, and a man who is able to do at least two things at one time. He has got to have his mind on the safe operation of that car and the safety of the passengers in that car.

You will get may be one or three men out of a possible ten who will make you a competent safety car operator. Lots of men come to us and we try them out. The first thing I do is to question the man as regards his last work, look up his reference, what kind of a life the man has led, as far as practical. I don't generally hire him the first time he comes around. I just let him make about two trips and let him think it over a while. Then we put him out with the most competent operator of a safety car, a man whom I myself get in personal contact with from day to day, knowing that that man is trying to observe the rules and regulations of the company. We have a form made out for the man who is breaking in the student who remains with that man until the student himself is competent enough to operate that car.

I then turn him over to a man who is known on my line as a supervisor, a man who is picked and appointed in that position and is thoroughly familiar with the equipment, thoroughly familiar with the operating rules of the road, and he takes that man and goes over the entire equipment, the cutting out of the motors, the head lights, everything

pertaining to the operation of that car. He is then taken into the train men's room and into the office and he goes through all the special rules and bulletins which are published from time to time. He is questioned on those different bulletins which refer to the safe operation and if he does not know them he is not O. K'd by the supervisor until he has the knowledge of the operation rules.

He is then turned in by a letter from that supervisor to me and I question the man and if he answers any questions which I put before him in the proper form, I put him to work.

It is necessary to have either the superintendent or his assistant or some man appointed to get in personal contact with these men at all times while they are operating; where you are running a frequent service at close intervals.

A false impression has been made upon the operators of safety cars, that the safety car is fool-proof. I found that somebody had given the men the impression that they could stop one of those little cars just about any time they wanted to. If anybody puts in a safety car on any property I would like to advise them to give the men the idea that it is not fool-proof. If you don't a lot of damage is done, especially car collisions and between the motor vehicles and the car, because the man will get the impression that he can stop that car at any time.

A very hard thing to stop is the talking of the operator. Employees of the company stop on the front platform with the operator. If there are seats in the car they will remain there just the same and hold a conversation with the operator.

Two rules should be strictly enforced—one, not to crank the fare box while car is in motion. The other is talking to the operator.

MR. HUGH WILSON (N. O. T. & L. Co.): Along the line of school instructions I have held the position of instructor for the last year and I want to give you my method that I pursue with the men.

#### EDUCATING MEN THROUGH HUMAN INTEREST STORIES

We have a questionnaire of about fifty questions and along with every one of those questions I have a little story that I give to the men. I take time and relate some little touching incident along with every question that I give to them.

For instance, prior to my taking this position there were a great many accidents boarding and alighting. The conductors, getting off and on the front end, were throwing people almost every day. So one night there was a young woman got on the car. She had been married two or three years, and was about to become a mother and the conductor got off the front end of the car and started up without looking back and threw that young woman. She was taken to the hospital and she lost her child and her condition is such that she will never have another child.

So when it comes to that question about flagging railroads I put it up to the men in that light. I say to them, "How would you like it if that was your wife? How would you like it if that was your mother or your



own sister?" And in almost every case the tears roll down their cheeks. You touch their hearts and you leave an impression that when they go to flag that railroad they don't easily forget it.

In the same way I have a little story for all the questions, but take it along the line of being considerate of one another. I also tell them if they see anything along the line that would have the least tendency to cause an accident they should stop long enough, regardless of their schedule, and tell the other fellow.

Then I tell them this little incident about myself. While I was running on the road I had to meet at a certain switch and when the motor-man came along I was standing in the siding waiting for him and he whistled and wanted to tell me something. This is what he told me: "Hughie, be careful when you get to Crown Point. I saw a man staggering from one side of the road to the other. You will meet him about Howells Avenue and be on the lookout." It was one of those nights when there was a drizzling rain falling, when it was scarcely possible to see a car length ahead of you. As I approached the place that he told me I couldn't see anything of the man. I was almost right up to the place and I thought he had gotten some place. I had my car so that I could stop it within a few feet. I had gotten almost up to the place when there was the man lying with his head on the rail. That fellow was considerate of me at the switch. Had he not warned me that man would be in his grave today. The investigation proved that the man was drunk and he was within a little distance of his own children and his own dear wife.

So I tell the men on that occasion if they see anything along the line that would cause an accident to tell the other fellow, be considerate of the other fellow, no matter how big or small it may be. I find out that works all right. When you tell them these little touching incidents it touches their hearts and they don't easily forget it.

CHAIRMAN MALLON: In speaking a while ago I did not complete the routine that we go through in qualifying men for the higher positions we consider, as motormen, just brought out by Mr. Wilson's remarks. The man is instructed by an inspector and passed upon by him. He then goes to the Division Superintendent who has jurisdiction over that entire line and he is passed on by that official, and before any of these men are allowed to operate a train under their own jurisdiction they are spoken to by the General Superintendent, and I might add that the conversation that is carried on between those men and the General Superintendent is practically along the lines that Mr. Wilson just brought out. For the prevention of common accidents he has got a little story to tell and it is very effective.

We have here today one of our own men who has had a vast amount of experience not only in Electric Railways but in Steam Railroad work, and from my personal contact with him I know he is a man after Mr. Wilson's heart. But due to his bashfulness I am afraid I will have to call on him because he hasn't made any attempt to get up yet. I would like to hear from Mr. John T. McIntosh, Supervisor of Service in the Metropolitan Elevated Railway.

**MR. MCINTOSH:** I believe that Brother Wilson; you notice I call him brother, we are all brothers, and that is what we ought to be in the road family, that is what we ought to be to promote safety first. In my connection with the employees of the elevated railroad and also the steam road on which I formerly worked, I have found that you can get service, whole-hearted service, by treating the other fellow the same way that you want to be treated yourself, and I believe that nothing will bring safety first to the front any quicker than that one thing of treating the other fellow the way you want to be treated yourself.

If a man wants me to do something, if he approaches me in the right way, I will co-operate with him. If he approaches me in the wrong way I will not co-operate unless I have to. I believe that if each man will try to approach every man that he comes in contact with in the way that he would like to be approached himself, that he will put safety first forward, he will put efficiency forward, he will put everything forward that will tend to create a successful company and personnel of the men.

We want first, in approaching a man, to study the man. There are some men you can approach in one way and you couldn't approach the other fellow in the same way. A man should be a student of human nature and if he isn't a student of human nature he ought to take lessons. He ought to begin to realize that fact that it is absolutely necessary to be a student of human nature.

I just want to relate one little incident the culmination of which came to my attention this morning.

A short time ago I was informed that one employee was apparently careless, indifferent, that he didn't care whether he operated his train efficiently or not. Just as long as he could get by he was satisfied. Unknown to the man who brought me that information I had a heart to heart talk with this employee without letting him know that I had been approached by one of the supervisors, and I was told this morning that that employee had improved fifty per cent in the operation of his train. I do not take the credit for that. I realize that there are others who have been talking to this man, but I do believe that a few words spoken to this man have had their part in improving him fifty per cent.

I believe in sentimentalism. There is foolish sentimentalism and there is practical sentimentalism and I am talking from the view-point of practical sentimentalism. And I believe that we should get in touch with our employees and try to get under their skin, as the fellow says, have these heart to heart talks, and we can't have too many of them. Get your men together, the same as we have gotten together here today and talk to the men, talk straight from the shoulder and try to talk in a way that will win their whole-hearted support. Then we will have safety first in every respect.

**CHAIRMAN MALLON:** It is getting past the hour. There is just one remark I would like to make that has been brought about by Mr. McIntosh's remarks, and that is that too many of us hesitate to speak to the man when we observe him going wrong. There is something

about us, whatever it is, we may not have the nerve or something else but I know that from my own experience. That is something to which we should give more attention.

The matter of going to your office and writing a letter and telling some one else to call some one else in and tell him what he did isn't getting home the goods. First of all we should speak to him the way we would wish to be spoken to ourselves, but we should speak to him at the time when it is fresh in his memory. If you write a letter that will reach the man three days after and some one else calls him in and tells him this, he says, "I don't remember anything about it", and he doesn't. We do it ourselves. When you observe a man doing something wrong speak to him then and speak to him in the right manner.

SECRETARY COX: The next speaker is our newly elected Chairman, Mr. J. H. Mallon.

CHAIRMAN MALLON: My paper is not long and I want to say before starting that the basis of this paper is taken from our own organization.

### DUTIES AND RESPONSIBILITIES OF FOREMEN AND MEN IN ADVISORY POSITIONS WITH REFER- ENCE TO THE SAFETY OF MEN UNDER THEIR JURISDICTION

J. H. MALLON, ASSISTANT GENERAL SUPERINTENDENT OF TRANSPORTATION  
THE METROPOLITAN WEST SIDE ELECTRIC RAILWAY COMPANY, CHICAGO, ILL.

The subject assigned to me for discussion is a comprehensive one. The importance of the position of the foreman in connection with safety work hardly can be over-estimated. It is a phase of the Safety Movement which has not, in my opinion, been given as much consideration as its importance warrants.

In using the title "Foreman" I wish to apply it to men in all departments holding similar positions, such as supervisors, inspectors, etc.

While there has been a gratifying change in the attitude of managing officials toward the prevention of accidents within the last few years, still I feel there is much to be done in this direction, for unless the men in positions of authority show an interest in the work, we cannot hope to attain the end for which we are all striving.

When I first began railroad work there was a sort of fatalism in the minds of managing officials and workmen. Accidents were looked upon as an inevitable accompaniment of the calling. If a collision occurred and some employee was killed, it might result in an investigation, but usually it ended there. Little attention was given to changing operating methods, or taking steps to guard against a recurrence of such accidents. The workmen themselves became callous and careless, following the old superstition that when one accident occurred two more were sure to follow.

In the old days of the link and pin, before the automatic coupler and

the airbrake, the loss of one or two fingers was a recommendation for a switchman looking for a job. In the mind of the employing officials it showed that the workman at least was experienced. Happily that stage has been passed and managers of railways and other properties no longer think that accidents are a necessary and inevitable result of our calling. They have been "sold" on the safety movement in a general sense but I doubt whether or not all of them realize their responsibilities as fully as they should.

#### SELECTION OF FOREMEN

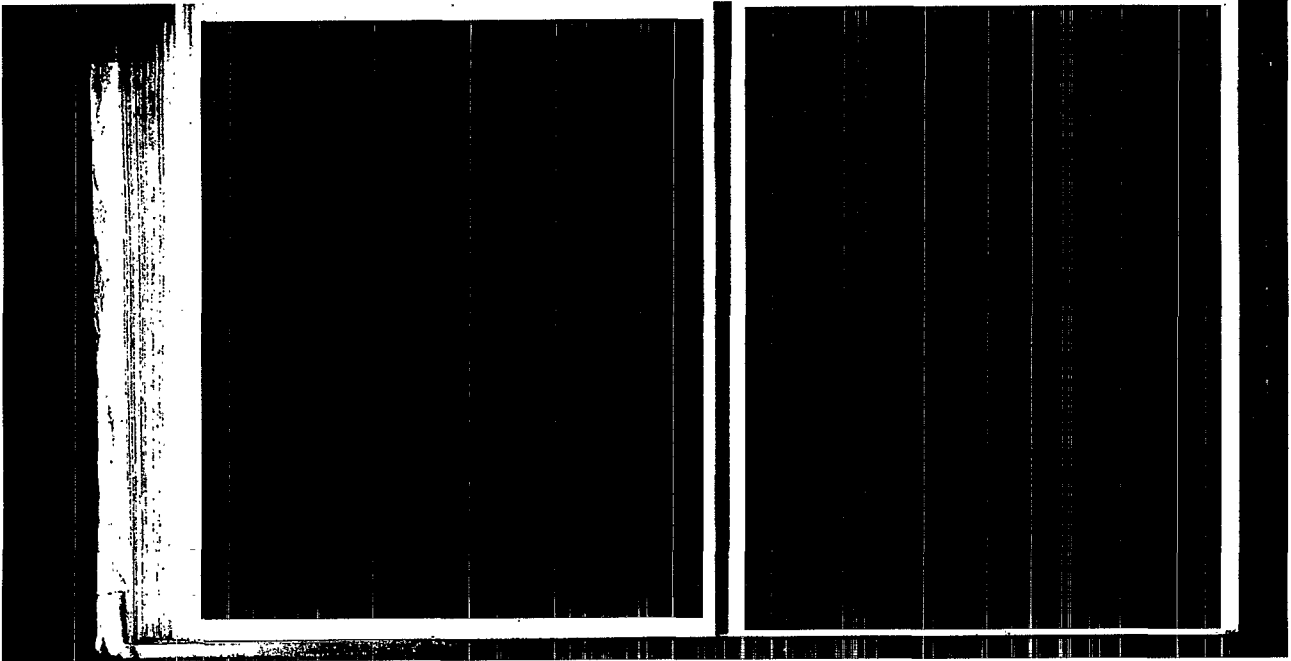
My subject has to do with the responsibilities of foremen, but we might go a step farther and point out that the higher officials are responsible for the selection of foremen and that is a great responsibility. If the foreman is to be an important factor in the safety movement, as he should be, he must be the right kind of man and it is there where I believe some managers are weak. Foremen are often selected because they are competent workmen, or because they have been a long time connected with an organization without due regard to their qualifications in the matter of dealing with the men under them.

The workmen in any organization are not going to be any better than the foreman under whom they work. They get their ideas of the management from the foreman, as he usually is the only representative of the management with whom they come in close contact. It is of the utmost importance, therefore, that the foreman should know the policies of the management with reference to safety work, as he is the man who must educate the workmen under him. In fact that is the most important part of his work, but too many times we find the foreman is looked upon as a timekeeper, a speed boss, whose duty it is to get as much out of his men as possible. He is not advised of the policies of the management and under those circumstances it is impossible for him to educate the men under his jurisdiction.

#### ATTITUDE OF CHIEF EXECUTIVE REFLECTED IN SUBORDINATES

It has been my experience that the character of the men at the head of a company—the president—is pretty much reflected in all his subordinates down the line. If he is an enthusiast on safety work and the prevention of accidents, it is a safe bet that his enthusiasm will extend to others and that the organization as a whole will adopt safe practices. On the other hand if the chief executive of a company displays no interest in the safety and well-being of the workmen, it is difficult, if not impossible to arouse enthusiasm among the men themselves.

While I fully appreciate the splendid work that has been accomplished by safety committees, as a result of the last few years of agitation on the subject, I feel that we can never hope to attain the best results until the executive heads of the various industries show that they have more than a mere passive interest in our work. They must show that they are actively interested and determined to eliminate accidents on the properties which they control and direct. It is not enough merely



we look for guidance. The example of the officials of a company from the president down to the foreman has a great deal to do with safety work.

A foreman must encourage his men and in turn he must himself be encouraged by his superiors. He must be more than a timekeeper or a production chaser. He must be human and a judge of human nature. He should always be ready to listen to any workman who has a suggestion to make pertaining to safety or efficiency, for many valuable suggestions come from workmen. When the men find that their foreman is ready to consider any suggestion they have to offer, it stimulates their interest and makes them more observant of the conditions around them.

#### EFFICIENCY AND SAFETY ARE INSEPARABLE

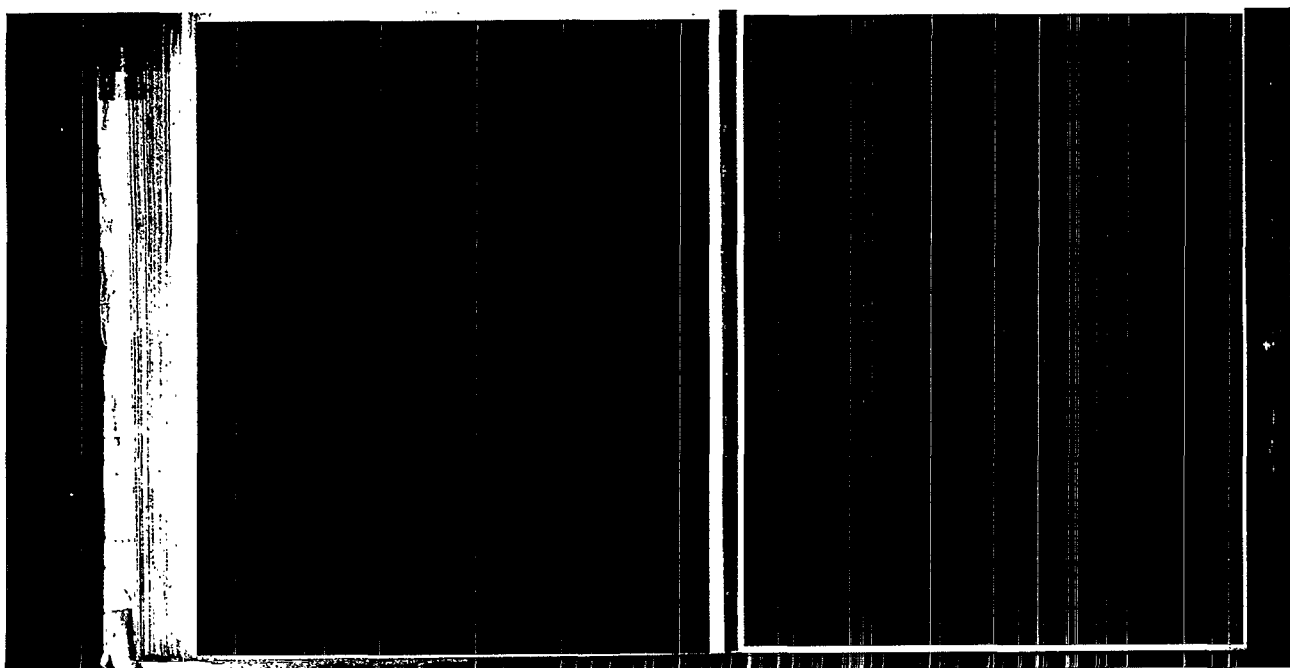
In placing new employees great care should be exercised in acquainting them with all details of the position. The foreman who does not look out for the safety of the men under him, is not, in my opinion, qualified for the position he holds, no matter how efficient he may be in other directions. We are constantly striving for greater efficiency and increased production, but I hold that real efficiency and safety are inseparable. Increased production and greater efficiency will not be obtained by reckless practices that endanger the lives and the limbs of workmen and the foreman or superintendent who thinks they can be so obtained, has received his education in a school of false economy.

Workmen are quick to perceive whether their foreman has a human interest in them. To them the foreman is the embodiment of the entire organization. If he is considerate of his men, if he is ever on the watch for defects in the machinery that might cause an accident, if he is ready with a word of sympathy for the men in trouble, or with a word of kindly advice, he will gain the confidence and good will of the workmen and do more to increase efficiency and production than the man who holds a stopwatch to see that no one wastes a minute.

#### THE KINDLY WORD OF CAUTION REGISTERS

The confidence and good will of the employees is the first essential step toward safety. The foreman who cultivates that confidence and good will is a big asset to an organization. I appreciate the vast amount of good done the safety movement by printed literature, cards, bulletins, etc., but in my judgment the spoken word is more effective, especially when the word comes direct from the man in authority and is spoken in a friendly human interest way. The kindly word of caution coming from the man in authority, makes an impression on the mind that stays. The printed word may soon be forgotten and the caution sign go unread, but the kindly warning registers every time.

To illustrate the truth of the statement just made, I might cite a little incident that occurred a good many years ago. A man who is now the general superintendent of an important electric railway system, began his career as a railroad man at a very early age in a switch yard. Among his duties was to throw a switch at a certain point and one day he made a mistake which resulted in several cars going into the ditch. The super-



If we will just get some way to get it into our minds to add to the duties including those things that I have just mentioned, the human element, the human machine, which is so much more important than any of the things that I have mentioned. And I hope that when you folks go back home that you try to take something with you that will be of lasting benefit and that will help you in your work to make it more effective, that will enable you to reach the man down along the line. I hope that you will carry with you this idea that you are to be successful, you are not only going to be a safety engineer but you are going to be a human engineer.

MR. I. GORDON (Bureau of Safety): I want to offer this as a recommendation to the employing officers or the employing agent for electric lines because I believe that if they will put into practice these admonitions and instructions and watch the personnel of their men they will see a wonderful improvement in a short time.

Put on your next employment blanks that are printed, these admonitions in a little frame up in the corner of the blank.

"There are three ways to improve the character of the service. First, employ a better class of men. Second, educate those kept. Third, discharge the vicious and incompetent. So far as possible men should be employed from those living along the line of the road. Their moral character, physical fitness, mental capacity, should be rigidly examined. *Only the best should be employed.*"

If the man who employs men will take that for his subject, take these admonitions for his subject, he can spend an hour profitably with every man that comes into the service of his company just as Mr. Wilson said. There is an opportunity or an outline for an hour's talk.

CHAIRMAN MALLON: I would like to take your time for just a few more minutes that I think will be helpful to those who are not of our company to give you our experience in the safety work. It is getting away from the papers that have been read, but I think it would be very beneficial to those of you who are not familiar with what we have done.

A year ago when I was in Cleveland I was the Safety Engineer of the Metropolitan West Side Elevated Railway. I came back full of pep which we usually get at these meetings, but until that time I had never done very much along the safety line because my main job was transportation, and safety was a side fiddle. I want to tell you something right now that if you are going to have a safety organization it must be first fiddle. You can't connect safety with some other organization. If you do, one or the other is going to suffer, and if the other position is the primary one safety will surely suffer.

About a year and a half ago our president told me he was not satisfied with the work I was doing and I seconded the motion. I told him that I would do better if I could have some help. He gave me the help. By the time the help got fairly capable they took them away and I was alone again and I was doing just about as good as I had before. So we had another little conference, and he told me again that we were not hitting the ball and I seconded the motion again. He said, "We have got to do



something." I said, "I know it, I realize it." "What are we going to do?" "The only way to get results is to form a safety organization, put a man in charge of it, two men, three men, whatever is necessary." He said, "All right, go to it."

I have listened to various men at this meeting and at the last meeting and I pity many of them, where they are working without the co-operation of the head of the organization. They are working against themselves, and I find in many, many cases that the safety movement originates practically in the middle of the organization and works down, and from the general superintendent to the president, they know nothing about it and care nothing about it. God pity that kind of a safety organization and thank God that we have got one where the president of our concern is the real punch in the movement.

I will tell you now briefly what we did since the first of the year when Captain Bridges was appointed Safety Engineer. I went to Mr. Richards of the Northwestern to get his general ideas and then I went to Mr. C. B. Scott of the Bureau of Safety and got his, and I am telling you men here today that I wouldn't take my hat off to either Mr. Richards or Mr. Scott when it comes to the safety work that we are doing in our organization and we have only been organized for a period of six months.

#### THE PRESIDENT IS THE "PUNCH" IN THE SYSTEM

Here is what we do. We have got the undivided co-operation of the president of our organization. As I said before, he is our punch in the system. If we don't do it he will make us do it. There is where you get co-operation. Our work is done in the employees' committee. Any suggestion that is made goes to the men. The men make the suggestion and it is handled by the men. They pass on it first and then it goes up the line, but they have first say. These are the men who know more about the conditions than the men higher up because they come in contact with them every day.

We have committees in all departments, all roads, all branches. We start in with the employees' committee, then we have a division committee. The employees' committee is composed of men beneath the rank of foremen. They act upon their own knowledge of the conditions and report accordingly, either approve or reject. Then it goes to a division committee that is composed of the heads of the various departments, such as the superintendent of transportation, road shop electric, etc. They may reverse the decision. It is then sent to the safety engineer and he goes over it and in his judgment he will decide one way or the other and if it is a condition that he doesn't feel like deciding it is sent to the central committee which is composed practically of the heads of all these points. And if the safety engineer is not satisfied with the action of the Central Safety Committee he is privileged to go to the president of the organization and get results.

Some of the things that have been accomplished in the last six months I want to bring to your attention. We are a poor utility company and

we haven't got money to spend. but our president feels that our employees and our patrons must be handled in a safe manner and money spent for safety is money we will spend. Here are a few of the recommendations that come a little bit higher and stand out prominently among others.

**SAFETY RECOMMENDATIONS OF METROPOLITAN WEST SIDE ELEVATED RAILWAY**

"Lighting of yards and junctions to make it safe for men to do the work in the yards where we have diverging routes. When electrically lighted those cost us in the neighborhood of \$5,000.

"Installing of additional grab handles on cars where it was hard for men to get on the cars due to our platform type in the yards.

"Installing overhead bridge so that men would not have to cross tracks where trains operate frequently.

"On one certain type of car we had one whistle operated from either end—economy in the first place. It wasn't a good operating condition because we had too many angles that the cord had to pass through. We are putting one on either end now at an expense of \$7,500.

"Installation of foot walks on curves where men have to walk, where the clearance is not sufficient, \$3,000."

Our record in accordance with the National Safety Council's request for the first six months of this year the number of days lost per one thousand hours worked on the basis of an eight-hour day is eighteen one-hundredths of a day per one thousand hours worked and I consider that some record and we are only six months old.

I want to take this occasion before adjourning of showing my appreciation for the honor conferred upon me as Chairman of this Section for the coming year. I will give the best I have and I sincerely trust that the other officers will co-operate and that the members of the Section in general will assist in every way possible to make the coming year the most prosperous of any years we have had in the past.

One thing I want to speak about again. I spoke about it yesterday and that is the bulletin service. That is one of the main services we get from this organization, and when you have an idea that can be put on paper either in the form of a cartoon or a photograph that will bring vividly to the minds of employees the necessity of being careful I wish you would bring it to the attention of the Chairman of that Committee who will be appointed later. You will be duly informed who those officials are, such as the Chairman of the Bulletin Committee and the Membership Committee and those other committees that will be appointed later and I sincerely trust we will get your co-operation in every way and if you have ideas that you wish to be brought out, set forth, don't hesitate to bring it to the attention of the Chairman of this Section.

ADJOURNED.

# **Metals Section**

**September 29—October 1, 1920**

---

**J. A. OARTEL, Chairman**

Director of Safety, Carnegie Steel Company, Pittsburgh, Pa.

**W. E. WATTERS, Vice-Chairman**

National Malleable Castings Company, Melrose Park, Ill.

**H. W. STEINMETZ, Secretary**

Midvale Steel and Ordnance Company, Cotesville, Pa.

---

## **WEDNESDAY MORNING SESSION**

**T**HE First Session of the Metals Section was called to order at 10.00 a. m., Wednesday, September 29, by Mr. J. A. Oartel, Director of Safety, Carnegie Steel Company, Pittsburgh, Pa.

**CHAIRMAN OARTEL:** The first thing on the program is a report of the Chairman of the Section. I do not intend to make a lengthy talk.

### **REPORT OF CHAIRMAN**

The work of the Section has been going along very nicely during the year and I am just completing my second year's term as Chairman. I don't know of any high spots in accident reduction in the iron and steel or foundry industry. Due to war conditions and reconstruction in the country, due to conditions in labor, I think we have probably all been having a strenuous time, and while I don't think for a minute that we have made any retrograde movements, yet perhaps it has not been a banner year in accident reduction. But, as I see the situation at the present time, we have partly recovered ourselves and there have been very good individual records in accident reduction made here and there. So we are still on the job, as we see by your presence at this convention, and we are going to talk of some things which we believe are practicable, things that can be done in iron and steel mills and foundries.

Now we steel men are all practical men and we want to make this Sectional meeting of benefit to us all. So I want to announce to you that it is not my meeting, it is not the meeting of the officers of the Section or of any one particular type of work, but it is a meeting where

representatives from the metal industry of the greatest metal producing country in the world can come together and discuss things that relate to accident prevention. Therefore, I wish you would all be very free in your remarks.

I will now call on our Secretary, Mr. H. E. Steinmetz, to make a short report of the details of the work of the Section during the year.

#### REPORT OF SECRETARY

SECRETARY H. E. STEINMETZ: The first meeting of the Executive Committee was called at the Carnegie Building in Pittsburgh, December 10, 1919. Those present were: J. A. Oartel, John Northwood and H. Edward Steinmetz. Owing to the absence of the other members of the Committee, and the presence of Mr. Northwood of the Program Committee, the question of program for the coming Congress was discussed. Mr. Oartel reported on the matter of a paid Secretary; this matter having been taken up at the previous Congress, he had sent out a form letter to the various members of the Section, requesting their opinion on the question of a paid Secretary. He in turn received various replies, most of them coming from the larger companies, which did not care to take the matter up at that time. It was therefore held over until the coming Congress.

The second meeting was held March 15, 1920, at the Hotel Cleveland, Cleveland, Ohio. Those present were: John A. Oartel, O. T. Lewis, J. A. Northwood and H. E. Steinmetz. The Program for the second and third days' activities of the coming Congress was discussed and a tentative program was decided upon. The question of bulletins for the Section was discussed in full. The Chairman of the Committee on Bulletins, Mr. Lewis, assured us that they would come thick and fast.

The third meeting was held June 11 and 12, 1920, at the Carnegie Building, Pittsburgh. Those present were: J. A. Oartel, J. A. Northwood, W. E. Watters, J. R. Mulligan and H. E. Steinmetz. As was suggested at the last meeting, the procedure of this meeting was to complete the program for the Congress. Mr. J. R. Mulligan, of the Bethlehem Steel Company, was present, his services having been offered through Mr. George Fonda. He offered to write a synopsis and sketch, which, after discussion, was decided upon and acted upon by the Section. The program for the coming Congress was further discussed and several changes were made in the tentative program.

The fourth and last meeting of the Committee was held in Coatesville, Pa. Those present were: J. A. Oartel, W. E. Watters, J. A. Northwood, J. R. Mulligan and H. E. Steinmetz. A synopsis of the sketch, "Fixing the Responsibility of an Accident," written by Mr. Mulligan, was again submitted; the parts to be played in same were assigned to the various officers and members of the Metals Section, after which it was read over and in a measure rehearsed. The final rehearsal to be held the Sunday preceding the Congress in Milwaukee. Chairman Oartel reported that a Committee had been appointed to formulate a code on crane signals, but to date had received no report on activities. It was therefore decided to make this matter of general discussion at the Section meeting. Mr.

Mulligan suggested that a very good code, with illustrations on card-board, was to be had by applying to the Department of Labor and Industry. Various other changes were made in the final make up of the program. After the Committee had made an inspection of the plant of the Midvale Steel and Ordnance Company, they adjourned at 3:30.

PAID SECRETARY FOR THE SECTION

CHAIRMAN OARTEL: You have heard the report of our Secretary. I wonder if you want to talk about that item to which he referred—a paid Secretary for the Metals Section, which was introduced at our meeting in Cleveland? As Mr. Steinmetz has said, a circular letter was sent out, putting the proposition before the members of the Metals Section; just what it meant to them in the way of dues; just what it meant to them in the way of service; what this man could do. There was something a little peculiar about the replies which came in. The large companies did not favor it, but a number of the smaller ones did favor it. Therefore, as we did not receive enough replies in favor of the proposition, we simply had to abandon it.

Does any one want to say anything on that question just now, or anything else that may have come to your minds from the reading of the minutes of the Executive Committee meeting?

MR. R. C. SALISBURY (Chicago Interstate Iron & Steel Co., Chicago, Ill.): I believe that it would be to the advantage of the members if we knew definitely just exactly how much the dues would be for the paid Secretary. The circular letter which was sent out was somewhat indefinite and I thought at the same time, if it were possible to give us a definite idea of the total cost of the proposition, we would be better able to decide whether or not we wanted it.

CHAIRMAN OARTEL: In answer to that question I would state that approximately the expense would be about \$10,000 a year. This would include the salary of the Secretary and certain traveling expenses. So that would mean, practically, that each member's dues would be doubled. Some of you perhaps paid \$7.50, some paid from \$200 to \$300, according to the class of membership, the number of employees, and the number of your membership in the Council; so it would mean practically doubling the dues of each one.

Let me announce this: that your dues will be increased at least one-third, to keep up with the high cost of living at the present time, the high cost of paper for bulletins, and all that sort of thing; so you will have to take that into consideration, that aside from this paid Secretaryship your dues in the National Safety Council are going to be increased one-third, beginning about the first of January.

If there is no further discussion, we will pass on to the next item, which is Reports of Committees. The Chairman of our Bulletins Committee is not present. The members have received their bulletins regularly, and whether the bulletins have been good or not depends entirely upon the membership of the Section. If you want good bulletins, it is up to you to produce them, in the way of photographs, drawings or

sketches. I am very sure there are things occurring daily in our steel mills and foundries, that make good subjects for bulletins. So I would ask you to co-operate with the Bulletins Committee, as you have in the past, and furnish them with good material.

#### APPOINTMENT OF NOMINATING COMMITTEE

At this time I will appoint a Nominating Committee, to nominate officers for the ensuing year—a Chairman, a Vice-Chairman and a Secretary. On that Committee I will appoint Mr. J. M. Woltz of the Youngstown Sheet & Tube Company, Mr. Walter Titus of the Jones & Laughlin Steel Company and Mr. F. G. Bennett of the Buckeye Steel Castings Company. Will these men please have their report ready Friday morning at 9:30 o'clock?

Is there anything that you want to talk about in connection with the work of the Section? Have you any complaints to make, or have you any approval to voice?

#### SECTIONAL BULLETINS

MR. R. C. SALISBURY (Interstate Iron & Steel Co., Chicago): In connection with the bulletin service, it seems to me it would be possible to do better work if we could get the members to co-operate a little more in getting the material or photographs to the National Safety Council, or to some member who is doing the photography work. I am doing considerable work at our plant and if I had a sufficient number of suggestions I might be able to get in some photographs that would be of advantage in the bulletin service.

Has anything been done in this manner to improve the service?

CHAIRMAN OARTEL: The headquarters's staff at Chicago agreed, if any suggestions were furnished, to send a photographer to the plant of the Illinois Steel Company, near the City of Chicago, and take photographs along the line of those suggestions. We have made up a few bulletins in that way.

MR. T. HUBERT (Commonwealth Steel Co., Granite City, Ill.): About a year ago we had a man killed on the vertical drill. Since then we have had one or two near-accidents. But on our drills we have a dynamic bar, so that if a man gets caught in any way, shape or form, his body comes in contact with this lever which shuts the whole drill down, just from 150 revolutions down to a quarter of a turn.

Now it is an easy matter for any one who is an amateur photographer to get out and take these pictures. As a rule when a man gets hurt, we go out and get the picture of the accident and put it back on our bulletin board as quickly as possible. If you want to get a picture out in a hurry, you can get a wet plate and a strip of celluloid; buy a big strip of celluloid and cut it off to the size of your plate, and you can print your picture an hour after you take it.

This young man here (referring to photograph) got caught on the drill. He turned around and handed a man a match, and as he turned back, the drill caught him in the seat of his trousers. It all happened

so quickly that he didn't know what had occurred. He tried to pull away from it. Then he happened to remember the "safety". He threw up his hand and got the "safety" and it stopped in a quarter of a turn. He was a nervous wreck but he wasn't scratched a particle. We took him to the dispensary, and after he got over the shock we kept him there for a little recreation. A rumor had been circulated through the plant, that the man was killed, etc. The next morning I put this bulletin up, which shows that the man is perfectly all right. Rumors about a man being killed are very quickly circulated through the plant, and the quicker you can get the news down to the other men, that he is all right, the better, because then they are satisfied.

I have been in a number of other plants where they have had these bulletins hanging around on a nail. Every Saturday morning our bulletins are fixed up with the regular bulletins. I am going to try to cooperate with the National Safety Council and get new bulletins in to them.

CHAIRMAN OARTEL: I am sure we are all very glad to receive this information.

There are two aspects of safety to which the National Safety Council is giving a great deal of attention at this time: public safety and school safety, so the headquarters' staff arranged with all the sections to put on a speaker on these two subjects at our Sectional meetings. The idea is that every member of the National Safety Council who attends our Congress shall go home with just as much information in regard to these two outstanding features, which the Council is now promoting, as possible. So this morning we have a speaker on "Public Safety," Mr. L. J. Smyth, who is the paid Secretary of the Local Safety Council at Kansas City, Missouri.

### PUBLIC SAFETY

L. J. SMYTH, DIRECTOR, KANSAS CITY DIVISION, NATIONAL SAFETY COUNCIL,  
KANSAS CITY, MO.

Every man whether interested in industrial safety or not, is interested in public safety, because the lives of our families and our own lives depend on making the streets and the homes safe.

There are approximately 15,000 children killed every year in public accidents. The streets are becoming absolutely the greatest of all hazards, and the hazard increases every year in proportion to the increasing number of automobiles. The accidents don't all occur on the streets, either.

One of the most remarkable accidents that has come to my attention, and one as illustrative of the queer things that happen, that cost life, occurred out in Kansas City not long ago. Two machines met at a corner. There was a violation of traffic laws there undoubtedly; one or the other was cutting a corner, and the cars came together in such a way that the radiator of one was punctured. A child riding a tricycle on the sidewalk was scalded by boiling water from one of those radiators and died a few hours later. Now that is an example of what can happen in public accidents.

The things that do happen in the way of fatal and non-fatal accidents on the streets, that are not unusual, are bringing up our public accident toll in every big city and increasing at such an alarming rate that the very big job of every one in safety is to find a solution.

#### IMPORTANT FEATURES IN PREVENTING STREET ACCIDENTS

I have recently made a tour of some ten or twelve cities, studying traffic from every standpoint; talking with the police, the city authorities, the safety people, and trying to find out what different cities are doing. The big result of that trip to me is the fact that no city in the United States has found a solution for the street accident problem. They haven't found it for the reason that while some of them have gone to the very limit in one particular kind of safety work, such as regulation, law enforcement or education, no one city has combined all three features that are absolutely necessary in order to cut down street accidents.

In every city that you come from, bigger than any other question is your question of what to do with street accidents; how to reduce the death toll of the streets, and as you get into the work you are going to find this: that in order to do anything with street safety, first you have to get into your schools; you have to teach the children not once a week or once a month, but every day, as a part of the other studies, the idea of self-protection. You have to get into the homes and teach the parents because two-thirds of the child death rate is directly chargeable to negligence on the part of parents in properly teaching their children safety. We have found through studying a number of accidents, that you cannot blame the child; the little child isn't responsible for getting run over. We found in nine cases out of ten, the automobilist was not responsible; his car was absolutely under control; he was moving slowly along the street, and yet the child suddenly dashed out from behind the car and ran in front of the car he was driving. It is not chargeable to the motorist in that case; it cannot be charged to the child. Therefore, it must be charged directly against the parent who has not properly taught that child, and it must also be charged against our school system, which, in educating children along every other line, neglects the most important of all, the idea of self-protection.

#### IMPARTIAL LAW ENFORCEMENT

When we get into public safety, we have to go into the schools, we have to go into the homes; we must have efficient, impartial traffic regulation by the police, backed by community sentiment that makes it possible for the police to make their work effective. The policeman these days isn't what he used to be at all, or what a good many of us consider he is. The police officer is our guardian, our protector; he's our friend; he's out on the street to regulate traffic, to make the streets safe for us, and the sooner we quit avoiding him or opposing him and get together with him and help him, the sooner we are going to have efficient traffic regulation. Then, above everything else from the standpoint of regula-



tion, comes impartial law enforcement. When we can build up a community sentiment that demands that when an offender goes into police court, whether he is the son of the richest man in town or the most influential man in town, or whether he is the son of the poorest man, the penalty shall be imposed. When the community determines to fight his offense, regardless of influence or anything else, then we are going to begin to get effective traffic regulation.

It is a great big community proposition, and if in the community the man who is interested in safety in the plant isn't willing to get into the game and take the lead in the community end of safety, I don't know how we are going to put it over—and let me tell you men, plant safety is a little bit of a game along the side of this idea of public community safety.

CHAIRMAN OARTEL: In the plant we have been studying safety and practicing it in one way or another, for from five to twelve years. We know the essentials required, and some men in the iron and steel industry are safety experts. Therefore, men in the iron and steel industry, I think it is up to you and to me, to go outside of the plant into our communities and promote public safety. Then do you know what it will bring to us? It will bring to us that reflex action, that co-operation from the home and the school and the community, that is so very necessary to help us. It is a fifty-fifty proposition: they need our help and we need theirs. I hope that you all have received this very effective message of Mr. Smyth's.

#### SUGGESTIONS ABOUT "NATIONAL SAFETY NEWS"

I have an announcement to make. I suppose you are all familiar with the NATIONAL SAFETY NEWS, the new organ of the Council, which comes to you every week, and which is brimming over with good things. Mr. Price has stated more than once that it is his intention, as General Manager, to make this NATIONAL SAFETY NEWS a paper that you can give to your superintendents, or to your foremen in the plant, that will be of real practical help and value. So, with that idea in mind, a number of companies are ordering the NATIONAL SAFETY NEWS in quantities, to be given or sent to their department superintendents and their foremen. You can get the paper in that way at reduced rates, which the Council will supply to you on application.

The Council wants suggestion about the NATIONAL SAFETY NEWS. Have you any suggestion or criticism to make for its betterment?

The Program Committee, in planning this program, has had in mind, that while we are called the Metals Section, we are really made up of two sections the old Foundry Section and the Iron and Steel Section; so they have planned to give one day's papers and discussion to foundries. Today is Foundry Day, and I imagine that there are more foundry men here than there are men who are in the larger iron and steel business.

The first speaker is Mr. R. C. Salisbury, Supervisor of Safety, Interstate Iron and Steel Company, Chicago, Illinois.

**BUILDING A SAFETY ORGANIZATION IN A FOUNDRY**

**R. C. SALISBURY, SUPERVISOR OF SAFETY, INTERSTATE IRON AND STEEL COMPANY, CHICAGO**

The attitude of the executive toward safety is reflected in the organization he perfects to prevent accidents, and it is the means by which safety education is disseminated. Dividing accident prevention work into, first, Organization meaning the formation of safety committee; second, Education including in this term every possible method of enlightening the employee on the value of safety and third, Safeguarding including mechanical devices and appliances, lighting and sanitation; is at once clear Organization is of prime importance. It is the center from which Education and Safeguarding emanate.

As to the particular plan of organization, it may assume various forms. Each safety engineer may have a favorite plan, it may be as varied as the conditions are varied in the plants where it is to be applied.

What general plan of organization should be designed to carry out the accident prevention work in a foundry divided into a wheel and soft shop where there are from one thousand to twelve hundred men employed.

That is the special topic to which I will give my attention in this paper. The ideal method of organization must include employee, foreman, as well as officer and the various units of such organization must have highly-specialized functions. There must also be co-operation between the various units and one of such units must stand in the position of a court of review to which any disputed matter may be appealed for final decision. The unit of the safety organization (as it is indeed the unit of all social organization for whatever purpose it may exist) is the committee. The number of committees may be large or small, but in my own view is that five committees in the foundry are sufficient to carry on the work. Too many units are necessarily cumbersome and may result in overlapping of activities. The five committees, each of which we will briefly discuss may be conveniently designated as the Plant Committee, Foremen's Committee, Workmen's Committee, Accident Investigation Committee, and a Special Chain and Cable Committee.

**THE PLANT COMMITTEE**

The manager or general superintendent of the shop should act as chairman of this committee, which ought to include the general foreman, master mechanic, chief engineer, local auditor, and safety engineer. The latter should act as secretary and hold himself responsible for the general functioning of the committee.

This unit ought to meet whenever a special occasion demands it and regularly at least once a month. It should pass upon all suggestions and recommendations which may have been appealed to it from other committees and discuss such suggestions as may have come from individual employees or from the other committees, with a view to ascertain

whether they are feasible or practicable. This Committee shall arbitrate and finally pass upon all matters submitted to it and shall formulate all rules, regulations, and specifications. It must also supervise all matters pertaining to safety education, special report forms, and service work.

#### FOREMEN'S COMMITTEE

The Foremen's Committee, as the name indicates, must include in its membership the foremen in the shop. Their meetings should be semi-monthly. At these meetings, special attention should be given to the discussion of accidents which have occurred in the shop with a special view to reaching clear-cut conclusions as to their cause. Of equal importance to ascertaining the cause of accidents is the discussion of ways and means to prevent their recurrence and this, of course, is the most important work of the Foremen's Committee. This Committee should also have read to it comparative accident reports. The safety engineer should make it his duty frequently to examine the members of the Committee on general safety rules and such an examination should be conducted at least once a month. Inspection tours of the shop should be frequently made by the members of the Foremen's Committee. The safety engineer should prepare a simple set of by-laws and see to it that all the members of the Committee abide by the simple rules and regulations contained in such by-laws. Carelessness or negligence in attending the meetings should be discouraged and the absence from a meeting duly called by the safety engineer should be noted in the minutes of the meeting and a written excuse required from the member who is derelict.

#### WORKMEN'S COMMITTEE

This Committee is composed of representatives of the workmen of the plant. Such representatives may either be chosen by the foreman over each department, or by the foreman in conjunction with the workmen. In a plant of the size we are now discussing, there should be: 7 representative molders, 4 cupola men, 2 brake wheel workmen, 2 core room employees, 1 wheel pit worker, 2 yardmen, 3 chipping wheel employees, 3 shop laborers, 1 teamster, 2 machine shop men, 1 pattern shop employee, 1 representative of the electricians and 2 miscellaneous employees. The Committee, of course, will have among its representatives both day and shift workers. The day workers should serve on the Committee two months and the shift men three calendar months in order to obviate changing the entire personnel of the Committee at one time. This Committee ought to meet semi-monthly upon due notice given by the safety engineer who should also act as chairman. The safety engineer should see to it that all current accidents are fully discussed and that suggestions for the prevention of similar occurrences have the fullest consideration by the members of the Committee. In many respects, this is the most important unit in the organization and the safety engineer will find that before this committee he will have the best opportunity

of inculcating and disseminating ideas of safety. The more stereotyped safety rules should be read and explained frequently. In the course of a short time, this will result, by reason of the changing membership of the Committee, in educating all of the employees in the shop. It goes without saying that these meetings shall be held on the Company's time.

#### ACCIDENT INVESTIGATING COMMITTEE

This unit must have for its membership the best intelligence in the office. The master mechanic should act as chairman and there should serve with him the chief electrician, carpenter shop foreman, and safety engineer. The Committee should inspect all the circumstances surrounding the accident in a thorough and impartial manner with a view to ascertaining the immediate as well as remote causes for the accident. Forms promulgated by the safety engineer should be used by this Committee in making reports of accidents. The safety engineer should see to it that these reports are complete in detail, bearing in mind that it may be necessary to submit such reports to the law department in case of a controversy between the employer and the employee. In its sittings this Committee should be careful not to rely upon hearsay and rumor as to the circumstances surrounding the accident, but should call before it the actual eye-witnesses and obtain from them the desired information.

#### CHAIN AND CABLE INSPECTION COMMITTEE

The master mechanic shall appoint two riggers to act on this committee, which ought to hold meetings at least once a week. These men should be instructed to make a thorough survey of the plant with a particular view to inspecting chains, cables, hooks, ropes, and blocks and tackle. It should be their duty to report their findings on the condition of the equipment to the Safety Department at once. In case a piece of equipment is found to be dangerously defective this Committee should have authority immediately to tag it "out of order".

#### ACCIDENT RECORDS

In speaking to safety men there is no need to stress the importance of accident records. The Safety Department should be able to justify its existence by referring the doubter to records and statistics. Records of all accidents, of course, must be retained. In classifying accidents, causes are unquestionably of paramount importance to the safety engineer. These should engage his best attention and furnish him constantly with new ideas of accident prevention. The effort put forth by a safety engineer in the mental process of generalizing from the recorded causes of accidents will abundantly repay him. Records should also be classified as to time lost.

The initial step in the preparation of records is the foreman's report of the accident; this may be made on a stereotype form in such manner a mere glance will inform the examiner of the date of the accident,

a brief description thereof, and the nature of the work in which the employee was engaged at the exact moment of the accident and his experience at the work in which he was engaged at the time of the accident. The records will necessarily include a technical report by the surgical department and from all of these the engineer must decide upon the nature and extent of the investigation that will be required. The engineer must by all means compile at regular intervals reports of accidents calculated clearly to indicate their cause and these reports should be posted on all bulletin boards and furnish the themes of the discussion at safety meetings. The records must also show cost of accidents both to the employer and employee. The Safety Department must make cost reports showing the monthly expense and disbursements of the department and at the same time indicate the increase or decrease from the corresponding period of the previous year or years. The reports should suggest reasons for the increase or diminution of the expenses of the department. It is unnecessary to state the cost and expense of the Safety Department should be classified in hospital fees, medical and surgical expense, salaries, amounts paid in settling claims, amounts paid on pending claims, and estimates to be paid.

#### BULLETIN BOARDS.

Bulletin Boards of sufficient number to care for the material sent from the National Safety Council should be well placed. The proceedings of the 1919 Safety Congress contain an interesting paper on this subject by W. R. Rasmussen, Field Secretary of the Council. The Safe Practices pamphlet on "Bulletin Boards" is soon to be issued. In addition to the ordinary bulletin boards, we have placed at each of the main gates, a large board fifteen feet by twenty feet, portraying a page of a calendar. Each accident resulting in disability of seven or more days duration is indicated on this board by a red line drawn through the numerals; fatalities by a blue line. On this board space is provided for striking phrases and pointed sentences which are frequently changed. Interest in this board must be stimulated by interrogation of workmen picked at random from the plant. On these occasions the employee is examined as to his recollection of the material facts appearing on this board and at the same time inquiries can be made as to whether he possesses goggles and a rule book. In each case he should be encouraged in suggesting means of accident prevention. We have found that this method of personal examination brings gratifying results.

Much can be made of danger and caution signs, of moving picture exhibitions, and of systems of awards or bonuses for favorable accident records but a discussion of these would lead too far afield.

This then in brief is an outline of the various units comprising the organization for carrying on accident prevention work in a foundry, and a discussion of their principal functions.

<sup>1</sup>This was issued October 4, 1920.

CHAIRMAN OARTEL: We have fifteen or twenty minutes for the discussion of this paper.

#### DISCUSSION

MR. HUBERT: May I ask Mr. Salisbury if that Committee isn't rather large for a big place? I find quite a bit of difficulty in asking one man in a department for more than one man. You are asking for five and three and so forth, from the various departments.

MR. SALISBURY: I presume you have reference to Workmen's Committee.

MR. HUBERT: Yes.

MR. SALISBURY: The Committee comprises about twenty-five men, of whom only fifty per cent regularly attend the meetings, and therefore the larger committee is asked for.

MR. HUBERT: That is probably all right in your plant, but we have at the present time about 1,650 men. For instance, take the pattern makers; we have three of them. The foreman is a safety booster from the letter A to Z, but it is a hardship for him to spare those three men to make that inspection. He would willingly give them up, but every day he gets his schedule outlining how much work he has to get out, and it is up to him to get it out. Therefore, it is rather unhandy for him to spare these three men. Probably your plant is different.

MR. SALISBURY: Possibly you require too much time of the Committee. We use the Committee for about thirty minutes.

MR. HUBERT: We require all day for the entire Committee. Beginning this next month, however, I am going to try the plan of calling for six men out of the different departments, one out of each large department, to meet at my place at seven o'clock in the morning. From there we are going to make the entire inspection all over the plant. We had committees going through departments and all they had to do was to go through their own department. Now it is a fact that a man going through his own department so many times doesn't think anything, for example, of a hole in the floor. But if you take a man in the machine shop and have him go into the pattern shop, he will notice that hole in the floor, the first thing.

I have in mind taking this Committee report and going to the foreman in that department with it and saying, "Here, Mr. So-and-So, there is something we found in that department." He doesn't know who reported that. He cannot blame his own men for reporting on something in his own department. We found a good deal of trouble arose from that. The men were uneasy and said, "Why didn't he come in and tell me? I would have had it fixed." These five or six men go through the entire plant; they report back to me, and I take it to the foreman and ask him if he will take care of it. He replies, "Yes, I will take care of that." Then I go to the next man and he says, "Well, that is a big question and I will take it up to the Manager."

The first week in each month we make our inspections; the second week in each month we have a meeting of the General Safety Committee, which is the General Manager and the Superintendent of the Department.

## AN ACCIDENT BAROMETER

We have two large glass tubes, one representing the accidents last month. We have figures from five up to sixty on the tubes, having a tube on either side. We take a little sand and color it. If we had seven or eight accidents last month, the sand would stay at five or six high. On the other side we start off with nothing and follow it up, and when the record for this month gets up, they begin to realize how important it is and they are very careful in trying to keep it below last month's record.

## BLIND REPORTS VERY HELPFUL

Mr. M. A. Pocock (Northwestern Casualty & Surety Co.): The large factories in large organizations have but little trouble in creating a good safety organization. The biggest factor to contend with, however, is the small institution; and I want to state, in connection with this last speaker's remarks regarding the taking of men from various departments and sending them through other departments foreign to them, that he will have a great deal of success if he insists upon those men going into details and breaks down the fear of the individual in making reports. He will successfully do that by having so-called "blind" reports and "blind" suggestions.

The great trouble that we find is to get a man within a department to make a report on his own department; he is afraid of his foreman to a certain degree, afraid that he will be discovered and found out and severely reprimanded for having done so. In that connection, the so-called "blind" report and foreign report, or report from a man in another department, will set every one up on their toes watching and looking for good results. The small organization can look to that with great advantage.

A man will overlook things in his own department, just as a man lives too close to his own home and habitually passes by and forgets those little things; he knows they are there, but he forgets to tell the new man and the new man gets into trouble.

Another feature to which I should like to call attention is the photographing of accidents. A photographic evidence is one of the best that can possibly be produced, either for use in the prevention of accidents or for litigation at a later date. The large organization again has the advantage in that it invariably has a so-called "commercial photographer" on its staff, within its organization, who can go from department to department taking pictures of what may occur, or conditions that exist, or photographs of the sales organization on the development of new machinery and devices; but again, in the small organization it is a stumbling block, it is often impractical to secure a photographer uptown who will come down to a plant and make photographs instantly. However, the small organization can very readily find within the factory or the office, the amateur, and the amateur can be trained, with a little coaching and by the management backing that amateur up in the purchase of sufficient and proper equipment, such as a canvas screen and a few floodlights, and

with the Kodak camera and this apparatus the amateur can be called upon to make a photograph immediately and the same can be reproduced on the bulletin board and also filed for future reference.

MR. D. NEILL (Standard Steel Car Company): I should like to say a word about how our committees function. We are somewhat different from most of the others that I have heard about.

#### COMMITTEE WORK OF STANDARD STEEL CAR COMPANY

We have a General Committee, a Foremen's and Workmen's Committee. The Foremen's Committee is composed of ten members. We don't figure departments at all. We divide the plant into ten districts, each foreman being a supervisor of that particular district. In a district we have three men representing the Workmen's Committee, and the supervisor of each district is expected to see that these men get out and make their inspections. They make a complete inspection of the plant once a month; that is, each district inspects that particular part of the plant. From time to time we change these men from one district to another, so that the man isn't always on the same district.

Referring to a remark that was just made about recommendations getting the men into trouble, we don't have any difficulty of that kind in our plant because the management absolutely backs the committees up in anything that they may do. I don't believe in the past year there have been three recommendations turned down, that the Workmen's Committee has made. The committees themselves are absolutely fearless. The criticism even extends to the supervisors of the districts and to the superintendents of the plants, and even to the manager of the works, himself. The Workmen's Committee meet by themselves, except that two safety inspectors and the safety engineer meet with them to furnish such information as may be necessary from action that has been taken by the General Committee.

CHAIRMAN OARTEL: Some one has spotted Mr. Eib, of the Illinois Steel Company, as being present at the meeting, and has asked for a few remarks along this line from him. Mr. Eib:

MR. JOHN P. EIB (Joliet, Ill.): I regret that I did not come in in time to hear the first part of the discussion. I gather from what I have heard of the discussion since I came in here, that it is mostly on the question of committees.

CHAIRMAN OARTEL: Yes, organization in a plant or foundry.

MR. EIB: We have not only worked the Foremen's Committees in various departments but the Workmen's Committees as well, and we found that it worked to very good advantage, picking out particularly the men who are alive and keen to the situation.

So far as being afraid to make reports is concerned, we did bump into that a little sometime ago, but that did not last very long and we soon found there was competition among the men to get on the various committees.

Perhaps here is something that might not have been taken up by some other plants. For a while we ran a scheme whereby the Committee that



secured the best results over a period of six months at first, and then we got it down to three months, was given a visit to another plant as a reward for its good work. I believe that will bring good results. It makes a man feel that his efforts have been rewarded and also gives him an opportunity to go to some other place to get new ideas. I believe the organizations in the other plants will find that it is a mighty good stunt. That, of course, should come after you have your men worked up. I don't know whether any one here has a situation that could be worked out in the same way, but we found that it put the right pep into the situation.

MR. NORTHWOOD: Just how do you choose your committee? Does the superintendent appoint it?

MR. EIB: In the first place he did, but after a while the superintendent, the general foreman, and I watched the fellows who were keenest in the department, and we picked out the most likely chap.

MR. SALISBURY: Do your committees make regular inspections at specified dates?

MR. EIB: Yes, we have a regular schedule. Previous to the first of the month we make up a regular schedule of what department a certain committee is to inspect, in order to have each department in the plant covered thoroughly each month.

CHAIRMAN OARTEL: Does the department know they are coming, Mr. Eib?

MR. EIB: It all depends. We have made it a point to notify that department, so they will appoint some one to go through with them; in other words, an unacquainted man won't go through the department and get much out of it. A green committee might go into a department and amble around and get into trouble, whereas a man who is familiar with the department acts as their guide.

CHAIRMAN OARTEL: In other words, there is a question of making a clean-up for the benefit of that committee.

MR. EIB: Well, that is possible.

CHAIRMAN OARTEL: Anyhow, if they would only do it for that reason, it would be good.

MR. EIB: We make a thorough inspection of the other department, and we don't want them to find themselves in the predicament of doing something in that department that is against the safe practices of the department.

CHAIRMAN OARTEL: Is there any other question you want Mr. Eib to answer? Mr. James, of the New Jersey Zinc Company, I believe, wanted to talk on this subject.

MR. J. D. JAMES (N. J. Zinc Co.): In regard to the Committee on the Plant, in 1912 we organized a Committee on the Plant, for the entire plant. To start in with, we picked out from each department one of the general foremen to act on the General Plant Safety Committee. After we made our rounds with the foremen, we went over it for two months, once every week. We make an inspection every Tuesday morning. We go over as much of the plant as we can cover carefully and intelligently. Then we go around the following week, and so on, until we have covered

the entire plant, and it takes about six weeks to make the tour of inspection. I go with that committee myself, and we also have a secretary. Then the members of the General Plant Committee, whenever they come across anything which in their judgment should be guarded, or anything that is necessary to cover a dangerous spot, have the secretary make a note of it. After we get through with the morning's inspection, we meet together the first thing in the afternoon and go over these suggestions, every one of them: and sometimes they run as high as 25 or 30 suggestions every week. Then if there are any of those notices or suggestions which do not warrant any guard or expenditures, we talk it over at the committee meeting and explain why it is not necessary, because we do not believe, of course, in wasting money on safeguards that are uncalled for.

#### MAKING A KNOCKER A BOOSTER

This committee, after they serve for two months, goes right back to the department, and we notify the chief of the department or the superintendent, that there is a vacancy in that department on the General Plant Committee. Sometimes we ask for a certain man; we try to find a man who is antagonistic to safety and bring him on this committee, and we give him a little encouragement, ask him to make suggestions as we go along, and as a rule when that man serves two months on the committee, he is one of the best safety boosters we have. On other occasions, of course, if we do not have any particular choice, we leave it entirely with the superintendent of that department. That has worked out very successfully.

#### FOUNDRY ACCIDENTS ALMOST ELIMINATED

We have now brought about a condition in the foundry where we hardly, if ever, have an accident of any kind. We used to have quite a few lye accidents, foot burns, and so forth. They have now been eliminated altogether. The first thing the man who works in the foundry does (especially metal chippers), is to go right into the office and get his goggles. Then in the afternoon, while they are waiting to pour the metal in molds, they have half an hour and they go and get the foot-guards and goggles, and that is how we have eliminated those accidents entirely. But we are working on a system to have in each department a safety committee that will look out for these accidents. They have already brought these accidents down to a minimum.

As to the man being afraid of making a suggestion, that is just what we endeavor to prevent by having a man from every department in the entire plant serve on the committee, because we don't believe that a committee in the immediate department has any success unless we have a mixture of all the departments, which are about twelve in number, and then no one will ever know in their particular department who made the suggestion. After those suggestions are made, they are sent in in typewritten form. If they are valuable, the committee goes right into them and they are turned into the plant. Those Plant Committees have

worked out very successfully and we have not found it necessary to change them.

MR. J. B. MULLIGAN (Bethlehem Steel Co.): The atmosphere does not seem quite clear as to the number of men who should be on the safety committees. I want to tell you of the personnel of our committees.

#### COMMITTEEMEN GIVEN TRAINING IN ACCIDENT PREVENTION

According to the Bethlehem Steel plan, we train our men for committee work through a four months' course in accident prevention. We change our committees every six months. Each departmental committee is made up of a foreman and a workman from the particular unit, bearing in mind that every unit of work involving 50 men, or more, should be represented by committee men. For instance, take the Mill Section: a foreman and a man, and a workman from the road; a foreman and a man from the machine shop, and so on; so that we have in the department a committee made up of foremen and workmen. In each department we have a man who has charge of all the detail committee work. He is the chairman of the committee. When new men are to be selected for the committee, he selects the men and has a conference with the superintendent on their appointment. So that the personnel of the committee is selected.

Now we work out our committees on the basis of a foreman and a workman for every fifty men, with a maximum of not more than ten or twelve. With the personnel of the committee composed of foremen and workmen, the physical things in the shop are reported from day to day to the foreman, so that at the end of the month the committee report is a report of things done each month and at all the monthly meetings we can get at this larger aspect of accident prevention, which involves not the physical things but involves the matter of unsafe methods and bad habits, which is the future big field in accident prevention work.

CHAIRMAN OARTEL: The next talk is on "Personal Element in Safety from the Standpoint of the Foundry," by Mr. Frank Moffett.

#### THE PERSONAL ELEMENT IN SAFETY FROM THE STANDPOINT OF THE FOUNDRY

FRANK MOFFETT, ENGINEER, THE NATIONAL MALLEABLE CASTINGS COMPANY,  
CLEVELAND, OHIO

The personal element, that human variable, enters into safety just as it enters into the quality and general appearance of the commodity being produced by labor. We can make good castings that will stand the physical tests required to meet the specifications with the proper kind of help, but sometimes we have trouble in making good castings because in producing castings we must deal with humans and all humans have a personal element.

The investigations of the Industrial Commission of the United States show that to a very great extent, the blame for accidents cannot be

laid to either the employer or employee, as accidents are a natural outcome of production. In many cases there is blame, especially when the best safety appliances are not provided, but the establishment of blame does not bring with it a remedy for the economic incapacity of the individual wage earner.

We have three elements of hazard with which to contend: Our material, our machines, and our men. The rules for the prevention of accidents in the Foundry naturally divide themselves into two main classes—those which primarily concern the employer and those which must be observed by the workman in his effort to guard himself against injury. The employer must provide the required safeguards; the employee must use care in operating his machines and doing his work without taking unnecessary chances, for a machine is never made with brains; therefore, it is up to the operator to do the thinking and lend a guiding hand.

It is true, however, that accident analysis on the basis of accident frequency has led to the general conviction that three-quarters of all accidents are preventable by better supervision and by education of the employee and foremen.

In this connection it is assumed that safety and mechanical efficiency go arm in arm, and all improvements in mechanical efficiency should bring commensurate improvements in safety.

#### DISREGARD OF HUMAN LIFE

In the years immediately preceding 1906 there existed in American industry generally a frightful disregard of human life. Accident occurrence had reached a condition not paralleled perhaps at any other time or place. Two factors contributed to such a condition: First, an unprecedented degree of business activity; and, second, the introduction into the country of a larger proportion of inexperienced immigrant labor than at any other time before or since. The combination of these circumstances, with the absence of any organized safety effort as the term is understood today, produced accident rates of a degree of frequency and severity almost unbelievable when the records of the past are compared with those of today.

Among the industries which had achieved the most unenviable accident record, and which needed most to awaken to the importance of accident prevention, the iron and steel industry stood out prominently. It was not only one of the great basic industries, but its intrinsic hazards were of a more pronounced character than those of the majority of industrial employments. And because of this, because the industry was spectacularly hazardous, and as the recollection of the past is useful by way of provision for the future, the safety movement, when it finally began, had equally spectacular accomplishments.

This country generally known as the melting pot for all races has had a stirring-up recently brought about by the great war. The result is that we have a condition today similar in many respects to that of 1906 especially in the North, or industrial center. The high wages and attractive conditions of the North has influenced the negroes of the South to leave the agricultural fields and its rural life for the industrial life in the great manufacturing centers.

THE NEGRO ELEMENT

Thus within the industrial centers of the country we have a new element, quite unfamiliar with shop work, and whose mental traits and characteristics are only imperfectly prepared for modern economic life and must be treated correspondingly. The colored man's mental and moral make-up is capable only of a limited modification after the period of maturity.

The negroes themselves or their near ancestors, were brought up in a stage of industrial society separated from ours by a period of hundreds if not thousands of years. Is it conceivable that in a short period that they can acquire those characteristics, such as forethought, careful planning and awaiting results which are necessary for their own protection in the personal element in safety?

THE FOREIGN ELEMENT

Again we have the foreign element similar to the negro in that he wanders from calling to calling. These foreigners are made up for the most part of the lower classes of various nations in the old world. Many of these are so illiterate that they cannot write their own name. They seldom get clear impressions. They neither stir up their brains of their own accord nor cross-examine their inherited ideas. They lack the gift of instinctive forethought and their only thought is work and wages.

These classes of help, the negro and the foreigner, certainly present a variable in the equation of personal element that makes the problem difficult to solve, and I hope that the proper substitution for the value of X in this equation will be education.

Accidents which occur through the fault, or at least not without the fault, of the employee in the whole industry known as the Foundry have always aroused disquietude and even indignation in the public.

MENTAL CONDITION OF THE MEN

In treating the personal element which is invariably the cause or at least connected with most accidents the questions of failure and statistical results as to the numbers of accidents and their relations to the various hours of the day and the time of labor have been gone over time and again. But now I believe it is the tendency to turn from these things and recognize a still more important phase than that of fatigue, the whole mental condition of the men. The ability to keep attention constant, to resist distraction by chance happenings in the workshop, and especially the always needed ability to foresee the movements of various machines, cranes, vehicles, and the other fellow, which are acknowledged as extremely different from man to man. True we have men who practically never have an accident, because they feel beforehand, even, what the other fellow, or the confused operator and the unskilled mechanic will do, while others relatively often experience accidents of all kinds because they do not foresee how matters will develop. They can hardly be blamed, as they were not careless, and yet accidents did result from their personal quali-

ties; they simply lacked foresight. All this naturally turns one to a psychological analysis which indeed is a deep subject where the farther one goes the more apt he is to get lost in its realms.

Aside from the man's psychological make-up we may consider some of the secondary factors such as the man may be too daring, and may like to run risks; he may be old or he may be young; or he may still need discipline; he may be too familiar or he may not be sufficiently acquainted with local conditions; he may be ignorant as to the laws of forces, etc. Any one of these coupled with the fact that he may have something on his mind or troubles of his own.

The human element is therefore a very complex force to try to harness so as to help the safety problem, for it is dealing with human nature and the inner man. Fortunately each of us has within himself a guide, a pilot, a mental doctor, an intelligence that understands the winds of life and how they blow.

The inward pilot is our own thought and conscience. We all know that every man who does what he ought not to do knows perfectly well that conscience is trying to pull him away. Thus if you ignore conscience and thought, you resent the suggestions of the better side of your character, the human side rebuking the animal side. Fortunately for the human race conscience is never silent.

Apart from the fact that consciousness is the first sign of mental life and activity, it is of the first importance because it is the basis of all sense of individuality and responsibility.

Now that we are sure each worker has thought and consciousness, what has he on his mind? Why does he not think of safety? Why does not every instance of accident justly awaken his fears and quicken his vigilance?

#### THE MECHANICAL AGE

According to the old and well-known classification, mankind has gradually progressed from the hunting and fishing stage to the pastoral stage, then to the agricultural stage, then to the handicraft stage, and finally to the machine stage of production, the mechanical age of the present time. Here we have that phenomenon which we call the nervousness of our time, the lack of composure, the hurrying, the restlessness pervading all walks of life. Through the peculiarity of business relations in all branches not only of economic, but of social life, this restless spirit prevails.

In this age, moreover, labor has frequently become a disagreeable, repulsive act, in the depths of the earth and amid the noise, dust, and heat of many factories of today. Labor has become more and more monotonous and unrhythmical—mere piece work of unvarying nature in the modern great industries built up by division of labor and consolidation. The laborer is now separated from his work. He creates no longer; he fashions no longer; he brings nothing to completion; nothing appears as his work, nothing in which his labor is embodied. He is no more than a secondary wheel in a gigantic mechanism. The direct personal contact of the employer and the employee through which ethical conditions existed has been lost through the aggregated system of production.

## THE MODERN INDUSTRIAL WAGE EARNER

The modern industrial wage earner becomes a characteristic representative of that artificial race of men now growing up in cities. Away from his natural environment, that is away from home, the thousand-fold spiritual ties and tender sentiments are lost. His home is the world, he is a child of the world, who now stands only in a business relation with his employer; services are rated on both sides at a money value. The uncertainty as to the means of his livelihood, the fact that he does not know from day to day whether he is going to earn his bread, for an industrial depression may result in the wholesale discharge of laborers, and thus widespread famine, the fear of losing his job is perhaps foremost in his mind.

In most factories the laborer who is not doing well simply loses his position, and by such an unfortunate experience he is not mentally enriched, but is impoverished, as he has lost much of his self-confidence, and of his joy in labor. This limitless waste of human material, this pitiable crushing of joy in the day's work and the crippling of the economic output only help to aggravate his morbid mind.

Again the wandering from calling to calling is more frequent in America than anywhere else. To be sure, this was the advantage that a failure in one vocation does not bring with it such a catastrophe as it does in Europe, but it contributes much to the greater danger, that any one may jump recklessly and without preparation into any vocational stream.

It is this continual change which brings to the laborer a consciousness of his position. The stretch of bare work without periods of proper relaxation and recreation will grind about a breakdown in his better judgment. His nights without proper rest are fatal to his highest efficiency on the following days. In other words, the man whose mind is ill at ease or who isn't properly fed, and who is up against the necessities of the dwelling houses in cities may make out about as well as he can. So we see that while labor is the sanction of life, as the director of energy it has ceased to round out the worker into a complete man, and hence to make him peaceful and contented.

The point that I wish to make is that accidents that are due to the personal element are not due so much to carelessness or foolhardiness as to ignorance of hazards and the proper way to do the work, the hesitancy in asking questions and what is in the worker's mind.

Young men, especially when they predominate in any department, are a potent factor in the accident report, especially in the accidents that the Company cannot prevent. They smash more equipment and are more severe on machinery, and while they have less accidents to themselves, due to their agility, their eagerness, chance taking, and speed, particularly in departments handling hot metal, they make all signs at the cross-roads read "Danger Zone" instead of "Safety Zone."

Diagonally opposite we have the men with long years of service behind them, the old men, the men who less easily adjust themselves to radical changes in the art of production or mechanical equipment. They have

not the elasticity of youth and are less able to think themselves into an artificial situation.

Age being the natural outcome of life, we must reward long, faithful service by placing these men in zones of almost complete safety, a number of which can be found in any industry, where the work is of such character that it will bring satisfaction to the man and stabilize the workings of safety.

#### FAMILIARITY ENGENDERS BLINDNESS TO ENVIRONMENT

Familiarity, strictly a human element, is peculiar the way it affects different men. Often you see material or objects that have been dropped or promiscuously placed on a board with a protruding nail awaiting an innocent victim, in the gangways or other much frequented places in the shop. While it is of course an act of selfishness, another human trait, on the part of any one that sees these objects in passing them, not to remove them or bend over the protruding nail, so as to protect the other fellow, some peculiar trait in his inner make-up bids him not to do it. After that has taken place these objects in question become familiar. Then this familiarity means that a man will exert more energy in trying to pass around these objects many times during the day, than he would in removing them at the first instance. He then has a typical case of that form of blindness called familiarity, which I might say is very contagious. While the objects are really there, he does not see them; he naturally or automatically goes by them and forms an accustomed habit.

He is a good deal like the thousands of New Yorkers that pass the Woolworth Building six days in every week. Perhaps they watched that mighty pile lift itself from its foundations and raise its gilded dome to the clouds. Yet I venture to say that nine-tenths of them have really never seen it. A stranger comes to the city, like the visitor comes to our shop, and the structure leaps into his vision like a lion from a thicket. He carries home a clearer impression of it than most of the folks who work within its walls. So familiarity may breed blindness—as well as contempt.

The innocence of compressed air, as it is generally known to the unskilled artisan, deserves more than a passing remark. Only lately in passing through the foundry I saw two men, one a white foreigner and the other a negro, tussling together with an air hose, that was emitting its colorless compressed content, as the object of possession. They stopped momentarily while I passed. As I proceeded farther on my way a passing glance showed that the friendly struggle was proceeding again as at first. I retraced my steps, and being a member of the safety committee, took it upon myself to inform the men in question that they were playing with something very dangerous. The expression on their faces plainly showed that they knew better and that there was no danger. The foreigner then said with an air of sureness, "This is no electricity, it can't hurt you." A little explanation on my part revealed to him that while they were only playing, as it were, there was the possibility of an agonizing death, broken ear drum or other serious injury. The colored man was an interested listener and no doubt will heed the warning in



the future, but the foreigner perhaps really did not understand, and still retains that possibility of accident, which, when it does happen will be charged to the personal element, and behind the personal element is ignorance.

While on the subject of power as it is stored in wires and pipes we must also consider the force of gravity as another potent factor. While neither of these are personal elements, their forces are so enormous, so capable of destructive violence, and their application to industry so complex, that one can not conceive of an engineer as failing to recognize that the personal element must enter as an important consideration.

The force of gravity, that great unknown reality, which is the element that causes so many accidents, such as the falling of objects either human or otherwise, should have some consideration. Also the position assumed by the worker, carelessly, thoughtlessly, or otherwise when dealing with that element calls for a mental reaction that is in most cases strictly a personal matter.

Men frequently place themselves between two objects attracted together by this mysterious force, such as occurs when lowering barrels, machinery, etc., down skids, or passing under stationary and moving lifted loads. By so doing they place themselves right in the path of danger, depending upon the ropes, chains, and hooks that hold the body in equilibrium, not knowing that these holding devices have some dependence on the human element in themselves, for they were produced by man.

In this connection anything that will teach or enlighten the worker such as a little instruction relative to the proper position to assume would be of value to offset the personal element attached to this hazard, for without it he would have to learn from the school of experience which oftentimes is a very expensive lesson.

After considering the worker with all his faults it is worth while considering his nearest associate, the foremen; the one that carries on the orders from the higher ups, and the one that we must look to for results both in production and safety.

#### PROBLEM OF THE FOREMEN

The foremen alone present a problem in themselves, for while they can take one of the two sides in safety, either for or against it, and they are above the average worker in intelligence, they present a peculiar case.

There are three classes of foremen; First, the indifferent class, or those that belong to the "what's the use brigade" and take the stand "Let things come as they may". Second, the doers class; those that do the little things, for they are disciples of the clan that believes success comes to those that do the little things—it's the little things in life that count. Third, the masters class, those that believe in themselves, believe in their co-workers; they enjoy what they have and work for what they get, and are those that say "good morning" to their companions at the start of the day.

As a plant is known by the foremen it keeps, it therefore is a big advantage first to get all foremen into this third class and get them to

believe in safety, then we have added 50 per cent to the power of the dynamo.

The human element in safety demands the assistance of the foremen if we are to attain any results at all. It must be put squarely up to the foreman in every and all industries in hopes that some may be awakened to caution and vigilance. I don't mean to say that he is a "cure all", but inasmuch as he is in direct personal contact with the laborer, he can encourage him to freedom and confidence, if he (the foreman) will avoid any such appearance of superiority as may overbear and depress those under him.

Safety must not only reach the surface. It must be made to penetrate deep so as to reach the depths where this accident malady takes root; it must reach the man himself, and by that I mean the laborer of the lowest rank, as well as the skilled mechanic. It should begin at the top with the manager, superintendent, and safety engineer, and without the co-operation of those on the lower rungs of the organization ladder little can be accomplished. Every cheek should be flushed with confidence and every eye should sparkle with eagerness to endeavor to make the draught of life long and sweet.

Life is sweet to every individual, and whether he be white or black, or whether he is mentally or morally equal to his superiors in the shop, the air of indifference which is so conspicuous in some that handle help should be laid aside, because, on the accident report sheet there is no distinction, for each accident that is in the total of the day is represented by a figure, and in this figure may be included the foreman himself.

While serving on a safety committee, we were making an examination of the Carpenter Shop. Our practice called for the foreman to accompany the safety committee on inspection trips in his department. This one occasion brought forth one of the peculiarities of which foremen are sometimes possessed. This foreman was well on toward life's expectancy, and being from the old school, was naturally or otherwise inclined to view the safety committee with a little skepticism.

Several of the guards on the high-speed woodworking machines were off to one side, and not in place, while the operators were working these machines. The foreman was naturally asked the question of why the guards were off and why he permitted the workmen to operate the machines without guards. These questions animated his feelings and excited his nerves, while his answer stimulated his muscular movements, for his hand and voice started to work in synchronism. Among several things that he said, this one stood out very prominently, for he used a great sweeping gesture with his hand saying: "Why, we don't need any guards on these machines. We haven't had an accident up here for years." Just then the scrutinizing eyes of the committee saw that there were several fingers missing from the hand that was waving so gloriously in fond recollection of the past.

You know the mind has some peculiar characteristics and one of them is that it remembers the pleasant things best and tries to forget the unpleasant things, just as the gambler remembers his winnings and not his losses. So it was with this carpenter foreman. He remembered that

they did not have any accidents for several years, and had forgotten about his mishaps which were the unpleasant thoughts. When the truth became known it was found that each finger that was missing was the result of a separate accident.

This living example of the "guardless days" will no doubt be a good advertisement for better protection, after he is educated to regulate his thoughts by those of reason, and that safety is a real necessity and not a menace and that the safety committee does not belong to the "what's the use brigade".

The next class of foremen, those that do the little things—the littlest thing they do is to help save their brothers from accidents, and to protect the interest of their employer. This is the class of fellows that have to have accidents occur continually in order that they may be stimulated up to a high pitch in safety, for they are otherwise unable to help themselves in this great humanitarian effort.

The last class of foremen, the type that can listen to the voice of wisdom and learn from the experience of others. They are like the captain of a great battleship, though he may be the greatest fighting sailor in the world, will take the advice of the pilot, give over the command of the ship to him, and control of the helm, when he is in that pilot's troubled waters. They are the ones that can be trusted and depended upon. They know the location of switches for lights and machinery, and are not at a loss as to what to do in case of an emergency. They are not quitters and never plead mental bankruptcy. This class, when properly instructed, always prove to be for safety from center to circumference, for they are conservative enough to be absolutely safe and liberal enough to satisfy fair-minded people.

When safety committees can work with men of this last class they can with almost infallible certainty point out, not only what work can be undertaken with fair hope of success, but also what slight modifications or additions and diminutions will more than double the safety power.

#### VALUE OF BULLETINS

The value of bulletins can only be appreciated by watching the attraction they have for the average employee. The reason for this is because the worker sees in the pictures the other fellow, just as the accident happened, and naturally accidents always excite curiosity and crowds. These bulletins should be placed in choice locations, such as near the drinking fountain or lavatory, the places frequented most by the worker during the working hours of the day. The worker can easily fall into a rut, in so far as safety is concerned, but when he sees the bulletin his mind is momentarily diverted and aroused by the substance brought out by a properly illustrated bulletin. The reading of the bulletins is restful as well as educational, especially if they are convincing and put up in a sensational manner like some of the popular newspapers of the day, that appeal to the more uneducated classes, and if they are short, snappy, new, forceful, and right to the point, much like the present day advertisements along the highways. They cannot fail to bring results, for their message is working every moment of the twenty-four

hour day. This will be of great assistance to all concerned in safety, for the laborer will soon discover that they are treasure houses of infinite capacity, always open to them, and the wise shall think about them to their advantage.

#### THE SAFETY MOVEMENT

This humanitarian movement called safety is something that will be with us for all time. It is a branch of engineering that has been neglected in the past by our colleges. It had its origin in the school of experience. We must regard everything that we do as dangerous. Failure is dangerous, and everybody knows it. So if we are to succeed we must sow the seeds of safety for the future harvest.

The young students attending our colleges and universities that will be the men of the future, those that will take up the problems that we leave on our departure, should have as part of their course, a certain amount of safety instruction. To turn them out into the great industrial world of today, cut off from the great thoughts that have been brought to light in the last decade, is like sleeping at our post during a siege, yes, I might say it is like sleeping at our post during an attack.

The engineers of today, those especially that have charge of men doing designing of industrial equipment, are perhaps more proficient than their predecessors were in the art of safety. This is noticeable in all the latest equipment, for much of the up-to-date machinery has had some safety thought while being developed on the drafting board. This finished product with all sorts of positive features, the result of careful thought and study, is today presented for productive labor to the worker, who, even though he may not be possessed of intelligence, good judgment, common sense, good eyesight, good hearing, good memory, or quick perception, or one who is able to concentrate his attentions completely on any matter in hand, makes less accidents in relation to output than the days before the advent of safety. So as time goes on the personal element that man is endowed with shall be harnessed so completely while he is doing his work that it will be very closely regulated.

I hope to see the day when all equipment layouts, in fact all ideas that are developed on paper in the drafting department, for construction purposes, will have to pass the Safety Department, composed of trained competent technical men, where it will receive the stamp of approval or a cut out by the censor.

The early beginnings indicate clearly that the goal can be reached only through exact and scientific principles, and that the mere naive methods as here-to-fore used cannot be sufficient for real, persistent furtherance of industrial safety.

Such of the personal elements that appertain to the psychological functions of attention, memory, ideas, imagination, feeling, volition, suggestibility, ability to learn, ability to discriminate, judgment, space sense, time sense, and so on, should have some introspection so that the lack of self-discipline, which is the cause of most mental inertia, can be corrected. These are the problems for the psychologist.

The fitness of employees for any vocation that may test the particular

complex unified combination of attention, imagination, and intelligence, will, and memory, which is essential for a special kind of labor, is a problem for the vocational counselor as well as the psychologist.

These are problems in psychology which would require perhaps volumes, if the human element was resolved into its component parts to test every single elementary function in its isolated form. And I only mention these in hope that some writers, in the meetings that are to follow year by year, will treat them so as to enable us to see our problem and obligation with a little clearer light and help us in our safety problem, and make the solution of the problem a matter for our personal attention and aim.

This question of personal safety is very broad. It is something that we can only see part of, the outward cast of man, his inner make-up we must learn. The result in so far as accidents are concerned, we can analyze and only draw conclusions, because the ordinary individual knows very little of his own mental functions, on the whole. He knows them as little as he knows the muscles which he uses when he talks or walks.

The company that I am connected with is facing this problem of accidents that they cannot control, accidents that are up to the man himself, with the idea of final solution as their aim; sparing no expense in this problem of the hour, in the endeavor to deliver its employees home in the evening to their wives and families in as good condition, if not better, than when they were received at the gate in the morning.

A welfare department composed of a vocational counselor to attend to the needs of employment, a safety engineer to protect and safeguard the interest of both employer and employee, and a welfare man to look after his environment and needs, is now an established fact. This set of men are specialists in their vocations, and this branch of the organization while comparatively new is now regarded as a valuable asset and is mentioned here because of its direct relation to the subject of this paper.

Finally, safety is to industry what hygiene is to medicine. It is, broadly, the science and art of preserving life and health, as currently restricted, not by curing disease, but by the prevention of accidents, through the removal of their generating causes. As we cannot remove them until they are known or truly inferred, the science advances with that of medicine, and had no general basis until the last decade, during which unprecedented progress was made in all branches of medicine, than which none is more important than that of preventive medicine.

If the many thousands of injury and many hundreds of death cases can be reduced by this great humanitarian effort to a half, then the conditions in the great basic industries of America will be relieved of much responsibility. But the whole world of industry will have to learn the great lesson, that of the three great factors, material, machine, and man, the man is not the least, but the most important.

ADJOURNMENT.

## THURSDAY MORNING SESSION

**CHAIRMAN OARTEL:** The first speaker this morning is Mr. Nicolaas Prakken, of the Pawling and Harnischfeger Company.

**SAFETY FEATURES OF OVERHEAD TRAVELING CRANES  
FROM THE STANDPOINT OF CONSTRUCTION AND DESIGN**

**NICOLAAS PRAKKEN. PAWLING AND HARNISCHFEGER COMPANY.  
MILWAUKEE, WIS.**

It is a pleasure, indeed to tell you something about traveling cranes, because you know that in any plant the overhead traveling crane is called upon very heavily to take part in production. It is certain that the overhead traveling crane is one of the most abused pieces of equipment that any plant, mill, or machine shop has installed in it. The question arises, when you are talking to a purchaser, one that is enlightened or one that might not be enlightened, "What overload will this crane carry?" If you asked him how much of an overload he could carry, he would say, "I am not in a position to carry any overloads". Oftentimes people do carry overloads, and when they do, they naturally show extreme fatigue, which means an overloading of the system, and they have to recuperate through rest.

A gentleman who had been assistant general manager of a telegraph office stated that all that was needed in a crane was simply some pieces of iron on the sides and bolts on the end for the truck ends to hold the wheel.

The traveling crane divides itself naturally into the electric overhead traveling crane and then a combination of the bridge with a monorail hoist. So that this transfer crane, with its monorail hoist running on the lower flange of an I-beam, possibly with a special track, can run off the spur beams to any part of the plant. In connection with the transfer crane comes a floor operated hoist. The floor operated hoist is operated in the same manner as the transfer crane, with its cage controlled monorail hoist; the only difference being that instead of the man being in the cage, he is walking on the floor with dependent ropes in his hands. Then in connection with the transfer train, cage controlled or floor controlled, you have your accessories such as switches and turn tables. These accessories, incorporated in a system with curves, makes it possible to give service to the different parts of the plant.

The standard overhead traveling crane is made in three units: the trolley, the bridge, and the cage. The bridge, being the part that spans from side wall to side wall, is composed of girders the bridge machinery, foot walks, electrical equipment, and the truck ends. The truck ends must carry the entire load, especially when the trolley is moved over to one side with its full capacity. On each wheel then, you will have one-quarter of the weight of the bridge plus one-half the weight of the

trolley and one-half the weight of the load, plus the additional movements that the bridge machinery goes through, added to the wheel on the truck and adjacent to the bridge machinery. That wheel, then, must carry the greatest part of the load, and it is important from the standpoint of design and construction to see that you have a bearing there that will absolutely withstand, with a minimum amount of maintenance, the loads that are imposed upon it.

#### THE TRUCK ENDS

The truck ends in a well designed crane are usually of a box section with cast steel truck housings securely riveted in between the channels forming the side members of the truck end. In the ends of the channels are riveted cast steel truck ends with M. C. B. bearings. The pin is keyed to the wheel and revolves in round post journals on both sides. Comparing that kind of truck journal with the other type that is put on the cranes, that costs less. You simply have the two truck channels with holes bored through the end and a pin put through these holes with keeper plates to hold the pin in place, and the wheel revolves on the pin. Now you can see there that the wheel that is revolving on a pin has not the same bearing per square inch of projected area that the type of truck end has where you have the standard M. C. B. bearing with a pin keyed to the wheel, the pin revolving on a bronze bearing on both sides. Ordinarily the pressures figured in the design are about 800 pounds per square inch of projected bearing area.

In selecting truck ends for design, the size for the wheel load parts, you must consider first the service that it is to render. We will take, for instance, a foundry where you have the top crane that is at the top of the building, used for cleaning-out purposes. It goes to one end of the foundry, picks up its burden, carries it over the heads of the other cranes and goes down to the other end of the building and dumps the castings. Possibly that foundry is 300 feet long. Here you have a minimum amount of hoist duty and a maximum amount of bridge duty. The truck ends, the wheels and the bridge machinery are called upon there to perform the greatest part of the duty which that crane is called upon to perform.

We will consider, in comparison to that, the crane which is working on the runway underneath, for working on the floor. Here you have the hoist doing the greatest work. It is lifting off flasks, turning them over, drawing patterns, and the bridge travels a minimum. There you must give first consideration to the work that the hoist must do. On floor work, if a crane makes twenty lifts per hour, it is doing exceptionally well, unless a man is taking material from one part to another, as in piling up finished work.

#### THE TROLLEY AN IMPORTANT PART

Then in the consideration of an overhead crane for magnet duty, the trolley again plays the most important part in its operation. It has been found that a magnet crane, in unloading scrap, (and it seems almost

impossible that you could get that many lifts out of a crane) will make as many as 90 lifts an hour. Contrast 90 lifts an hour in a shop, and you can see that you have again got to give study to the type of trolley, its size, for a crane to perform that work. So in selecting a magnet crane, the safest manner, if you wish a 5-ton crane for magnet service, is to take a 10-ton trolley and put it on a 5-ton crane and call it a 5-ton crane because the work that the trolley can do is limited entirely by the heating of the motor. Fifty to sixty-five per cent of the hook movements are empty hook movements. The minute you place a magnet on the hook of a crane, you place about one-third of the full load capacity of the crane on the hook of the trolley. That requires more current consumption and consequently your motors heat to their rating earlier in its operation than it would for standard crane service. If you take the standard 5-ton crane trolley of any manufacturer and use it for magnet service, using 90 hoists an hour, you will find that that trolley will shake itself to pieces, irrespective of the metals put into it, in a period of three to four years whereas if you take the 10-ton standard crane trolley of any make and impose upon it a 5-ton load for magnet service, you will find that that trolley will stand up indefinitely, or for the natural life of a crane.

The truck ends are of the box section M. C. B. journal type. Where two cranes are on the same runway, they should be provided with bumpers. Bumpers are mounted at the top end of the cast steel truck ends. That is one of the safety features. Now supposing two cranes, weighing about 40 tons apiece, come together, you can see that you must have a very substantial type of truck end in order to withstand that jar. The bumpers are simply a precautionary measure so that the wheels will not come together and destroy the flanges. Covering the rail should be a very substantial rail fender. The rail fender covers the rail, projects around it, so that in case there is any obstruction on the rail, or a man's hand is on the runway rail, that might be working on an adjoining shafting or running up the column, his hand will not be crushed off. In addition rail chocks should be present on the truck end. The real chock is a part of the steel truck end casting projecting around the rail but clearing the rail so that no resistance will be offered in the traveling of the crane. In case a rail breaks (which happens quite often), the rail chocks will hold the truck end on the runway rail. If greater resistance is offered on that side, the result would be a twisting of the crane, enabling it to leave the runway; but the rail chocks would hold the rail to the runway and prevent disaster.

With respect to the end trucks on an outside crane, the wind pressure on that outside crane is tremendous and some lock must necessarily be provided to prevent the crane from running off the end of the runway in case of a storm. There are two methods of locking an outside crane: one is that the foot brake is on normally and in order to release the traveling you apply pressure to the foot brake and it releases the foot brake which is attached to the foot brake start. Normally at night the operator runs his traveling crane to the end of the runway. On the end



trucks are provided arms, and by the use of a lever the operator throws this lock right over the end of the runway which holds that securely and makes it impossible for the wind or a storm to blow that crane away from its locked position. So you have that lock, and normally the foot brake which is on in the normal position.

#### THE GIRDERS

You have various conditions to be met in the industries such as chemical plants, where gases are present, and plants where the acid fumes from the product which is being manufactured attack the metal. It is obvious that the design of the girder should be such that the maintenance men can get at every square inch of its surface with paint, in order to resist the fumes of the acid. The web girder there and the lattice box girder are the best types. The box girder is a poor type of girder because the inside is enclosed and it is difficult to get at it, in order to paint it. The box girder, which carries the bridge machinery, or the plate girder, carries the maximum amount of load. It is merely a matter of stresses to get the proper proportions of that girder, to determine its lateral strength. In cranes that operate over furnaces, especially some that are found in the northern part of this country among the copper people, in placing the mass copper into the furnaces, the crane must stand over the top of that furnace sometimes for periods of half an hour, and longer. The top of the furnace gives off a heat of 2400 degrees Fahrenheit. With ropes on the crane, the strength of them is naturally determined by the hardness of the rolling produced in the individual wires of the strands. Heat will anneal and soften those cables and render them practically useless. It has been found necessary in some instances of that type to use chains because chains are improved by annealing, although they do not give the usual warning that cable gives. The box girders are likewise again necessary because the box girder, for the same strength as an I-beam and channel construction, has more radiating surface. I am speaking with respect to short span cranes. The I-beam and channel section there can be analyzed as an infinitesimal number of fine steel wires welded together. It has less radiating surface for the same strength, than a box girder has, and consequently where heat is the criterion, you should have as much radiating surface in the girders of your crane as you possibly can obtain. The bridge machinery, the bridge motor in the box girder type is mounted on a bracket and this bracket is usually level with the floor.

#### THE FOOT WALK

The foot walk should extend solid to girder, with a six-inch angle iron bordering the foot walk, so that there is no possible chance that any tools, wrenches, or parts of equipment, during repairs, can be kicked off onto the floor. Bordering this foot walk also should be an angle iron member hand rail, and oftentimes it is specified by several of the people that this hand rail shall be fenced or covered with wire. That is a very good provision. The foot walk now is completely baffled, you might say, so that

there is no possibility of any parts being kicked off onto the floor, and as the foot walk extends solid to girder, whether it is made out of plate or wood, depending upon the service required, any particle that might be resting on that foot walk is safe from being kicked off the load.

Oftentimes the construction of the trolley demands that you have a foot walk on the opposite side. That is very desirable because you always must perform work on that trolley on one side or the other and in order to save expense to the purchaser, a short foot walk is usually put on the opposite side, where the trolley is of such design that to get at it you must provide a walk there. In the past some of the purchasers have required that we build a foot walk over the end of the bridge. If you have plenty of head room, that is possible, but usually the head room is barely enough to put a foot walk over, and it is common practice by a number of people at the present time especially when building costs are excessive to reduce the height of the building a foot or two and then pay the crane manufacturer a couple of thousand dollars more to design a special crane to get into the limited head room. When a crane manufacturer gets to that point, his production is decreased because he must give time, if he accepts this order, in order to get out the crane that will go into that head room. It means that he must get more for it because the majority of the buyers are buying standard types of cranes. So that is an obsolete pattern you might say, that you have no use for.

#### THE TROLLEY

The trolley parts are the trolleysides, girts, gears, gear cases, drums, and electrical equipment—the electrical part is the limit switch. The trolleysides on a good high-grade trolley should be the box section. The girts should be of structural steel. The equalizing sheave is usually placed within the girt. The motors, if they are for a standard type of service, are mounted on the trolleysides. If they are of the mill type, two girts are usually placed in between the trolleysides and the mill motors are mounted in between the trolleysides. The gear cases are totally enclosed, and the individual reductions are placed within these gear cases and they run in oil. The specially desirable feature of the entirely enclosed trolley gear case is that one reduction is found in each individual case, which means that both of the bearings are contained within the same casting, and consequently your gear centers will always be maintained. Where it is necessary to have three bearings in the same casting, where the drum comes over to the rear trolleyside, the second reduction will be on the same side. The top casting holding those bearings should be in one casting, so that the two centers would be maintained, and the third bearing for the drum on the rear trolleyside should have a recessed housing. That will hold all of your bearings in alignment.

#### THE TROLLEY BRAKE

There are many different types of trolley brakes on the market. There is the trolley brake of the multiple disc type and then there is the trolley

brake that is of the brake type which is used in a frictional contact with the surface of the pulley. They all seem to hold up.

#### THE LIMIT SWITCH

The function of the limit switch is to stop the upward travel of the hoist. The most universally accepted type of limit switch is one of double weight type. Springs are undesirable on any of that nature. The weight that is raised by the block is heavier than the weight that is attached to the switch on the box. The block is fitted with a pan, and attached to the weight is a loop of rod-iron; the two cables coming from the equalizing sheave pass down through this loop of iron attached to the weight. This lower weight is attached to a shift wheel of the sheave by a cable. As the hook block travels upward, it is guided so that the pan will strike that weight, irrespective of the swinging of the lower load block. As it carries up the weight, the weight on the sheave will open the contact, this being merely a relay circuit, and it will open the contact with the cage. That contact is simply this: connected with one side is a wire of low amperage connected with your switch box. Then the other plunger runs over through your coil on your contact or circuit brake, if you wish to call it that, to the other side of the line. The instant the switch is thrown in, the contactor closes the circuit; the limit switch is closed on the hoisting position. Now as the block raises the hoists, it lifts the weight; the other weight on the sheave pulls open the contact which is nothing more than a keeper plate across it; it interrupts the circuit of the magnet coil and your contactor opens, and on your dynamic brake, the instant it opens a contact is made on the bottom of the shift. It makes the motor perform as a generator until the brake on the motor shaft has time to act. That has been found to be one of the best methods of control.

#### THE CRANE CAGE

There are cages of various types. Some are enclosed; some are too small for a man to move around in. We have made all kinds of them; so have all the other manufacturers. A cage should be roomy. It should have ample space so that the operator can move around in it; so that he can view all parts of the building, so that he can look down over the front of the cage and can look to one side or to the other. If the manufacturers would buy a crane like the manufacturer of cranes would like to make it, I know every crane manufacturer in existence would put every possible safety feature on a crane.

The finest type of crane cage that any one could ask for is one that is roomy, which has a lever stand in the front, so that in hoisting you lower your lever forward. Hoisting backward, the movement of the lever then indicates the direction in which the hook is going to go. Some men have even gone so far as to state that in breaking in a new operator they would like to have the bridge motor controller on this side (indicating), so that he would push his lever back that way, and in going this

way he would push the lever over that way (indicating). But we have to put them all in the front of the cage.

The back of the cage should contain the controllers and the switch-board equipment. That should be enclosed; and when the main line switch is thrown in, there should be a lock on those panel doors, so that there is absolutely no chance of the operator or anybody else opening those doors for any kind of work until the main line switch has been pulled out, which then would not lock the doors. That undoubtedly would be the best type of crane, because operators very often have been jostled and have fallen back against switches and the lock. Any projections on the doors would necessarily mean that a man walking along the inside of the cage could possibly catch his garments on them and it might arrest him in his work one way or the other.

A new place has been found for the resistances. The resistances have been mounted on the side of the cage and on the foot walk. One of the nicest places is on a sub-floor under the floor of the cage, on which the operator walks. Trap doors lead from this floor immediately to the sub-floor beneath, that can be opened, and all the resistances are immediately available for his inspection. In case the resistances are mounted on the bridge walks, repair men and the like can get up there, they can probably use it as a rest for tools, screw drivers, and the like which sometimes fall between the resistances, short circuit them, and the result is that you have a blowout and your crane service is held up. By placing them underneath the floor you have a space there entirely for the resistances, that can likewise be screened in, and it is always there for inspection; it is not used as any tool rest, and it is simply a space reserved for the grid resistances. The general purchasing public appreciates that and in many instances we have found that they have insisted that their buildings be made higher, in order that the resistances can be housed and mounted on a sub-floor.

#### LOCATION OF LADDER FOR BRIDGE WALK

The ladder going to the bridge walk should be in such a position that the floor of the cage is always beneath the operator. You have often-times seen a number of traveling cranes in which the operator has to climb up and swing on the outside of the cage, and then climb up this ladder to his foot walk. Our company is just as guilty as the rest on that, because that used to be common practice years ago. It is not so any more. In case the operator is subject to fits, etc., that employer does not know the habits of his employee, and the man would not only be likely to injure himself but he would also endanger the lives of the workmen working underneath the crane. Therefore, by having the ladder from the cage to the foot walk, so that the floor of the cage is always beneath the operator, you eliminate that hazard that the operator or some one else might fall off to the floor.

#### TRANSFER CRANES

The transfer crane, so far as the bridge part is concerned, is the same type, in construction, truck ends, and girders as the bridge of the stand-

ard traveling crane. Attached to the box member that spans from truck end to truck end is an I-beam, the I-beam being mounted on its lower flanges, either T-rails or what is known as the cross-section of the American Bridge Company; that is an angle iron which has one of its legs rolled to take the angle of the standard I-beam, but the tread on which the wheel runs is horizontal; it is used to a considerable extent in mills, chemical plants, etc., where acid fumes are present. The structure is painted with an asphalt paint, but the surface of the whole track cannot be painted because the trolley wheels of the monorail hoist are running over this track continuously. The result is that the tracks are being pitted by the acid fumes.

In the registering of the transfer crane, with its spur, it is necessary that some exact method of registering and locking be placed on that crane, as well as baffling. Sometimes a crane is locked on both sides simultaneously; sometimes a crane locks alternately, first on this side and then on that side (indicating). That is done by a locking device. It is necessary to register that crane exactly because if it is not registered exactly, you are going to have trouble with your truck ends and a gradual bumping and wearing away of the parts.

#### VARIOUS METHODS OF REGISTERING TRANSFER CRANES

There are different methods employed in the registering of transfer cranes with the spur runways and different methods of locking. One is that of coming up with a target two points like this (indicating). The instant that the targets come together, the operator stops; traveling very slowly, of course, and by assistance of the bell cranks in a lever connected to the cage throws in a pawl. The motor to the cage is in a monorail hoist. As he throws in that pawl, the baffles are raised on the I-beam, which holds the case control monorail hoist on the transfer crane as it is passing back and forth in the base, and keeps it from running off the ends, either side, in case the operator should momentarily be overcome or forget that he is near the end of the crane. Those baffles are either of the interlocking type, which come into the end of the beam, or of plate metal, which falls down in this manner on both sides and engages in the truck ends. As soon as a register is made, in case there is a transfer crane in the next bay, that he wants to run onto, spur baffles should be put on the spurs that work in connection with the baffles on the transfer crane. The other type of baffle, as I explained, is one that drops down, this way (indicating) and that is actuated by the throwing of a lever, which throws out two rods. The function of the one rod is to ride along a plate that is made in that manner (indicating), as it rides along this plate and comes to the top, registration is made the instant that that rod comes to that position. Back here about two feet from the end of that plate is the baffle; the baffle arm that raises the baffle and gives clearances, so that the monorail hoist can pass underneath. On another plate over at this side, which is notched in this manner (indicating) is then a square bar that falls into position there and holds the transfer crane into place.

In the spur connection, where it is necessary to baffle the spur, this rod that comes up in this manner raises underneath the long angle that has its pivot point back there (indicating), with another arm here raising up this baffle, and as the arm from the transfer crane raises up in this manner, it likewise raises the baffle upon the spur. If there is a transfer crane in the adjacent bay, it is likewise baffled.

The operator is in position to travel over any system of runway that you might have; he is registered; it is locked; it is impossible for any one to take that bridge away until he comes back.

In traveling over the runway, we encounter switches. Switches are again baffled, the same as I have mentioned with respect to these plates; that is, with the plate sections that drop down over the I-beam. The spurs as well as the tongues must be baffled because you can see that a tongue can be thrown into a central position in between the two spurs and if the tongue is not baffled, the operator could run right off the end of the I-beam. The other type of baffle, which is more secure than the type that drops down, is made out of plate, because this type that drops down this way (indicating) is made to conform to the standards of the hoist. In case you put a smaller hoist on it, it might run right in between the baffles. So the baffle would have to be changed in the event that you were to make a change at any time, by putting another hoist on the runway.

Then there is the interlocking type of switch in which a section is cut out of the side of the I-beam and a heavy cast steel arm comes right in there in this manner (indicating). The locking part is a section of metal, possibly about that long (indicating), about that high, two inches thick, connected to a very strong arm. As the switch travels from one side to the other, we will say it is lined up on this spur going off to a curve, this lock is off in that position, and as the I-beam tongue of the switch travels over here, this lock moves over to that point and locks in position, and opens this one. In order now that the monorail hoist will not fall from the runway, it is essential that some provision be made in the matter of safety catches, to prevent it from leaving the runway. One type employed is a steel collar which is cut in half and bolted around a turned portion of the trolley part, which is steel, and the frame part of the hoist which is steel, with about one-eighth of an inch clearance in between. In the event of a cage pin breaking, these two curved surfaces, or the collar, would hold that right into place and prevent the hoist from falling. This type of lock has the advantage over the other type in that you can travel to any point for repairs, but before you can make the repairs it is necessary to fasten the monorail in position by a chain, to take up the distance that the hoist body has fallen on account of the king pin breaking.

The other type consists of two steel castings that fit over the lower range of the monorail I-beam, but still with sufficient clearance so that it offers no friction to impede the travel of the monorail. In the event of a king pin breaking, the safety catches would fall on the runway; the hoist itself would stop right there, until you had gotten chains and taken up the slack, so that you could run to a point to repair the machine. The

safety catch is just as good as the other type, and it costs about one-third of the price, and that oftentimes makes a big difference to the man who has his hands on the pocket book.

That covers pretty generally the field as far as safety features are concerned. The cage on the cage controlled monorail hoist is the same as that on the traveling crane, only that a man riding on a monorail hoist should have a cage adapted so that he can be seated at his work. On account of handling long loads, the glass should extend way down to the floor, baffled with rods of iron or angle iron in front, so that the loads swinging back and forth will not break the glass. In the floor of the cage should be a good section of heavy plate glass, so he can look downward; in case he has an 85 or 90-foot lift, he can then see the movements of his hook. If he is handling a bucket or a magnet, and control his hook and the movements of his crane as he wishes.

#### ELECTRICAL MAINTENANCE

We now come to the repair item, which is electrical maintenance. That is very hazardous, especially where you have to employ operators who do not understand the general conditions about the plant. Oftentimes when work is being done on the crane, the repairman goes for some tools or some materials and somebody get up into the crane and starts it off, and if a man is working, he is injured. There are two ways in which that can be overcome. One way is by placing in the cage a cabinet containing the main line switch, which is absolutely locked, and the repairman, who is working on the crane should keep the key to that lock in his pocket. As soon as he is instructed to make any repairs on that crane, he goes up, unlocks that lock, opens the door to that cabinet, pulls out the switch, closes the door and locks it, and he keeps that key in his pocket until every last repair is made on that crane. That works out all right when only one man is working on the crane, but supposing there are two or three men working on that crane, that means possibly one fellow who is holding the key might finish his work before the other fellows do, and the result is that he would be waiting on the job until the other fellows were finished. So that the best system which has been found and used is that in one side of the line you place the series of plugs, the type that is made right in your own repair shop, and have a series of two, three, four, five plugs on this side of the line. The minute one of your repairmen is instructed to repair anything on that crane, he takes one of the plugs out and puts it into his pocket, and he keeps that plug in his pocket until that job is completed. If two men are on, each man has one of those plugs in his pocket. Now that absolutely insures that the crane cannot be operated until all of those plugs are placed back in their receptacles, and it insures that no danger will be occasioned by any one in the plant getting into the cage and starting off the crane, because no current can flow through until all of those plugs are in.

All equipment should be blown off at least once a week. In many plants it is found that they give the oiling to a certain individual. That might be necessary in a large plant, but in a small plant where there are

a comparatively small number of cranes, the crane operator should have entire charge of that crane; he should be charged with the responsibility of seeing that the crane is in good running condition, and he should know at any time of the day what the condition of his crane is. Good common sense on the part of the operator; that he is watchful; that he gets his night's rest; that he is alert and awake while he is in that cage: these are all very essential. A man who is awake in a cage and knows what he is doing, can make more money—(and it has been proven so time and time again) than a foreman on the floor, because in order to get out material, you must move those materials by machines.

CHAIRMAN OARTEL: I am sure this talk will furnish a very valuable contribution to our minutes, and that it will be very useful to refer to when any of you want to buy a crane.

Now have any of you any questions to ask Mr. Prakken?

#### DISCUSSION

MR. FRANK LABARRER (Carbon Steel Co.): Mr. Prakken has gone over this limit switch proposition very nicely and comprehensively. While I understand fully how it is operated for the upward motion, I do not understand how the contacts are made for the downward motion, when the switch is in operation.

MR. PRAKKEN: The down motion is not connected in any way with the limit switch. The contacts are made to the control, and then for lowering they are made through the controller. The limit switch only works in the upward direction.

MR. LABARRER: In connection with the progress along the lines of lever control, Mr. Prakken has mentioned there is a precautionary measure of covering some of the parts of the resistance as it was likely that the operator would be thrown against the contact points. Now I would like to know what progress is being made as to a centering device for this labor operation, so that if the operator falls, the lever comes to the center automatically?

MR. PRAKKEN: Mr. Labarrer, the centering device is usually a notch, and on the lever type I do not know of any device that is out, excepting some that require a man absolutely to bring it to one point and lock it there. It would require some heavy types of springs. There are springs that will throw the controllers off in places; that is in the cage, but we have not furnished any of them, I will admit. But on the floor control hoists, where the man is walking along a floor and is apt to stumble, with pendant ropes, the controllers are of the spring type. The instant you let go of a rope, the controller will throw itself off, irrespective of hoisting or traveling in either direction.

MR. LABARRER: Then you will admit it is a question for treatment?

MR. PRAKKEN: Yes sir.

MR. HOMER J. WEEKS (American Steel & Wire Co.): I should like to ask the speaker how many brakes he recommends on the hoist of a crane of 25-tons capacity and upward?



Maybe I can state that a little clearer in this way: The dynamic brake is simply a retarding brake; it doesn't hold the rod. Do you consider that one solenoid brake is sufficient in connection with the dynamic brake, or would you recommend putting on one brake on your armature shaft and one on your intermediate shaft?

MR. PRAKKEN: There are usually two brakes placed on a crane of high capacity: one on the intermediate shaft and one on the motor. In connection with that, the magnetic switch panel is almost always put in a cage.

MR. J. A. NORTHWOOD (Cambria Steel Co.): Due to some criticism sent in to general headquarters in Chicago regarding standard signals for crane, the headquarters asked Mr. Oartel, Chairman of the Metals Section, to appoint a committee to look into this matter. This committee was appointed, with Mr. H. K. Burgwin of the Crucible Steel Company as Chairman. The committee met and went over various standard crane signals and from that they have drafted a new schedule, which we wish to make a report on today. Mr. Burgwin was unable to be present and asked me if I would make this report.

A meeting was held in the office of the Chairman of the Metals Section, Carnegie Building, Pittsburgh, on Tuesday, August 31, 1920, at which the following schedule was adopted unanimously:

I am not going to take the time to read these various standards, and we only wish to send this to the headquarters office, where of course it will have to be approved by an official committee, but we would like to make this report at this time.

CHAIRMAN OARTEL: All right, Mr. Northwood, this will be referred to headquarters in the regular way, and they will refer it to the Safe Practices Committee, who will give their comment or criticism on it, and it will be handled by the new officers.

Our next topic is "Safe Practices in Blast Furnace Operation", and our speaker is Mr. L. A. Touzalin.

### SAFE PRACTICES IN BLAST FURNACE OPERATIONS

L. A. TOUZALIN. ASSISTANT SUPERINTENDENT BLAST FURNACES, SOUTH WORKS, ILLINOIS STEEL COMPANY, SOUTH CHICAGO

A description of safe practices in blast-furnace operations from an operating man's standpoint includes the consideration of safety devices and the best methods of promoting safety thinking. As a rule, the operator is not familiar with statistical details and you will, therefore, pardon me if my treatment of the subject neglects to a certain extent this side of the question.

When the "safety first" slogan was first seriously taken up by the industries of our country it was perfectly natural that the installation of safety devices should receive first attention. For several years such installations could not be carried on fast enough to meet the needs of the hour. In fact, the average operator's first definition of a safety inspector

would probably be "a pestiferous individual whose business it was to hound the operating departments with the everlasting question: 'When is the installation of such and such a safety device going to be completed?'" Comparatively little attention was paid to the study of the best methods for promoting "safety thinking." Prizes, buttons, bonuses, etc., were awarded to those who proposed the best safety devices to overcome well known serious mechanical hazards. Gradually as such safety devices came into more common use it became noticeable that while the diminution of accidents was very gratifying, it was, nevertheless, not in proportion to the installation of such equipment. It was then first realized that the concentration of effort in developing devices had possibly overshadowed and neglected to a certain extent the practice of teaching workmen to *think* safety. Developments during the last few years have made it more and more apparent that the greatest weapon for cutting down accidents is the instilling of safety thinking in the minds of the workmen. I believe that the majority of blast furnace superintendents would prefer to operate a plant having a well-trained *safety thinking* organization than a plant containing most of the up-to-the-minute safety devices known, with an organization indifferent to safety *thoughtfulness*.

Mr. McKenney, in his paper on Safety Committees, has discussed the methods employed by our various departments at South Chicago, to stimulate the thinking of safety in the minds of the workmen. As he has pointed out, the success which these methods may achieve depends, to a large extent, on the interest and co-operation of the men at the top, assistants and foremen. Blast-furnace executives can display this interest by frequently attending the meetings of their committees and by strongly enforcing the proper and continuous use of safety methods, rules, and equipment. If safety equipment is neglected and allowed to stand idle or out of repair, the workmen are not slow to infer that the term "safety first" is a catch phrase only, and not a high ideal, and token of appreciation of the value of human lives.

#### BLAST-FURNACE HAZARDS

The consideration of safe practices around blast-furnaces naturally hinges on blast-furnace hazards; for the greater the hazard the more intense should be the application of safety methods. If time permitted, it would be interesting to start at the docks, proceed through the stock house to the furnace tops, from the tops to the cast house, and from there to the pig machine, ladle house, etc., and trace the gradual development of safe practices and equipment to overcome hazards encountered at these points. In the limited time at our disposal, however, we must be content to dwell upon the most serious of these hazards only.

All blast-furnace men will undoubtedly agree that the most serious hazard in connection with the operation of iron blast-furnaces is the handling of blast-furnace gas. While it is true that the improvements made in blast-furnace construction and operating during the last ten years have largely reduced the necessity for workmen to come into contact with furnace gases, these very improvements, to a certain extent, have

made the gas more treacherous and dangerous to the operating crew should they come into contact with it. In the days of hand filling the top fillers were apt to consider a gas headache as a normal condition under which their work was to be done. The men were wont to boast as to their ability to "eat the gas." These men were brought down from the tops and scattered along the cast-house gangs by the replacement of hand filling by the automatic skip hoist. Shortly after this new development, the use of washers for cleaning the gas was inaugurated, and when these same "gas eaters" encountered their old friend in a cold, wet, and clean condition they received a severe shock. They suddenly discovered that their former boast of "knowing when they had enough gas" was no longer applicable. They had simply to take a whiff or two and Presto!—they were out of business. They failed to realize that the gas, which had formerly been fairly visible, hot and light enough to rise and diffuse rapidly, after being washed, had become practically invisible and odorless, and of such lower temperature and greater density that its presence was not apparent until it had made itself evident by its sudden effects. There was a period when several serious gas accidents were required to convince these old timers that a change had occurred in the properties of blast-furnace gas. It did not take long, however, to demonstrate to all concerned, that the only safe way to treat washed blast-furnace gas is to stay away from it.

#### WHEN A BANKED FURNACE RESUMES OPERATION

One of the greatest gas hazards is the seepage of gas through furnace walls, foundations, and surroundings whenever a banked furnace resumes operation. At such times gaseous areas will accumulate in most unexpected locations, and too much emphasis cannot be laid on the importance of the most rigid watchfulness at this time. At South Works our experiences during the past two years of alternate banking and "blowing up" have resulted in the following method of procedure under such conditions. Just before blowing up, two or three of our practice men are sent out to gather the men into groups and to explain that the furnace in question is about to resume operation. Each man is instructed to watch his fellow workmen. The Blower assigns a partner to each man whose presence somewhat near the furnace is necessary, and these men are instructed to watch each other for any symptoms of the effects of gas. Patrols, in pairs, are placed at safe distances from the furnace and at locations which will enable them to see and prevent any one approaching the furnace from any direction.

Many accidents have resulted and many lives have been lost by men working in a furnace or in its gas equipment when such furnace was out of blast and disconnected from other furnaces by water seal only. In unaccountable ways the water has been lost at the seal or violent slips on other furnaces have blown enough gas through the seal to cause serious trouble. The only positive means of preventing such accidents is the ironclad law prohibiting any individual or group of men, under ordinary operating conditions, from working at any location in a furnace, dust

catcher, washer, dryer, water seal, or any part of the furnace equipment where he is protected solely by a water seal. When such work is to be done the furnace in question should be protected by a plate or goggle valve. This positive means of protection becomes very simple if water seals with adjacent flanges for plate valves are installed just beyond the dust catcher and just before the clean gas main. At South Works each of our eleven furnaces is now so equipped and it is possible to shut off any individual furnace by first filling a water seal and then turning a goggle valve or inserting a plate on the dead side of this seal. Under extraordinary conditions, occasions may arise when it is necessary to send a man into a place protected by a water seal only, but in such cases the man doing the work should either wear a gas helmet, or where impossible to enter so equipped, should have a life line securely tied about himself, and extended to a safe location outside of the manhole.

The ordinary manhole provided in dust catchers, washers, gas mains, etc., is of such size that a man under normal conditions can just about squeeze through. It is an exceedingly difficult task to get a man through the hole if he is in a partial or completely unconscious condition. In all future construction man-holes should be made large enough to admit freely a man fully equipped with a gas helmet apparatus.

Provision is made on all of our furnaces for inserting a goggle or plate valve in the main when a furnace is to be relined, banked or down for repairs, as mentioned above. In some cases, however, the necessity might arise for repairs to be made at some point in our gas main where such provision cannot be made. In such a case, when men are working behind a water seal only, it is our practice to have the water seal carefully inspected regularly, the inlet and overflow outlet, water valves locked with safety locks, and the bottom discharge valve securely blocked or locked. We believe that these precautions carefully followed will adequately protect men while working in such locations. Where provision is made, it is our practice to insert the goggle valve or plate when men are going in a main, and to have the water seal also full as an extra precaution.

#### INSPECTION AND CARE OF BREATHING APPARATUS EQUIPMENT

From a safety as well as an operating standpoint every blast furnace plant should have an up-to-date, self-contained, breathing apparatus equipment, but it must be borne in mind that the most efficient gas helmets made are only safe when they receive constant attention in keeping up the equipment and when worn by men who have been thoroughly trained until they feel absolutely familiar with the apparatus. The responsibility for maintaining our gas helmets in first-class condition was at first put up to certain men in each branch of the department, but this plan did not prove a success and for the last two years we have had one man whose sole duty it was to keep our 21 gas helmets in first-class usable condition at all times, and to take charge of training our helmet squads. Our breathing apparatus is housed in wooden cabinets with glass panel doors. These cabinets are of sufficient size to allow each set of apparatus to be hung at the height of a man's shoulders. They were designed with

two purposes in view. First, to make the apparatus accessible and ready for instant use or inspection. Second, to protect the apparatus from dust. The apparatus is hung completely assembled with the exception of potash cartridges, which are kept on a shelf immediately above the helmet. When a man desires to use a helmet for relief or emergency work, he inserts a new potash cartridge and, after putting on the apparatus, tests it thoroughly for leaks. If he desires to put on the helmet for practice work only, he uses a potash cartridge which has been previously used for this purpose, and is sealed with rubber stoppers. Our helmet man systematically inspects each helmet once a week. If the helmet is in first-class working condition he attaches a seal, and should this seal be found broken at any time it is an indication that the helmet has been in use since his last inspection. A written report is filled out after each inspection and a copy submitted to the Assistant Superintendent in charge of that particular department.

Before the World War it was difficult to instill confidence of the workmen in gas helmets but the trench helmets used for gases other than carbon monoxide received so much publicity in our newspapers during the war that men have lost, to a great extent, their fear of them. Each of our departments has a helmet squad consisting of men who have been examined by the Company physician and thoroughly trained in the use of the equipment of our helmet man. This squad is made up of day and night men and at least three are always on the job on either day or night turn at each group of furnaces. A siren whistle is blown in case of any gas emergency and all helmet men immediately proceed to the nearest helmet station and prepare to enter the gaseous area. Drills are frequently held, and several times during the past year certain men in the relief squad have been told to hurry to the office, get on a helmet and rescue a man from the bustle pipe of a furnace. When the relief man arrives at the bustle pipe he finds the foreman lying down beside a bag of sand. The foreman then directs him to lower the bag carefully to the ground. The best record made so far is a total of  $5\frac{1}{2}$  minutes from the time the man started to the office for his helmet, until the bag of sand touched the ground below the bustle pipe. The furnace in question was located about 500 feet from the office.

One of the most recent developments in appliances to assist in overcoming the hazards of blast-furnace gas is the appearance of a new carbon monoxide detector, which I note will be discussed by a later speaker. It may be stated that should this instrument be found practical and positive it will fill a long-felt want in blast-furnace practice.

#### HOT METAL AND CINDER BURNS

Considering the next serious hazard after gas, we come to hot metal and cinder burns. Here again emphasis must be laid on the importance of safety thinking. And a safety-thinking workman thinks for the other fellow as well as for himself. The best evidence of safety thoughtfulness in an organization is the care and advice which older furnace men bestow on new employees in regard to safety precautions. In these days of

great labor turnover this lack of watchfulness of the older men over the less experienced may be the cause of many accidents.

Several devices have been brought into use during the last few years to counteract the hazard of burns around blast-furnaces. Among the most important of these may be mentioned the Bates Cinder Notch Stopper, the Berg Automatic Mud Gun and the Mullin Tapping Machine. At South Works we are at present installing the Bates cinder notch stopper on our furnaces as they are relined, and our experience with this device so far promises good results. Like all new equipment, it will require months of use to obtain the confidence and appreciation of the men. Insistence is often required to establish the routine use of a safety device, which, once established, is henceforth an absolute necessity. We have not as yet had experience with the mud gun and tapping machine, mentioned above, but have heard some recommendations and some criticism of both. Two devices which have recently been put into use in our plant and which tend to cut down burns from splashing and sparking at the iron notch are a chain screen which is lowered in front of the hole at the end of the cast and through which the mud gun muzzle is inserted to stop the hole, and a splasher plate which is raised above the trough, and swung away from the hole at the end of the cast, by one man, operating a hand wheel, at a safe distance from the furnace.

The keeper, first helper, and cinder snapper of each furnace are required to wear safety leggings whenever the iron or cinder is running, i. e., at flushes or casts. These leggings were unsatisfactory as originally purchased on the market, but with some few changes to make them lighter and more flexible are now well thought of, and freely used, by our furnace men. Wire masks are sometimes used by the keepers when they close up the hole. These do not impede the vision and are preferred by our men over goggles. Two other devices which tend to cut down burns in our cast houses may be touched upon. One is the arrangement of sheaves and cables which are used to pull all shutters from a safe distance, thus making it possible for the man doing this to keep out of range of sparks or shots of iron. The other is the heavy cast-iron bridges which are conveniently located at several points along the iron and cinder runners. These bridges make it possible to cross the runner without danger of stepping or falling into the stream of molten metal or cinder.

#### MECHANICAL HAZARDS

Taking up next the mechanical hazards, the skip hoist undoubtedly stands first as the source of accidents. It is true that the use of safety locks, rigidly enforced, has done much to overcome the great element of danger due to the possibility of men being run over, crushed, or caught by moving parts, but in spite of this safeguard, near accidents have demonstrated the necessity for some method of quick control to check the movement of the skips, should a man be found to be in danger. In order to take care of this condition we have installed safety switches, readily accessible to any one standing at the side of the skip pit; so that by simply throwing a switch the power is cut off, and brakes automatically applied to the hoisting machinery.

As our furnaces are relined all skip inclines are covered, on the bottom and sides, with steel plates to prevent injury to those below from falling material.

Owing to the compact construction of stock houses, serious collisions have occurred between scale cars where one car happened to be stationary under breakdown repairs, and the other operating. Men working under the stationary car have been injured from the resulting shock. In order to prevent such occurrences, our stock houses are provided with suitable skids which are placed on the rails at a safe distance from each end of a car under repairs to protect same.

The usual form of snorting valve used to by-pass the cold blast into the atmosphere, when it is desired to take the wind off the furnace; and the blow-off valves, which are operated to release the pressure from stoves taken off the furnace and put on gas, have given blast-furnace plants the reputation of being the greatest noise producers in steel mills. It is safe to predict that within the next few years blast-furnace plants will be operating as silently as any other department of the mills. Patent blow-off valves are now on the market which permit the discharge of air from three-pass stoves to be directed into the stacks. The muffling of two and four pass stoves is easily accomplished by connecting the blow-off valve directly to the draft flue. The snort valve may be muffled in the same way; i. e., by connecting the outlet to the draft flue. Both of these plans are at present in use at South Chicago and we believe that the elimination of these violent noises is conducive to greater safety to the operating force; not to mention the prevention of partial or complete deafness to the man whose duty it is to operate these valves.

The above items are the most important of a vast number of improvements and safe practices, or devices, which have been brought forward during the last decade. Statistics show the wonderful results of the continuous efforts being made to safeguard human lives in this field of industry, and there is no reason why this progress should not continue until blast furnace accidents closely approach the irreducible minimum. It is certainly true that the reward, in the satisfaction that lives have been conserved and suffering greatly alleviated, is sufficient to justify the efforts required to maintain eternal vigilance in the daily routine of the manufacture of iron, the master metal.

CHAIRMAN OARTEL: Are there any questions you wish to ask Mr. Touzalin; or is there any discussion?

I just wish to state that the CO Detector will not be demonstrated today; it will be demonstrated tomorrow, as we are putting on our practical demonstration of the investigation of an accident today, just immediately following this.

With your kind indulgence while we shift a little scenery, we will put on the demonstration. Before putting it on, I would just like to make an announcement in regard to it. You remember at the Metals Section meeting at Cleveland last year Mr. H. J. Weeks, of the American Steel & Wire Company, staged a Court of Inquiry, which met with so much favor on the part of those in attendance, that your officers decided

to put on something along the same line this year, and so we had prepared by Mr. J. R. Mulligan, of the Bethlehem Steel Company, this practical demonstration of the investigation of an accident. You will see on the stage, when the curtain is drawn, a machine shop office, with all the equipment. The characters I wish you to note, which we are trying to emphasize, are two foremen, William Light, who is a Twentieth Century foreman, and his treatment of a new employee. The other is Samuel Stone, an old-time foreman, and his treatment of the new employee is very different.

## FIXING THE RESPONSIBILITY FOR AN ACCIDENT

### A SKETCH

PREPARED BY J. R. MULLIGAN, SUPERVISOR, ACCIDENT PREVENTION AND EDUCATION, BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

#### CAST OF CHARACTERS

1. William Light, A 20th Century Foreman, George T. Fonda
2. Sam Stone, Foreman, "An Old Timer," W. E. Watters
3. George Brown, A Guide Boy from the Employment Office, D. P. Kennedy
4. Frank Cole, A Bench Worker in the Machine Shop, V. A. Lewandowski
5. James Smith, A Bench Worker in the Machine Shop (Also a member of the Shop Safety Committee), J. A. Northwood.
6. Leo Wise, A Shop Clerk, J. H. Jeffery
7. Thomas White, Operator of Lathe No. 2 in the Machine Shop, F. A. Nilles
8. Harry James, a New Employee, W. E. Megraw
9. Roy Lang, a New Employee, J. R. Mulligan
10. Charles Metz, A Plant Safety Inspector, H. E. Steinmetz
11. John Telford, Superintendent of the Machine Shop, J. A. Oartel.

#### PART I

#### SCENE FURNISHINGS

A combination office-workroom in the machine shop.

A work bench with vise and hand tools, emery wheel in operation, foreman's desk, table with blue prints, First-aid kit, safety signs, telephone, chairs, etc. (Arranged as per sketch.)

#### ACT I

Frank Cole and James Smith at work at bench.

William Light, foreman, writing at desk.

Enter at Door "A"—George Brown, a guide boy from the Employment Office, accompanied by Harry James, a new employee. Foreman Light



arises from his desk and steps forward to meet them, Brown introduces James to Foreman Light who shakes hands with the new employee and gives him a hearty welcome to the shop. Light questions new employee as to his former machine shop experience, then introduces him to Cole and Smith at work bench (both greet the new employee warmly and tell him they will be glad to help him in any way possible). Light gives James a Safety talk on the general hazards of a machine shop, presents him with a pair of goggles, takes him over to the emery wheel, puts on the goggles and shows him how to hold a tool or job when grinding, tells him of the necessity of wearing goggles when grinding and in all other cases where flying particles are liable to strike the eye. Light tells James of the necessity of keeping tools in good shape as "mush head" tools are both inefficient and dangerous to the user. Light gives the new employee instructions about punching time card, starting and quitting time, lunch hour, tool room, toilet facilities, etc. Tells new employee to come to him for any information he needs, that he will be glad to help him in any way possible. Foreman Light now selects a blueprint from table and accompanied by James exits at door "B" into machine shop proper where he assigns James to work on lathe No. 1. After introducing him to Thomas White, operator of Lathe No. 2. (As the new employee passes Cole and Smith at the work bench, they wave to him and both say "Good luck.") Smith and Cole converse at work bench after which Smith puts on goggles and grinds tool at emery wheel. Foreman Light enters at door "B," he is accosted by Cole as he passes the work bench, who questions him about the work. Light replies in a very cheerful spirit and then passes on to his desk. Smith finishes grinding at the emery wheel and resumes work at the bench.

Enter new employee, James, at door B, stops at work bench and shows "Mush head" tool to Smith and Cole, tells them he is going to take Foreman Light's advice and keep his tools in safe condition. Passes on to emery wheel, puts on his goggles, grinds tool, finishes and exits at door B.

CURTAIN

PART II ACT II

(Scene and furnishing same as in Act I.)

Cole and Smith at work at bench.

(Foreman Stone sits writing at desk.)

Stone arises from desk and goes over to work bench, finds fault with the work of Smith who shows Stone that his work is done according to the blueprint. (Smith and Cole show that they resent the attitude of Stone and also that they are afraid of him.) Stone gives a tirade against what he terms "Sunday School Management" and concludes with the statement that he will not brook interference from any one and that he will run his department as he "Damn pleases." Stone resumes seat at desk and writes.

Enter Brown guide boy at door "A" accompanied by Roy Lang, a new employee. They both advance to center of room. Stone scowls at them

from desk and resumes writing, keeping them waiting three minutes. Stone finally arises and starts toward exit B, is accosted by Brown who introduces Lang to him. Stone does not acknowledge the introduction but snatches the employment card from Lang's hand and scowls at him as much as to say "What the —— are you doing here." Stone looks at card and with evident incivility, questions Lang as to his previous machine shop experience, questions the veracity of Lang's replies. Finally Stone snatches a blueprint from table, hands blueprint to Lang, roughly pushes Lang toward door B and following Lang to door points to Lathe No. 1, in machine shop and tells Lang "Get to work."

As Stone returns from door B he is questioned by Cole as to a detail of his work. Stone gives a very uncivil reply and passing on resumes seat at his desk and writes.

(Cole and Smith converse and shake hands.)

Enter shop clerk, Leo Wise at door A. Papers in hand, advances to Stone's desk, seeking information as to finished material. Stone gives uncivil reply, swears, arises as if to throw Wise out of the office. Exit Wise hurriedly. Stone gives another tirade on present "Red tape" methods as compared with "Old time" methods and then resumes writing.

Enter Roy Lang at door B with tool in hand for grinding, advances three steps in room and looks toward Cole and Smith, hesitates as though he would like to have information but is reluctant to ask for same from men he does not know. Advances to center of room, hesitates and looks toward foreman who is writing at desk, looks about and sees emery wheel, takes one step toward it, again hesitates and looks toward workmen and then toward foreman. Finally Lang advances to emery wheel. (As he does so foreman Stone turns around, notes Lang's going to the emery wheel, and then resumes writing.)

#### THE ACCIDENT RESULTING IN THE LOSS OF LANG'S RIGHT EYE

Lang looks about emery wheel as if looking for something. Not finding it, hesitates, looks across room toward Stone, again hesitates, and then with evident reluctance starts to grind tool on emery wheel. Grinds tool for about one minute, then drops tool to floor, covers face with hands and shrieks "My eye, my eye," staggers and falls to floor. Smith and Cole rush to his assistance, raise him from the floor and seat him on a chair. Smith gets First-aid kit and prepares to give First-aid, examines Lang's injury, then rushes to shop telephone and summons the Plant ambulance, returns to assist Cole in applying bandage to Lang's eye. In the meantime Stone arises leisurely from his chair, advances toward the group and says, "What's the matter with him?" Cole replies, "He didn't wear goggles and he got binged in the eye by a chip from the emery wheel." Stone replies "He told me he was an experienced mechanic, and if he was, he should know how to use an emery wheel without getting chips in his eyes. Anyhow, I told him to wear goggles, if they are of any use. I worked twenty years without them and I have two eyes yet."

In the meantime Smith and Cole have dressed and bandaged Lang's injured eye. Lang groans with pain, and keeps repeating "How can I

work at my trade if I lose my eye, what will become of my family." Smith, the shop Safety Committeeman quiets him and questions him as to how the accident happened. Lang, between spasms of pain replies as follows: "No one told me where I could get goggles and I didn't want to bother you fellows to find out. I thought I should wear goggles but when a boss is as grouchy as he is and me just hired I didn't want to have him get sore on me. I wasn't going to ask him if I was supposed to wear them nor where I could get them."

Safety Inspector Metz arrives with ambulance at this point (entering at door A). Metz questions Lang as to the cause of the accident. Lang replies repeating statement given to Committeeman Smith. Smith and ambulance driver help Lang to the ambulance through door A. Cole resumes work at bench. Metz, remaining, questions Foreman Stone as to whether he warned Lang of the general accident hazards of the machine shop, whether he supplied Lang with a pair of goggles and told him to use them especially when grinding on the emery wheel. Stone evades answering Metz's direct questions but replies as follows, "If Lang was an experienced machinist he should know the hazards of a machine shop, but I told him to wear goggles." (Smith, returning through door A, hears the latter part of Stone's reply and shakes his head.) Stone resumes seat at desk. Metz moves over to the work bench and questions Smith and Cole, making notes of their replies. Metz then passes into machine shop through door B to get the evidence of Thomas White, Operator of Lathe No. 2.

#### CURTAIN

### PART III—ACT III

#### FIXING THE RESPONSIBILITY OF THE ACCIDENT

##### HEARING THE EVIDENCE

|                                            |                           |
|--------------------------------------------|---------------------------|
| The Shop Safety Committee                  | The Witnesses             |
| John Telford, Shop Sup't, Chairman.....    | George Brown, Guide Boy   |
| James Smith, Bench Workman, Sec'y.....     | Frank Cole, Bench Workman |
| Thomas White, Operator of Lathe No. 2..... | James Smith               |
| William Light, Foreman.....                | Thomas White              |
| Sam Stone, Foreman.....                    | Sam Stone                 |
| Charles Metz, Plant Safety Inspector       |                           |

CHAIRMAN TELFORD: Our Safety Committee meets this morning to hear the evidence and fix the responsibility for the unfortunate accident which happened in this department yesterday morning. This accident happened to Roy Lang, a new employee, while using an emery wheel and as a result I am informed, Lang will lose his right eye.

We will first hear the reading of the written reports of investigators as to cause, or circumstances bearing on this accident. I will now call on Foreman Stone to read his report. Stone reads as follows:

Machine Shop Dept., Sept. 29, 1920.

This man, Roy Lang, was struck in the eye by a flying chip, while a new employee who was fully instructed by me as to his duties in the shop, including the wearing of goggles.

(Signed) Sam Stone, Foreman.

CHAIRMAN TELFORD: We will now hear Safety Committeemen Smith's report. Smith reads as follow:

Machine Shop Dept., Sept. 29, 1920.

Accident Case 13:

Roy Lang, a new employee, started work in this department September 29 at 7:30 A. M., injured September 29, 7:50 A. M. Roy Lang struck in the eye by a flying chip from a tool which he was grinding on the emery wheel in the machine shop. Lang was a new employee and was injured 20 minutes after starting work. He was not wearing goggles at the time of the accident as required by the Safety rules of this company in using an emery wheel. While giving First-aid to Lang immediately after the accident he made the following statement to me in the presence of Frank Cole, of this department, "No one told me where I could get goggles and I didn't want to bother you fellows to find out. I thought I should wear goggles but when a boss is a grouch and me just hired I didn't want him to get sore on me. I wasn't going to ask him if I was supposed to wear goggles nor where I could get them. I didn't see any goggles about the wheel and thought I'd take a chance." From my own personal knowledge and also the evidence of other employees in the shop who had any knowledge of the circumstances bearing on this accident, I believe Lang's statement of the circumstances leading up to this accident to be true and correct.

(Signed) James Smith,

Machine Shop Safety Committee.

CHAIRMAN TELFORD: We will hear Safety Inspector Metz's report.

INSPECTOR METZ: That part of my written report bearing on the immediate cause of the accident which will result in the loss of Lang's right eye, agrees exactly with Lang's statement as just read by Mr. Smith. This statement was also made to me by Lang shortly after the accident. I called on Lang at the hospital this morning and he again repeated the cause of the accident agreeing in full detail with his original statement as made to Mr. Smith and also to myself.

(Reads)—I further find upon a complete investigation of all the circumstances connected with this accident the following facts for your consideration:

1. That Lang was not properly received as a new employee should be by Foreman Stone of this department.
2. That Lang was not introduced to near-by employees by Foreman Stone as is the rule and custom in this plant.
3. That Lang was not made acquainted with the general shop rules and regulations by Foreman Stone as is required in this plant before assigning new employees to work.
4. That Lang was not instructed by Foreman Stone as to the general

accident hazards of the machine shop and particularly that Foreman Stone did not present Lang with a pair of goggles, as is the rule and custom in this shop in case of all new employees; that Foreman Stone did not give particular instructions as to the required use of goggles on specified classes of work in the machine shop and especially that Foreman Stone did not instruct Lang that goggles must be worn on all emery wheel work as a direct result of which Lang will lose his right eye.

5. That Lang was not properly assigned to his work on Lathe No. 1. by Foreman Stone. Necessary both to Lang's efficiency and his safety.
6. That Foreman Stone's attitude toward the new employee, Lang, was of such a nature as to give Lang a FRAME OF MIND—in which condition he was especially susceptible to accident.

All of which I submit as result of my investigation as to the cause of this accident and to substantiate my conclusions, as above stated, I have summoned the following employees as witnesses in this case:

George Brown, Guide Boy  
Frank Cole, Bench Workman  
James Smith, Bench Workman  
Thomas White, Operator Lathe No. 2.  
(Signed) Charles Metz,  
Plant Safety Inspector.

CHAIRMAN TELFORD: Before hearing the witnesses summoned by Safety Inspector Metz, I wish to give Foreman Stone an opportunity to make any statement or ask any question he may see fit, now that he has heard the reading of the accident investigation reports. Foreman Stone, you have the floor.

FOREMAN STONE: Nothing to say.

CHAIRMAN TELFORD: We will hear the witnesses in order as named by Inspector Metz and I will call George Brown as the first witness.

Chairman Telford questions and Brown answers:

QUESTION: George, what are your duties?

ANSWER: To guide the new men from the Employment Office to the department where they are to work and to introduce the new men to the boss.

QUESTION: Did you guide Roy Lang to this department yesterday?

ANSWER: I did.

QUESTION: Did you introduce Lang to Foreman Stone?

ANSWER: I did, but Foreman Stone took no notice of it.

QUESTION: Didn't Foreman Stone shake hands with Lang?

ANSWER: Not much!

QUESTION: He didn't welcome Lang to the shop?

ANSWER: About as much as he would a case of Small Pox!

QUESTION: What did Foreman Stone do when you presented Lang to him?

ANSWER: He jerked the Employment Card out of Lang's hand and asked him some questions about where he worked before, he then took

Lang to the door over there and told him to "Get to work." I went back to the Employment Office.

QUESTION: Did you hear all of the conversation between Foreman Stone and Lang?

ANSWER: I did.

QUESTION: What time elapsed between the time Foreman Stone took the card from Lang's hand and his telling him to "Get to Work?"

ANSWER: From two to three minutes.

QUESTION: Did Foreman Stone introduce Lang to any of the men here in the shop?

ANSWER: No, sir.

QUESTION: Did foreman Stone explain anything to Lang about the rules of the shop or about the work he was to do?

ANSWER: No, sir.

QUESTION: Did Foreman Stone give Lang a pair of goggles as required by the shop rules, or say anything to him about the necessity of goggles on dangerous classes of work?

ANSWER: \* He did not give Lang a pair of goggles, neither did he say anything to him about wearing goggles.

CHAIRMAN TELFORD: That will do, George. Frank Cole is the next witness.

QUESTION: Frank, what do you know of this accident?

ANSWER: I do not know anything other than the evidence given by George Brown. I agree with all that he has said except that I could not hear the conversation between Foreman Stone and Roy Lang. I did hear Foreman Stone tell Lang to "Get to work."

QUESTION: Were you present here in the shop and in a position to see all that transpired between Foreman Stone and Lang?

ANSWER: I was present and saw all that happened.

QUESTION: How long did Stone and Lang converse before Lang was told to get to work?

ANSWER: I judge between two and three minutes.

CHAIRMAN TELFORD: That will do, James. Thomas White is the next witness.

QUESTION: James, what knowledge do you have of the circumstances connected with this accident, other than related in your written report.

ANSWER: My knowledge of the circumstances other than given in my written report agrees exactly with the evidence just given by Frank Cole. I work beside him and saw everything that happened in this case as he saw it.

CHAIRMAN TELFORD: That will do, James. Thomas White is the next witness.

QUESTION: Thomas, what is your occupation?

ANSWER: I am on Lathe No. 2.

QUESTION: How far is your lathe from Lathe No. 1?

ANSWER: About fifteen feet.

QUESTION: Tell what you know of the injured man, Lang, starting to work on Lathe No. 1 yesterday morning.

ANSWER: I happened to be looking toward the door at the time and as I did the boss and the injured man appeared in the doorway. I saw the boss point to Lathe No. 1 and saw the injured man start toward it.

QUESTION: Did Foreman Stone accompany Lang to the lathe?

ANSWER: No, sir.

QUESTION: Did Foreman Stone appear at Lathe No. 1 at any time previous to Lang's being injured?

ANSWER: No, sir.

QUESTION: How long was Lang at Lathe No. 1 before going out to grind the tool?

ANSWER: About 15 to 20 minutes.

QUESTION: How did Lang act while at Lathe No. 1, did you notice anything particular?

ANSWER: Yes, he was in a daze, as though something was bothering him, and couldn't get his mind set on his work.

QUESTION: Why didn't you go over to help him?

ANSWER: I would have but the boss won't allow it.

CHAIRMAN TELFORD: That will do, Thomas. Inspector Metz, do you have anything further to offer in this case?

INSPECTOR METZ: Nothing, sir.

CHAIRMAN TELFORD: Foreman Stone you have heard the evidence of the witnesses summoned by Inspector Metz. You now have the opportunity to question or cross examine the witnesses or make any statement you may see fit.

FOREMAN STONE: I have nothing to say.

CHAIRMAN TELFORD: Inspector Metz, what is the accident record of the Machine shop department for the year to date?

INSPECTOR METZ: It depends upon the foreman in charge. Under Foreman Light the accident record of the machine shop is one of the very best in the plant, with but one slight accident this year to date. Under Foreman Stone the accident record of the Machine shop department is one of the worst in the plant with a total of 12 lost-time accidents for this year to date, several of which were quite serious involving lost members.

CHAIRMAN TELFORD: This will conclude the evidence in this case. Do any of the members of the Safety Committee have any questions to ask? (Pause.)

CHAIRMAN TELFORD: Gentlemen, you have heard the reading of the written reports and the verbal evidence of all the witnesses who had any knowledge whatever of any of the circumstances leading up to this unfortunate and preventable accident, through which Roy Lang lost his right eye.

It is now our duty as the Safety Committee of this department to weigh the evidence in the case and place the responsibility for this accident exactly where it belongs without fear or favor, and in this connection I wish to assure you that as Superintendent of this department I fully recognize and fully accept the great responsibility that rests upon me to do everything possible on my part to prevent accidents to my men, to

make the shop not only a safe place but also, as far as possible, a pleasant place where men may work. To seek to achieve that spirit of good fellowship and co-operation between management and men so necessary to the mutual advantage of both parties in this twentieth century struggle.

CHAIRMAN TELFORD: (Briefly develops the following):

- A. The Foreman's responsibility in Accident Prevention
- B. The Twentieth Century Foreman vs. the Old Timer
- C. Our obligations to the new employee. The least we owe a man seeking employment is common courtesy man to man. (Develops the evidence in the case step by step by contrast.)
  - 1. The Foreman's reception of the new employee who is a stranger to his surroundings vs. Stone's reception of the new man.
  - 2. Instruction as to shop rules and facilities vs. Stone's lack of instructions.
  - 3. Safety instruction, general.
    - Safety instruction, particular vs. Stone's lack of instructions. Goggles and their use. (The new man six times more liable to injury than the old employee.) (In a large Steel Plant covering a four year period, 75 per cent of all eyes lost were on operations on which goggles should have been worn.)
  - 4. Introduction of new man to near-by workers, vs. Stone's failure to introduce new man.
  - 5. General instruction on machine to which worker is assigned, vs. Stone's lack of instruction.
  - 6. Stone's personal attitude toward Lang.

Gentlemen, the evidence in the case is direct and conclusive. Inspector Metz's charges have been clearly proven in every detail. As members of this Safety Committee, I am sure we are all of one mind as to where the responsibility for this accident should be placed and it remains for me as Superintendent of this department to pass judgment. Samuel Stone, you are directly responsible for the accident resulting in the loss of Roy Lang's right eye. Neither this department nor this company can longer afford to continue the service of a man of your type. You are discharged from the service of the company to take effect at once.

FINIS

ADJOURNMENT.

#### FRIDAY MORNING SESSION

CHAIRMAN OARTEL: We will first have the report of the Nominating Committee.

#### REPORT OF NOMINATING COMMITTEE

MR. W. C. TITUS: The Nominating Committee begs to present the following nominees:

For Chairman, Mr. W. E. Watters, National Malleable Castings Co.



For Vice-Chairman, M. J. A. Northwood, Cambria Steel Company.

For Secretary, Mr. J. R. Mulligan, Bethlehem Steel Co.

(These men were elected.)

CHAIRMAN OARTEL: I am very sorry that Mr. Watters is indisposed and not able to be here. The Vice-Chairman, Mr. Northwood, is present, but has requested me to continue with the program.

At our convention in Cleveland there was some discussion about giving prizes or bonuses as an inducement to safety and the thought appealed so much to the officers, in making up their program, that they thought it would be a good idea to put it on and thresh it out; so we invited Mr. J. C. Smith of the Inland Steel Company, and Mr. Philip Strémmel of the National Enameling and Stamping Company, who both voiced their opinions last year, to prepare papers on the subject, and we asked Dr. Chaney of the Department of Labor at Washington to sum it up. So we will first listen to Mr. Smith.

## PRIZE AND BONUS SYSTEMS IN SAFETY WORK

J. CLAUDE SMITH, INLAND STEEL COMPANY, INDIANA HARBOR, IND.

Statistics gathered through many years have indicated that approximately not more than twenty-five per cent of all accidents are preventable through the use of guards and safety devices. After the dangerous conditions in an industrial works have been safeguarded it is usually found that not more than from one to two per cent of the accidents that occur may be charged to lack of safeguards. Realizing these facts it becomes readily apparent that about ninety-eight to ninety-nine per cent of all the accidents that occur are concerned with the human element in the organization.

A further analysis of the statistics will probably reveal in most industries that approximately fifty per cent of the accidents may be charged to the hazards of the industry and fifty per cent to the negligence of the workers, although as a matter of fact these are more or less arbitrary figures. However, it must be admitted that all accidents that occur are preventable through care and caution on the part of those injured, their fellow workers, and the operating officials. It therefore appears that the problem of the prevention of accidents is to sell safety to the organization.

The solution of the selling problem is accomplished through education carried on in every possible way to stimulate the interest and secure the co-operation of all employees.

One of the most effective educational mediums through which to advertise safety and to reach the workers is through a prize system. The advantages of such a system are:

1. It can reach all employees in the organization.
2. It can be used to advertise safety in a most effective manner.
3. It will stimulate interest on the part of the workers in accident prevention activities.

- a. By causing employees to read their rule books and to pass an examination as to knowledge of the safety rules.
  - b. It will reward employees for sending in suggestions to prevent accidents thus causing them to look for dangerous conditions and correct them.
  - c. Group action and interest can be secured by awarding prizes to departments or divisions by prize systems.
4. The prizes if properly selected build up a company spirit through the wearing of same by many employees.
  5. The winners of prizes receive acknowledgment and reward for their special interest and co-operation and this inspires others to make a real effort to assist in preventing accidents.
  6. A cumulative psychological effect is secured which has a real value in the success of all branches of the industrial safety movement.

Bearing these reasons for the awarding of prizes in mind it is most important that the prizes be most carefully selected. It is my opinion that any prize given should be practical and useful, having a permanent value. Its value as an advertising medium should also be most carefully considered. Presuming that a safety emblem has been adopted by the company this emblem should appear on all prizes that are awarded. It also seems to me that the emblem should represent and signify safety.

#### SAFETY SERVICE MEDAL

One of the most popular and practical prizes ever given out is the safety watch fob. At the Inland Steel Company's works we call it safety service medal. This medal is given to all employees who are in the service of the company at least six months who pass an examination on the safety rules and who avoid causing accidents to themselves or others which cause a loss of time during a period of six months. The safety lapel button or pencil clip is an attractive award used in getting new employees to read the safety rules and pass an examination within ten days after being employed. Working these prize stunts in co-operation with the foreman who is encouraged to insist that each man in his gang either has a safety lapel button or a safety service medal goes a long way toward training and educating employees to prevent accidents. A card is given to each new employee describing these prizes at the time he is employed at the Employment Office.

Several thousand safety service medals have been given out at the Harbor Works of the Inland Steel Company and men wearing these medals stand out as the best men in the employment of the company. It is amusing and yet significant to observe how highly these medals are valued by the workers including those who can speak only a little English. They will come in the office and ask for chain watches and point out what they want. When they get it they tell their friends about it and they come flocking to the safety office in their spare time and so spreads throughout the works.

Prizes for all employees in departments for accident prevention records attained or in competition with other departments stimulates interest.

and enables a very effective accident prevention campaign to be successfully put across. The prizes may consist of tooth brushes, pocket dictionaries, collapsible drinking cups, cloth caps, pocket combs, match cases, pocket mirrors, fly swatters, ash trays, knife sharpeners, tie clasps, cuff buttons, tie pins, etc.

#### PRIZE WATCHES TO FOREMEN

The foremen in the departments can be stimulated to renewed efforts through the awarding of prize watches to foremen obtaining the best results, eliminating each foreman as he wins a watch but retaining his interest by encouraging him to assist the other foremen and penalizing each foreman who has a serious accident by placing him at the foot of the list. This plan gives superintendents and foremen a chance to win safety watches and helps to secure greater co-operation on their part.

It is necessary to have variety in carrying on accident prevention campaigns of this kind as the same stunts tried too many times fail to maintain interest and therefore it is up to the safety director to figure out new prizes and new plans to keep up interest at all times.

A stunt which has been worked out successfully at the Indiana Harbor Works of the Inland Steel Company in departments where special effort seems to be needed to reduce accidents is the "Safety Gold Watch Raffle Contest."

#### SAFETY GOLD WATCH RAFFLE CONTEST

This contest is based upon the department getting through a month without having any accidents causing a loss of time. Each man in the department is seen by the "Plant Preacher" from the Safety Office and is talked to by him about safety and what it means to the workers and is given a chance of getting a gold watch provided the department gets through the month without having any lost-time accidents. His co-operation is thus secured and his interest aroused by the chance he has to get the watch and by the record which his department achieves if no one is injured. He thus takes a very active interest in preventing accidents. The coupon or card which he receives is numbered and is carefully prepared to retain his interest in preventing accidents.

If the department gets through the month without having an accident causing a loss of time a public raffle is held and the gold watch is given to the man having the lucky number. Advantage is taken of this occasion to deliver a short safety lecture to the assembled workers by the superintendent, foreman, or the safety director. In large departments this contest can be so arranged that the various natural divisions are considered separately and if one division has a lost-time accident they are eliminated from the contest. By such an arrangement continued interest is sustained throughout the month.

#### TAKE PHOTOGRAPHS OF THE MEN

Another method of reaching the men and preventing accidents that has been successful is the stunt of rewarding departments that get

through the month without having any lost-time accidents by taking a photograph of the men in the department and giving one of these photographs mounted on an 11 x 14 card to each employee. On the back of each picture is attached a letter of congratulation and encouragement from the safety director.

All of the workers greatly appreciate these photographs of their fellow workers in which their own faces appear and set a high value on them. These photographs are also published in the monthly Safety publication giving publicity and due credit to the department and encouraging others to cut out accidents and receive photographs. The photographs are usually given out at noon when the men are eating lunch or a special time is appointed to get the men together and safety talks are given by the foremen or safety director.

#### PRIZES FOR SUGGESTIONS

Suggestions from the workers throughout the entire plant can be greatly stimulated by offering prizes for suggestions to prevent accidents. These prizes should preferably be awarded monthly and the names of the winners should be announced in the safety publication together with a halftone showing illustration of the several prizes to be awarded and the rules governing the awarding of same.

#### COST OF THE SYSTEM

The cost of prize or bonus systems can be limited to almost any specified amount but if practical results are to be obtained it should be fairly liberal. In a works employing several thousand men the cost will be approximately from one hundred to two hundred dollars a month for a fairly liberal system.

The number of prizes to be awarded will depend on the size of the organization. A fairly good rule is one prize for each five hundred employees.

All suggestions should preferably be turned in direct to the Safety Department either through Suggestion Boxes placed near the Safety bulletin boards in the various departments, through the works mail, through the safety inspectors at the safety office, or through members of the safety committees. It will be found that the best results will be obtained by these methods of turning in suggestions. In very few instances will nearly as good results be obtained by compelling suggestions to be turned in either through foremen or superintendents.

Prizes may be awarded either by the Central Safety Committee, Chairmen of Safety Committees at regular monthly meetings, or by the Safety Department. All awards should be approved by the Departmental Superintendent or by the General Superintendent.

The prizes may be given out publicly at monthly meetings of safety committees, at mass meetings, at departmental noon meetings or at any other opportune time, or may be given out privately. Publicity as to the names of the winners should be given in the monthly safety publication.

Records kept as to the value of prize systems in securing suggestions

from the workers show that before prizes were given out there was approximately 100 suggestions per year without a prize system. After the prize system had been installed there were 609 suggestions turned in during the year.

The purpose of giving prizes is to stimulate interest, secure co-operation, advertise the safety-first movement. It is in my opinion a lubricant that enables a safety machine to operate smoothly and effectively and it certainly makes a hit with the workers.

It has long been recognized that men will die to win medals of valor on the field of battle—and we are now endeavoring to demonstrate that they will make efforts to save lives to receive medals and tokens of honor. Men are only grown children and from my experience in the awarding of nearly 10,000 prizes for one company I can say the prizes were sincerely and deeply appreciated by the men who received them and that the wearing of these prizes represents something real and significant to their fellow workers and to their superiors.

Prize systems will work out best in large organizations and are mostly needed there although from my experience in comparatively small organizations employing from three hundred to a thousand men I believe the prizes are just as much appreciated and will do just as much good although I do not believe they are quite so necessary, as in smaller organizations there is a closer contact and in the larger organizations the prize system brings about this closer contact.

It has been contended by critics that prize systems are all wrong both in theory and practice as the only effect is to reward the employee for something he should do as a duty. This in a sense may be true but as yet we are far from the ideal and anything that works out for the practical benefit of both the employee, the employer, and society as a whole has a high value as a practical asset in the great safety movement.

Admittedly it is difficult to state just what percentage of accidents may be prevented through prize systems. It is my idea that prize systems are merely to be used in putting safety across. There is no practical method of ascertaining just exactly what percentage of accidents may be prevented by any one thing. Just how necessary prizes are depends on circumstances and conditions which those in charge of the work must meet. Accident prevention campaigns may be operated successfully without prize systems but it is my opinion after several years of experience that no matter what the conditions are accidents can be reduced through the operation of carefully worked out prize systems and that greater co-operation can be secured from the workers even after every other method or system is in use.

#### CASH PRIZES

Now we will take up the matter of cash prizes. In looking up this subject I ran across a little story which I believe illustrates the efficiency of cash bonuses. One of the great trans-Atlantic liners was out in the Atlantic Ocean, and, by making special efforts the Captain stated that it would be possible to reach New York that evening, thus effecting the

saving of a twenty-four hour delay in the operation of the boat, and it would save the feeding of 1,200 people for one day and also keep them out of quarantine. The Captain of the ship sent down word to the firemen: "If you get into port tonight, each fireman will receive one pound bonus." Well, the ship got in; which I believe proves the efficiency of the bonus system. That is just one instance of it.

#### EXPERIENCES OF OTHER COMPANIES

Mr. J. G. Hatman of the Semet-Solvay Company, Birmingham, Alabama, said: They have a system where they give one-half of the savings that are made in accidents. Ten per cent is given to any man who has no time-losing accident during the month. The reports of results are astounding. Two plants, six months previous to the prize system, had 134, 200, 300, and 400 hours in time-losing accidents. At Plant No. 1, after the bonus system was installed, there was 95,000 hours' work with no accidents, and at Plant No. 2, 100,000 hours' work; 34 hours time-losing accidents. The bonus system cut it down to a minimum.

Mr. John M. Woltz, Youngstown Sheet & Tube Company, reported, at one of our Safety Congresses here, giving out a gold watch to each foreman having no accidents. There were 150 foremen eligible and nearly all got watches. This resulted in an accident reduction of 70 per cent.

W. C. Wilson, D. L. & W. Railway Company: They have a system of giving out gold watch charms. This watch charm is given out to one man in each division. They have a contest in which the men in that division vote for the man who is going to get the charm, which stimulates interest. One of their men who got the charm did not have a chain, and he immediately went in and bought a gold chain so he could display that gold charm—which shows the interest they have in it.

They also have a flag which they give to the best division. This is awarded in public and arouses a great deal of interest.

Mr. Chandler, of the Dodge Manufacturing Co. at Mishawaka, Indiana: They have a bonus system in safety work. They give two days' extra pay for every man in the department, if the department has a perfect accident score. If there is no perfect department, next to the perfect department prevails. The results were: in the first eight months they did not really sell the idea to the men. After they got the idea sold (and I might say that the whole secret of this thing is the selling of the idea: no matter what your system is, it has to be sold), they had one-half of their departments with perfect accident prevention records. The accident prevention cost per \$100 payroll in 1910 was 50c; in 1911 it was 22c; in 1912 it was 11c; in 1913 it was 7.9c; and in 1914 it was 7c; that is, through this bonus system in some of the work, their cost in the period of five years per \$100 payroll was reduced to one-seventh of what their cost was before they put in the bonus system.

Mr. Evanston, of the U. S. Coal & Coke Co. of W. Va.: They have a bonus to foremen. This bonus is based upon the idea of \$5.00 extra each month if the foreman has no accidents in his gang. After six months of getting through without any accidents in his gang, of the period of

six months, they give him \$10.00 extra each month as long as he continues that record, in addition to the \$5.00, making \$15.00 a month in addition to his regular pay. The results were: No bonus system—1 fatal accident for each 100,000 tons of coal mined; bonus system in effect and sold to the men—one fatal accident for each 500,000 tons of coal mined—one to five. I think that surely proves that it is worth while.

In looking up this subject, I found that some of the railroad companies (which might be applied to our present problems in the work) were giving out a bonus to motormen and to engineers who got through without having any accidents. The Dallas Railway Company in Dallas, Texas, claim they have derived benefits from the system.

There are a number of other companies that have also gone into this matter. The Armstrong-Cork company, at Lancaster, Pa., report very good results.

It has been our theory and opinion that all of these prizes have helped to reduce accidents. I do not want to convey the impression that I believe that any bonus system, whether it is cash or prizes, will entirely solve the matter of accident prevention. As I stated, I believe they are merely a lubricant, merely a medium through which the safety idea can be put across, but we cannot neglect the guarding of machinery; we cannot neglect the organization of safety committees; we cannot neglect our inspection work or our educational work, or any part of the work, but it all has to be carried on just as efficiently as possible. However, the prize system and the bonus system will certainly help to make it much easier to accomplish results than if you do not have them.

CHAIRMAN OARTEL: Mr. Philip Stremmel will now present the other side of the question.

### SHOULD PRIZES BE GIVEN FOR SAFETY WORK?

PHILIP STREMMEL, SUPERINTENDENT, HOT MILLS, NATIONAL ENAMELING AND STAMPING COMPANY, GRANITE CITY, ILL.

No rewards or premiums should be given for safety work, as it has a tendency to make our men more interested in prizes than in promoting safety. In other words, it cheapens the great cause of Safety in the minds of men whom we are desirous of reaching, by holding up to them the thought of prizes rather than the thought of Safety.

In the beginning the Creator made man physically perfect and endowed him with everything necessary to his well being,—a perfect manhood. When the time came to offer sacrifices to their Creator, Abel offered more acceptable sacrifices than did his brother Cain, and though both did well and gave the best they had, Abel's sacrifices were the better of the two: as in everything, some are capable of doing better work and giving better service than others. It was then that selfishness crept in (just like the man who is thinking more of the prizes he is going to receive than of the safety and protection of his brother) and Cain contrived to slay his brother. Hoping to cover up the evidence, he hid him in the sand, but the Creator called and asked him, "Cain where is your

brother?" At which Cain became all puffed up and sought to evade the question by saying, "Am I my brother's keeper?" The structure of humanity is so built that that which seems useless must repose on the strong, and as a great leader of men has said, "No man liveth unto himself alone". It is evident that we cannot evade the responsibility of looking after our brother.

As the safety movement, like all others, necessitates the process of education, the result will depend largely upon the spirit which actuates and the motive of accomplishment; not self-aggrandizement or the securing of a cheap fob, knife, cuff-buttons, or the fact of being favored by being placed on a safety committee, or by being permitted to mingle or dine with a bunch of the good fellows, but the fact that we have the right to be our brother's keeper.

Should prizes be given for Safety Work? No! Serving on a committee for one's church, lodge, club, or any other organization, does not need the incentive of a prize to get the interest of the members, but the spirit of what the organization stands for is enough incentive for one to do his duty. So with Safety First:—one must sell the idea to the workmen, and this can be brought about by education which will give lasting results, and cannot be accomplished by the giving of prizes.

The idea of safety in our plants has come so quickly that many fail to catch the spirit of self-sacrifice. As any big undertaking must get started on the right line, so must safety be founded on principles of service to one's fellow man (as the Big Brother Movement) and the workmen must be educated in carefulness and loyalty to rules that are made for the best interests of all. Loyalty cannot be bought or stimulated to do better service by giving prizes or premiums, but must be brought about by the satisfaction of knowing that one has done his duty to company and fellow workmen by having a part in making the mill or factory a better place in which to work.

Safety work is one of helpfulness, and what bigger job can a man find to do in the eight hours or more he is at his work than to look out for the best methods to do better work or safeguard dangerous places in the mill or factory. Then why give special inducements for one to perform his duty to his brother workmen? If we have a real desire to be of service to our fellow men, one does not have to join a lodge to be a brother to this or that man, but can participate in constructive work each day in dealing with a big man's problem.

One of the best things that a safety committee can do for the morale of a plant is to have meetings of the different departments, helping each to co-operate in lessening accidents. Men working for a big movement like this cannot do their best work if they are on a committee only a few months for a prize.

At this point, I am reminded of a piece of service rendered by one of our men in saving the lives of two workmen who were working on a yard engine standing at the foot of a long incline in our plant. This act, the saving of the lives of these two men is one that no prize or premium could buy. The spirit of self-sacrifice will come out in men if



given a chance to express the feeling of trying to do a kindness for one's brother workmen.

The motive for doing safety work is one of the greatest opportunities of getting all our men to think and study the conditions in which they are working and to co-operate with other departments in making a safe place to work. If there are men who will not serve on committees because no prizes are given, then it is up to the safety engineer to sell the idea of doing the greatest good to the greatest number, for in the safety movement, because of its strength and popularity, there is a place for every one. In a lodge or club all cannot expect to be leaders, but in the safety movement with a well-organized safety committee, we can interest all of our men in the work. One interested in the work only because prizes are given will serve while the prizes are offered, but after the same are given to the lucky individual they lose interest in the work.

The principle on which to work in the cause of Safety, is to set a standard that is reasonable for men to follow, then all who are interested have the satisfaction of knowing that they are doing a co-operative and loyal piece of work, which is the greatest and best reward that a man can receive.

More harm than good arises from the giving of premiums or rewards, for one usually finds that jealousy in different departments arises when a single or a few prizes are offered, when one or two men of nearly equal ability carry off the prize to one department of the factory and leave the other departments with very inadequate recognition of their efforts.

The next year when you get the committees together, after such a procedure of giving prizes and rewards, many will refuse to serve or try for a prize. A meeting of all the committees, held monthly, with suggestions from all departments, all working for the good of the safety movement and interested from the humanitarian standpoint, will be of better service to fellow workmen and company, will accomplish more real good for all concerned than all the prizes or rewards that can be given.

We all remember the old Christmas treat,—how the Sunday Schools were crowded a few Sundays before Christmas, but that is all changed now. All up-to-date Sunday Schools teach the principle of giving to those less fortunate at Christmas rather than coming to Sunday School to receive gifts. The safety movement can learn from this experience that the easy way does not pay in any game well worth striving for, but the result getter is the man or the committee that works day in and day out for the protection of his fellow man.

Safety is so new a game that it is more the question of education than one of lack of interest. It is the question of getting our safety committees educated to what is expected of them. They do not lack interest, nor are they unwilling to do their part. But if they cannot be educated in safety and the value of protecting themselves and their fellow workman, how then can prizes of any type get permanent results? Our newer methods of education are going after the greatest good to the greatest number, without awarding prizes.

A few weeks ago in St. Louis, the Playgrounds had over 10,000 children taking part in a field day. I noticed with interest that in scoring for the different events that it was a mass proposition rather than an individual one, for after all, the teams were not stronger than the weakest child taking part. All the children were striving to get the weakest member of the team to do better work.

So with safety; no mill or factory is stronger than the weakest employee. The individual in our plant who needs safety education most is not the one who will be able to make a record to win a first, second, or third prize, but it is the man in a department who needs some one coaching him, to help him think safety, rather than the alert employee who is thinking safety not so much for himself or the other man, but a pot hunter, trying for some prize.

Safety will not prosper by the giving of prizes, nor will it become of great importance to men, but if presented to them from the standpoint of loyal service, rendered in the interest of their fellow men, showing them that they have a large part in the game of Safety in the saving of life and limb, you will be able to receive larger and better results, which the giving of no amount of prizes can accomplish.

Shall prizes be given for Safety? Again I say, NO!

CHAIRMAN OARTEL: You have heard both sides of the question. We will now hear from Dr. Chaney of the United States Bureau of Labor Statistics.

## DISCUSSION OF THE TWO PAPERS ON BONUS SYSTEMS

DR. LUCIAN CHANEY, U. S. BUREAU OF LABOR STATISTICS.  
WASHINGTON, D. C.

I am not going to undertake to express an opinion upon the merits of the discussion. You are perfectly able to form your opinion without assistance from me. But what I am going to do is to ask the question and answer it for the largest group of plants which have so far been studied, from the statistical standpoint. How does it work? What does it do? What can you expect of it, if you do undertake to work with the bonus system? I am concerned particularly with the bonus system in the sense of the money payment for certain definite results.

There are about four types of motive which appear in the discussion which we have had so far. First, the humane and human motive. Rather curiously, it seems to me, in a commercial and materialistic world, the Safety Movement started almost everywhere; the men who began it started on the basis of the safety of life and limb (it was a question of humanity with them), and a large share of those pioneers of the Safety Movement have looked with a good deal of suspicion upon the proposition to introduce anything of a commercial nature into it.

Then we have the motive of personal distinction. Most of us swell up a bit when we are conscious that our fellows look at us a bit distinguished from the rest of the ordinary men in the fold.

Then there is the motive of competition. We all like a contest and we all like to win.

Then finally, there is the motive of economic advantage. "Shall I somehow get something tangible in the way of economic return?" "Shall I be better off?" "Shall I be able to buy something more than I would be able to if I did not enter upon this particular effort?"

Obviously there is not any use in comparing plants of an entirely different character. If we are to see how a given procedure operates, we must at least choose concerns which deal with the same sort of thing.

Inasmuch as my own work has been very largely with the iron and steel business, I naturally turn in that direction, and I isolated from the reports which are on file with our Bureau those pertaining to blast furnaces, steel works, and the heavy type of rolling mills, such as slabbing heavy structural metal, and I undertook to find out the course of accident history in those plants, so far as it can be shown by statistical compilation.

Here is the record from the year 1912 to the year 1917, of the frequency of accident. The plants with the bonus plan registered the greatest decline, and particularly the more rapid decline in the first two years, at which time the bonus system was inaugurated. They also maintained, after they had reduced their accidents to that point, a lower rate. You will see here somewhere an indication of the effect of the war. The war period pushed up accident rates everywhere.

Well, that looked very favorable for the bonus system, so far as the reduction in frequency of accident was concerned. However, when I examined it a little more closely, it did not look quite so favorable because it was perfectly evident that this fall in accidents was largely due to the elimination of minor injury.

So I had to work out, as I am accustomed to doing, the conditions so far as the severity of accidents is concerned.

The non-bonus plants have maintained a pretty constant reduction in the severity of accident. They started at a certain point; they dropped down—they terminated at the far end in 1917, at a considerably lower point than they started. What about the bonus plants? They dropped down in the first year and then they began to go up, and they ended in 1917 at a point higher than their record in 1912, so far as the severity of their accidents was concerned.

It seems to me that three conclusions are justified: First, this grouping is sufficiently large, extends over a sufficiently long period of time, and is sufficiently constant, that we may accept it as representing the typical result of the application of the bonus system, under certain circumstances. I am inclined to insist that this is so, because I have found it so in other cases which I have not yet had time to work out completely; but wherever a bonus system has been installed,—by that I mean payment to foremen and men—wherever I have been able to work it out, I have found constantly this phenomenon: The rapid decline of minor injury; some increase in cases of severer injury. Now why should that be so; what reason can possibly be offered for severer injury becoming

more frequent when minor injury is declining? I think it is this: The main reliance of safety departments, as to the decline of their accident rating, has been upon the frequency rate; they have followed it. If they have seen it going down rapidly, they have been satisfied, and, being satisfied, they have failed. Thus far all concerns that I have been able to examine have failed in the matter of the reduction of severe injury. Now that does not mean that that is always true, mind you; it means simply that in those cases that I have been able to examine (and those I believe to be a sufficiently large number, over a sufficiently long period of time) there is indicated a tendency against which it is necessary to safeguard yourself. If you are going to use the bonus system, you have to look out and see that you do not fool yourself by noticing a rapid decline in the frequency of minor injury and concluding that that tells you the whole story, because it does not. You are very apt to overlook what may occur right along with that decline in minor injury; an increase in injuries of a more severe character.

We will say, then, that a bonus system applied to foremen will certainly greatly decrease minor injury. Now that is an eminently worthwhile thing to accomplish. Anything which will bring down minor injury deserves the closest and most careful consideration from the safety man, as a means of accomplishing his desired results. He ought to consider it. The bonus system will not necessarily influence satisfactorily the occurrence of severer injury. It has not so affected it in the largest group, over the longest period of time which it has yet been possible to examine. We may find different results with further study. That is the situation as it sizes up with the figures which we have on file in the Bureau of Labor Statistics.

I thought it might be worth while to study another phase of the situation: What sort of things did the foremen in the bonus plants give attention to and get rid of? Could I find anything which would give an indication on that point?

Here is a little table which seems to me rather illuminating, as to what the foremen in bonus plants went after. I grouped the facts under three heads—the whole group is of this character; they are: Accidents against which provision could be made by modifications of structure—what I have called “engineering revision”. All these had some engineering remedy. Then I grouped them, those of minor character, six weeks and under; those over six weeks, and those causing deaths and major mutilation.

I find that in the bonus plants the foremen discovered and had corrected, for cases producing disability of six weeks and under, at the rate of 2.70 per million hours of exposure, whereas the non-bonus plants found and corrected at the rate of .90 per million hours. You will see that the foremen in the bonus plants were clearly getting after the cause of minor injury at a rate surprisingly in excess of the non-bonus plants.

Those over six weeks also showed a marked advantage for the bonus plan. But when we come to those causing death and major mutilation, the bonus plant finds them at the rate of 50 per million hours' exposure

and the non-bonus plant at the rate of 60, and I cannot but believe that this difference in the two cases is due to the fact that the foreman has a greater advantage in the detection and protection of his men against minor injury, whereas major injury is not adequately penalized.

Now I happen to know that in all these plants which I have included here, the penalty for major injury is not more than ten times the penalty for a comparatively minor injury; the penalty for death is not in any case over ten times that for an injury which keeps a man off one day. Now it is perfectly absurd to estimate a death at only ten times as serious as a day's lost time. If anybody is going to use so inadequate a penalty for death as to make it equivalent to the loss of one day's time, they are bound to come out in just this way. What will the foreman do? He will inevitably give attention to the causes of minor injury, which he could easily get out of the way, rather than the causes of major injury, which might require pulling down the mill before he could correct them.

The conclusion which we can fairly draw from this experiment is that every safety man who tries it must look very carefully so that he is not deceived into supposing that his results are satisfactory when he gets rapid decline in frequency of minor injury. He has to go into the situation much more closely, so far as the causes of severe injury are concerned.

Be it understood, of course, that you may have an entirely different experience from this, but the experience of no one of you begins to be as large and as long-continued as this experience which I have presented to you. So I think we may fairly say that this represents the natural inevitable tendency of the application of the bonus system to the reduction of accidents, the bonus system through awards of money to foremen.

CHAIRMAN OARTEL: I now throw the meeting open for a general discussion.

#### GENERAL DISCUSSION

MR. J. R. MULLIGAN (Bethlehem Steel Co.): I am for a cash bonus to safety committeemen for services rendered. I agree with Mr. Smith, first, in giving prizes to get attention and promote interest; and second, in giving cash prizes to get direct tangible results in the real accident prevention game. I disagree with Mr. Stremmel in his paper, because I believe it is idealistic; it sounds good, reads well, but it is not practical.

We have spent about eight years now in the accident prevention game; that is, under direct organization of the National Safety Council, and we have not gotten to the point that we should have reached, considering the time and attention of the great men in the accident prevention work devoted to this particular phase of it. It is about time that we put accident prevention work on a practical business basis and go after it in a practical way, just the same as we do any other thing in which we are engaged.

We who have to do with accident prevention work, are convinced that the point in our program has been reached where we should place the

accident prevention work of our safety committeemen on a compensation basis, and we propose to do it in the near future.

The guarding phase is represented by one-fourth or 25 per cent of the field of accidents, and that is the field where we are practically all working. We are still working in that field. The larger field, which involves the unsafe practices, the bad habits, the carelessness, the recklessness, we still have to enter.

In the plants of the Bethlehem Steel Company, we train our safety committeemen for their work through a four-month course of two hours per week, on company time. The men are trained in First-aid work and accident prevention work. A departmental team of eight men coming from the blast furnace department, is trained along the hazards of their particular department, based upon the accident history of that department. After passing through their graduation exercises in the form of a first-aid meet, they are eligible for safety committee work. These men serve on committees for six months. Our departmental committee is made up of an equal number of foremen and workmen, so that both will work together. The number of committeemen in the department depends upon the number of employees and the number of different or unrelated units of work in that department.

Now in the blast furnace department we have as a committee one man who is known as the Permanent Committeeman; he continues to be the representative of that department while the personnel of the committee changes. He is the Chairman; has charge of all the details of the committee. Then on one side we have three foremen and on the other side three workmen. The superintendent of the department is also a member of that committee, and in our plan of organization the superintendent is held responsible for the accident prevention work in his department.

Our men are trained. The superintendent is responsible. The committee is made up of an equal number of foremen and workmen, giving direct representation both to the management and to the men. These men hold monthly meetings. During the month, as things occur in the department along this line, up in the physical phase of it, the guarding of it, as the committeemen notice this, that and the other thing, they report it to the foreman at once and it is taken care of; instead of waiting until the end of the month at the monthly meeting to report things which need attention, these are given attention from day to day, so that when the committee meets for their monthly meeting, their report is a report of things done rather than things to be done, and the time of that meeting is devoted to the discussion of the things that enter into this field rather than into the field of guarding and so forth.

I maintain that in order to get the direct, personal interest and attention of your Committee every day in the month, there must be a cash compensation or bonus attached to their service, to get direct results; and we have decided, in order to get the personal interest of the committeemen continuously throughout the month, that we will offer such a bonus or cash compensation. To give our plan briefly, let us represent it in this way.

This is the accident scale (illustrating on the blackboard), whether it be frequency of accident or severity, from nothing up to 25 points. Let us say this line here (indicating) represents the hazard or the accident history of any one department in the plant. Let us take the open-hearth, for instance; this line represents the history based on the hazards; things that have actually happened. This line will continue to represent the history of the department if accidents are not prevented, for the reason that the hazard is there and the accidents will result. With this as the starting point, the history of the department for a number of years, several years, two, three, and four, let us drop down on the scale say 10, 15, 20 or 25 per cent, and let this line represent the line to be attained. We say to the committeemen at the beginning of the month, "Boys, reduce your history line for the coming month from this point (indicating) to this point and you will receive as compensation, each one of you (an average of ten men being on the Committee), \$10.00 each, for your definite, detailed attention to this prevention of accidents through unsafe practices, etc."—and the result is that the amount paid for this attention down here, with an average committee of ten, would be ten times ten, or \$100. Now \$100 is about one-fourth the actual cost of a simple fracture of the leg; what is represented in arms, legs, lives, between this line and this line (indicating), not to speak of the amount of money represented here in compensation, outside medical attention and inside medical attention. In other words, we place the line down at a definite point, something that is possible, and when it gets down to that point, the compensation is earned, and the saving is this (indicating).

It resolves itself into this factor: Why not pay the compensation before the accident, in the form of a bonus to committeemen, and save all that is represented between these two lines, rather than pay it out in compensation to the injured after the accident—compensation which never compensates; why pay it out to the doctors, nurses, and everything else involved? Why not pay it on the prevention side rather than on the resultant side?

CHAIRMAN OARTEL: Are there any more questions?

MR. HENRY H. OLMSTEAD (Du Pont Fabrikoid Co., Newburgh, N. Y.): We are trying out a plan something on that order. It has been in force about seven months. We took the total amount of expense due to accidents for two years, and we found that for quite a number of months the expense was practically nothing; some \$10.00 and some \$15.00, so we took the total number and divided it by four, and the Manager agreed that if we kept below the amount of money representing a fourth of the total, he would give in prizes another fourth; in other words, if we could cut them in half for one month, he would give the prizes.

This is the way we give our prizes. Every man and woman on the plan has an equal interest in it. We divide the plan into five areas, under supervisors, and we raffle these prizes off, to the amount of \$10.00 apiece, and so far we have gotten four out of seven months.

MR. J. E. SCHILL (Cleveland Metal Products Co.): I would like to say,

Gentlemen, we are commercializing on everything, we Americans, and it's about time we call a halt! We want to get close to the man, and the way to do it is to study human relations, and get your superintendent and manager and president in with you on the same thing.

I tell you fellows, when you commercialize Safety work, you are doing the wrong thing! Get your superintendents, your factory managers and your executives in and let them study human relations with the men, and you will be far better off.

MR. FRANK E. MORRIS (Secretary, Syracuse Safety Council, Syracuse, N. Y.): We put on a Safety Campaign not so long ago, and one of the stunts put over was to award a prize of \$5.00 to the school child who wrote the best letter on Safety. I went down to one of the school houses to see how this worked out. We saw the school children walking along with these letters in their hands. A gang of boys went over to play a ball game and here came one of these little freckled-faced kids, a little rough boy. One of the boys said to him, "Come on and play ball with the boys", and he replied, "Play ball! Oh, the hell with it; I'm going home and win \$5.00 on Safety!"

I think the cash bonus, offering money for the prevention of accident in safety committee work, sounds too much like the slogan, "A Dollar to Save a Life!" Pay inspectors and First-aid teams by all means; but this thing of paying for safety committee work does not appeal to me. Safety work is a service to your fellow human beings, and I don't think you can buy it with dollars. Let the foreman appoint his safety committee, and let him tell them what to do, as a part of their work. He's the boss, and if he tells them to look out for unsafe practices and conditions, that is their job. If they don't do it, let him fire them, just as he would for any other disobedience.

Mr. Smith gave you a very good elucidation of this subject, and when he got through I thought perhaps I was wrong in this proposition, but I honestly believe that if he had not had his bonus system at all, he would have gotten the results anyhow. This is another form of Safety advertising, I believe. I think that this bonus proposition is just merely getting your men to think about this Safety idea, and when they do that, you have them; they think of Safety, which is the big idea. If you should, instead of having the bonus systems, get all the plant widows at your plant and line them up at the gate for one month, don't you think it would cut accidents? Or, take the cheerful side, and get a lot of sunny-faced, happy, smiling children, and string them along outside of your plant, and have them carry banners with the slogan, "We are happy because our fathers came home from work!" That is better than a bonus system.

CHAIRMAN OARTEL: I am very sorry we have to close this now, but we have a mighty interesting demonstration to follow, by Captain Guy H. Burrell, of the Mine Safety Appliances Company, who did a lot of good research work in the Gas Defense Division during the war, and who is master of his subject.



## CARBON MONOXIDE GAS

RECENT DEVELOPMENTS IN DEVICES FOR DETECTING ITS  
PRESENCE AND AFFORDING PROTECTION

CAPTAIN GUY H. BURRELL, MINE SAFETY APPLIANCES COMPANY,  
PITTSBURGH, PA.

(Outline of Discussion of Technical Principles Involved and Demonstration)

The great war gave tremendous impetus to technical research in a great variety of fields. Problems were solved in a few months' time by virtue of the fact that the most capable technologists in the country were concentrated upon them.

The greatest body of research men ever gathered together in the history of the world was located at the American University Experiment Station, Washington, D. C., in Chemical Warfare Service. Here more than 2,000 of the best-trained technical men in the country were congregated and divided into groups, each group working upon some particular problem having to do with the prosecution of the war.

It is logical that some of the results of this vast research work had application in industrial fields. One important application was that of the gas mask, which has found a broad use in a great variety of industries.

## USE OF STANDARD ARMY MASK IN THE INDUSTRIES

Carbon monoxide gas was not a war gas in that no means was ever found for distributing it effectively over the fighting line. In the first place it was difficult to produce in large quantities, and in the second place it dissipated so rapidly that a toxic concentration could not be maintained.

However, carbon monoxide constituted a distinct hazard in the gun turrets of our men of war, where the gas collected in dangerous quantities when the guns were in heavy action. Carbon monoxide was also likely to be encountered by sappers and by men working in machine gun emplacements, etc.

The standard Army gas mask would not afford protection against this gas, and Chemical Warfare Service was asked to develop a mask similar to the standard army gas mask, which would give adequate protection. The only means heretofore available for protection against carbon monoxide was through the use of the heavy, more cumbersome, oxygen breathing apparatus.

A great amount of work had been done prior to the war on the detection of carbon monoxide gas and means of affording protection, as represented by the canary bird as a detector and the oxygen breathing apparatus as a means of protection. Both of these devices were impracticable so far as the soldier was concerned.

The men in Chemical Warfare Service who were put upon the problem

of developing the carbon monoxide gas mask and detector included Dr. J. C. W. Frazer, of Johns Hopkins University, Col. A. B. Lamb, of Harvard University, Dr. C. R. Hoover, of Wesleyan University, and others of like caliber.

The entire research extended over a period of about one year and in this time a mechanical carbon monoxide detector and a simple type of carbon monoxide gas mask were perfected.

The carbon monoxide detector now comprises a small metal barrel with a rubber bulb on one end and a means for quickly inserting a glass tube filled with a special chemical in a space on top of the barrel. By means of the rubber bulb a sample of the air to be tested is forced through the glass tube and the chemical inside of the tube changes color in contact with the carbon monoxide if any is present, the depth of color depending upon the percentage of carbon monoxide in the air. In the lower percentages of carbon monoxide light green shades of color are produced, while in the heavier percentages deeper greens appear in the tube. By means of a small calibrated color scale, which accompanies the instrument, the approximate amount of carbon monoxide in the air is readily determined by comparing the colors.

The instrument is entirely mechanical in its nature and any one can operate it. It is far more sensitive than a canary bird and has the further advantage that it can be carried through gaseous zones and is always ready for work. The instrument has been thoroughly tried out around blast furnaces and steel mills and in coal mines with most satisfactory results in every case.

It is well known that ordinary tobacco smoke from a cigar, pipe, or cigarette contains a considerable proportion of carbon monoxide. To indicate the action of the detector tube blow a little tobacco smoke through the tube and notice how quickly the color changes to green. (At this point tubes were passed around through the audience, enabling the different smokers to test the carbon monoxide content of their pipes, cigarettes, or cigars, and during the discussion above the details of the instrument were thoroughly explained, the chemistry brought out, etc.)

Nothing that we know of suitable for a gas mask canister will absorb carbon monoxide gas. The standard army canister depends largely for its action in removing ordinary industrial gases upon the fact that the ingredients of the canister absorb the gases. If a substance that would absorb carbon monoxide mechanically could have been produced matters would have been greatly simplified.

However, research to find an ingredient for the gas mask which would protect against carbon monoxide was started out along the line of finding a substance which would, at ordinary temperatures, catalytically convert carbon monoxide to carbon dioxide. It was well known that certain substances such as copper oxide would convert carbon monoxide to carbon dioxide catalytically at high temperatures. After many months of research a combination of metallic oxides was found which would convert carbon monoxide to carbon dioxide at ordinary temperature. This material, placed inside of a gas mask canister, will afford protection against carbon mon-

oxide in that the carbon monoxide in the air that is inhaled through the canister will be converted to carbon dioxide gas.

This material represents a gigantic stride in chemistry and is really one of the great chemical achievements of the war. As stated above, it is catalytic in its nature and as such it neither loses nor gains in weight nor changes physically or chemically while in use. Catalytic reactions are explained by physical chemistry, and a simple definition of a catalytic agent is any substance that will, by its mere presence cause any other two substances to react chemically. The fact that certain substances are catalytic in their nature is taken advantage of for a great many industrial purposes. This catalytic reaction will be thoroughly explained and comparisons made to other catalytic reagents which are being used in the industries.

By means of this special substance then, a simple form of gas mask weighing only 3 to 4 pounds has been developed which will give complete protection against carbon monoxide gas. This particular mask will never take the place of oxygen breathing apparatus in that it cannot be used where there is a deficiency of oxygen, but in places around blast furnaces, steel mills, fighting mine fires, etc., it will be invaluable.

#### DEMONSTRATION APPARATUS

The apparatus for demonstrating the action of the special material for catalytically converting CO to CO<sub>2</sub> consisted essentially of a reservoir containing pure carbon monoxide gas, small glass flow meters for controlling the flow of gas and air, and a glass compartment for containing a white mouse. The demonstration first consisted of passing a carbon monoxide-air mixture through the special substance into the mouse bottle to show how the carbon monoxide is rendered harmless by being converted into CO<sub>2</sub>. The air-gas mixture then was by-passed around the tube containing the special material and the mouse collapsed in several minutes time. In conjunction with this demonstration the audience was invited to come forward and feel the tube containing the special material and to note how it heats up indicating the reaction, etc.

Another experiment was conducted, showing how the material glows at a red heat whenever pure gas is allowed to blow upon it, indicating the very vigorous reaction that takes place and the carbon monoxide detector was demonstrated in the carbon monoxide gas. In addition there were complete instruments for examination and the foregoing talk included full details of all instruments both in their mechanical and technical make-up.

ADJOURNMENT.

## **Mining Section**

**September 28—October 1, 1920**

---

**B. F. TILLSON, Chairman**

Assistant Superintendent, The New Jersey Zinc Company, Franklin, N. J.

**H. G. DAVIS, First Vice-Chairman**

Lehigh and Wilkes-Barre Coal Company, Wilkes-Barre, Pa.

**DR. A. F. KNOEFEL, Second Vice-Chairman**

U. S. Bureau of Mines, Terre Haute, Ind.

**C. A. MITKE, Third Vice-Chairman**

Consulting Mining Engineer, Bisbee, Ariz.

**R. H. SEIP, Secretary**

The New Jersey Zinc Company, Franklin, N. J.

---

### **TUESDAY AFTERNOON SESSION**

**T**HE meeting was called to order at 2:30 P. M. by the Chairman, Mr. B. F. Tillson.

#### **DELEGATES ATTENDING**

Adams, W. W., U. S. Bureau of Mines, Washington, D. C.  
Appleton, I., Union Carbide Co., Sault Ste. Marie, Mich.  
Arthur, P. M., American Zinc Co. of Tennessee, Mascot, Tenn.  
Bach, E. E., Pennsylvania Americanization Bureau, Philadelphia, Pa.  
Becker, R. C., Keystone Consolidated Coal Co., Pittsburgh, Pa.  
Bradley, J. T., W. J. Rainey, Inc., Uniontown, Pa.  
Breskin, C. A., Rock Products, Chicago, Ill.  
Brown, E. H., American Cyanamid Co., Niagara Falls, Can.  
Chandler, W. D., Clinchfield Coal Corporation, Toms Creek, Va.  
Charlton, D. E. A., "Engineering & Mining Journal", New York, N. Y.  
Clark, F. R., Clinchfield Coal Corporation, Clinchco, Va.  
Comfort, W., Maryland Casualty Company, Chicago, Ill.  
Conibear, Wm., Cleveland-Cliffs Iron Co., Ishpeming, Mich.  
DeBlots, L. A., E. I. du Pont de Nemours & Co., Wilmington, Del.  
Fife, H. A., Commonwealth Edison Co., Chicago, Ill.

Findeisen, A. H., Industrial Commission of Wisconsin, Madison, Wis.  
 Fisher, Capt. G. R. G., American Red Cross, Minneapolis, Minn.  
 Fleenor, R. F., Clinchfield Coal Corporation, Clinchfield, Va.  
 Flyzik, M. J., Wash. State Safety Board, Olympia, Wash.  
 Fraser, M. L., Nova Scotia Acc. Prevention Assn., Halifax, Canada.  
 Geister, E., Ford Motor Co., Detroit, Mich.  
 Gidley, W. W., Phelps Dodge Corporation, Bisbee, Ariz.  
 Gildea, Mary, Allis Chalmers Mfg. Co., West Allis, Wis.  
 Greeley, M. L., Jr., Chicago, Wilmington & Franklin Coal Co., Chicago, Ill.  
 Guerrant, R. G., National Safety Council, Chicago, Ill.  
 Hall, R. D., "Coal Age", New York City.  
 Harper, H. T., Tennessee Copper Co., Copperhill, Tenn.  
 Harrington, D., U. S. Bureau of Mines, Denver, Colo.  
 Hawkins, J. D., Clinchfield Coal Corporation, Dante, Va.  
 Herbert, C. A., U. S. Bureau of Mines, Vincennes, Ind.  
 Hoffmann, R. B., Mineral Point Zinc Co., Depue, Ill.  
 Hunter, Dr. E. R., American Red Cross, Washington, D. C.  
 Johnson, G. J., Homestake Mining Co., Lead, S. Dak.  
 Juhlén, C. E., U. S. Bureau of Mines, Minneapolis, Minn.  
 Lanza, Dr. A. J., Hydraulic Steel Co., Cleveland, Ohio.  
 Lind, C. A., Midland Counties Coal Co., Chicago, Ill.  
 Lunt, H. F., Colo. State Bureau of Mines, Denver, Colo.  
 Lynott, Dr. W. A., Empire Gas & Fuel Co., Bartlesville, Okla.  
 MacMahon, W. H., American Hoist & Derrick Co., St. Paul, Minn.  
 McIntyre, M. D., Pickands, Mather & Co., Cleveland, Ohio.  
 Mabery, G. M., Clinchfield Coal Corporation, Toms Creek, Va.  
 Mackay, M., Hydro Electric Power Commission, Toronto, Canada.  
 Martinson, Geo., Pickands, Mather & Co., Hibbing, Minn.  
 Mexnanski, Andrew, Mark Mfg. Co., Evanston, Ill.  
 Michall, H. B., Underwriters' Laboratories, Chicago, Ill.  
 Miller, H. R., Pittsburgh Coal Co., Pittsburgh, Pa.  
 Minshull, G. E., DuPont Co., Wilmington, Del.  
 Mulligan, Mrs. W. H., Hydro Electric Power Commission, Toronto, Canada.  
 Murrill, R. T., Inspiration Consolidated Copper Co., Inspiration, Ariz.  
 O'Connor, E. S., The Steel Tube Co. of America, Mayville, Wis.  
 Pellett, J. S., The N. J. Zinc Co., Franklin, N. J.  
 Pride, Florence, Y. W. C. A., Milwaukee, Wis.  
 Pettibone, C. E., American Mutual Liability Insurance Co., Boston, Mass.  
 Price, D. J., U. S. Bureau of Chemistry, Washington, D. C.  
 Quayle, S. E., M. A. Hanna & Co., Virginia, Minn.  
 Reed, J. W., Consolidation Coal Co., Fairmont, W. Va.  
 Reynolds, S. C., Aetna Life Insurance Co., Pittsburgh, Pa.  
 Roark, Henry, Clinchfield Coal Corporation, Dante, Va.  
 Rungay, D. L., Clinchfield Coal Corporation, Wilder, Va.  
 Ryan, J. T., Mine Safety Appliances Co., Pittsburgh, Pa.  
 Ryan, W. D., U. S. Bureau of Mines, Kansas City, Mo.  
 Sayers, Dr. R. R., U. S. Bureau of Mines, Washington, D. C.  
 Schmidt, H. C., Ford Blast Furnace, Detroit, Mich.

Seip, R. H., The New Jersey Zinc Co., Franklin, N. J.  
 Shaw, R. A., Ford Motor Co., Detroit, Mich.  
 Shields, Major M. J., American Red Cross, Washington, D. C.  
 Shillito, W. F., The Alabama Co., Birmingham, Ala.  
 Smith, D. C., Aluminum Ore Co., East St. Louis, Ill.  
 Snively, R. A., Ocean Accident & Guarantee Corp., Kansas City, Mo.  
 Stock, H. H., University of Illinois, Urbana, Ill.  
 Story, B. S., Pickands, Mather & Co., Cleveland, Ohio.  
 Street, T. G., Mineral Point Zinc Co., Depue, Ill.  
 Sullivan, W. W., Oliver Iron Mining Co., Hibbing, Minn.  
 Taylor, W. W., T. L. Smith Co., Milwaukee, Wis.  
 Thirtle, James, Inland Collieries Co., Indianola, Pa.  
 Tillson, B. F., The New Jersey Zinc Co., Franklin, N. J.  
 Warwick, M. L., Y. M. C. A., Milwaukee, Wis.  
 Woodburn, Orr, Globe-Miami Dist. M. R. & F. A. Ass'n., Globe, Ariz.  
 Woodhead, John, Employers' Ind. Corp., Kansas City, Mo.

## SUMMARY OF REPRESENTATION AT SECTIONAL MEETINGS

|                                                          |     |
|----------------------------------------------------------|-----|
| No. of Representatives .....                             | 79  |
| No. of Companies Represented (Total) .....               | 57  |
| No. of States Represented .....                          | 22  |
| No. of Cities or Towns Represented .....                 | 47  |
| Total Attendance for 4 Meetings .....                    | 168 |
| Average Attendance per Meeting .....                     | 42  |
| No. of Metal Mining Companies Represented .....          | 13  |
| No. of Coal Mining Companies Represented .....           | 8   |
| No. of Representatives from Metal Mining Companies ..... | 18  |
| No. of Representatives from Coal Mining Companies .....  | 15  |

## REPORT OF CHAIRMAN

CHAIRMAN TILLSON: Gentlemen, it is a pleasure to renew acquaintance with so many whose faces are familiar and to greet others who for the first time are joining us in our common search for that knowledge and inspiration which will lead to universal safety in our mines.

In welcoming you to this, the Ninth Annual Congress of the Mining Section of the National Safety Council it seems to me fitting to spur you to even greater endeavors in the future by outlining for you your achievements in the past.

The following statistics will indicate to you the relative space which the Mining Section has occupied in the entire proceedings of the National Safety Council Congresses and will show that it has outstripped the other largest section, the Metal Section, in the volume of its transactions and the amount of discussion taking place in its meetings. These are matters of which we may justly be proud for they indicate that we are alive to the opportunities presented to us by such gatherings of experienced mining men as congregate at our annual meetings.

The following tabulation of the space given in our proceedings to the various principal sub-divisions of our mining industry is more or

Number of Addresses and Pages in National Safety Council Proceedings.

Table I.

|                       | 1912 |     | 1913 |     | 1914 |     | 1915 |     | 1916 |     | 1917 |     | 1918 |     | 1919 |     | TOTAL |     |
|-----------------------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                       | A    | P   | A    | P   | A    | P   | A    | P   | A    | P   | A    | P   | A    | P   | A    | P   | A     | P   |
| Mining .....          | 1    | 3   | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |
| General .....         | 1    | 3   | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |
| Anthracite Coal ..... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |
| Bituminous Coal ..... | 6    | 28  | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |
| Metal .....           | 1    | 14  | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |
| Miscellaneous .....   | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |
| TOTAL .....           | 8    | 43  | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...  | ... | ...   | ... |

A—Denotes Addresses.  
P—Denotes Pages.

Table II.

| YEAR.              | MINING SECTION. |       |                 |       | METALS SECTION. |       |                 |       | ENTIRE N. S. C. |       |       |      | PCT. MINING. |      |       |      |
|--------------------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|-------|------|--------------|------|-------|------|
|                    | Papers          |       | Pages           |       | Papers          |       | Pages           |       | Papers          |       | Pages |      | Papers       |      | Pages |      |
|                    | No.             | Pages | Discus-<br>sion | Total | No.             | Pages | Discus-<br>sion | Total | No.             | Pages | No.   | %    | No.          | %    | Pages | %    |
|                    |                 |       |                 |       |                 |       |                 |       |                 |       |       |      |              |      |       |      |
| 1912               | 8               | 43    | ...             | 43    | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1913               | ...             | ...   | ...             | ...   | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1914               | ...             | ...   | ...             | ...   | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1915               | ...             | ...   | ...             | ...   | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1916               | 15              | 76    | ...             | 76    | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1917               | 14              | 146   | ...             | 212   | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1918               | 14              | 134   | ...             | 204   | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| 1919               | 10              | 86    | ...             | 135   | ...             | ...   | ...             | ...   | ...             | ...   | ...   | ...  | ...          | ...  | ...   | ...  |
| TOTAL              | 68              | 555   | 272             | 827   | 64              | 359   | 167             | 526   | 601             | 7,280 | 11.4  | 11.4 | 11.4         | 11.4 | 11.4  | 11.4 |
| 1918 to 1919, Inc. | 14              | 92    | 70              | 162   | 10              | 56    | 17              | 73    | 156             | 1,369 | 8.9   | 8.9  | 8.9          | 8.9  | 8.9   | 8.9  |
|                    | 53              | 436   | 265             | 701   | 46              | 250   | 167             | 417   | 458             | 5,637 | 11.6  | 11.6 | 11.6         | 11.6 | 11.6  | 11.6 |

NOTES: a—Mining Section organized. No stenographer at meeting to report extemporaneous addresses or discussion.

b—Includes reports on first aid meets during the year.

c—Iron and Steel Section.

d—Iron and Steel and Foundry Section combined.

e—Proceedings condensed as a measure of economy and smaller size type used.

less approximate since it is often hard to make a distinctive classification. Therefore under the "General" heading will be found papers prepared by representatives of the anthracite and bituminous coal and metal mining branches. Under a "Miscellaneous" heading the reports of committees, business meetings, etc., are grouped. The need for reduction of size of the volume of transactions has resulted in the use of finer print, closer spacing, and the elimination of most of the reports of activities throughout the year during the past two years, so there is no absolute comparison.

The number of delegates attending our meetings is naturally smaller than that in many of the other sections, since the mining districts are usually remote from the populous cities in which these Congresses are held, and the correspondingly greater expenses to delegates inhibit their attendance. However, it is clear to me that the benefits accruing to those attending our meetings should (and I think have) warranted expenditures in excess of those required by the majority of the Mining representatives of such companies who are not represented here today. It seems to me that the inspiration and concentrated thought in regard to mine safety which we experience at these meetings makes them the most important service we receive for our membership in the National Safety Council; and if our neighbor companies do not appreciate this we should in all kindness point out to them their error. But let us also remember that we benefit only proportionately as we give, not only in taking the time and thought to prepare addresses but also in entering frankly into the discussions.

But are you all satisfied in having as your ultimate gain such Congress associations, with the added bulletin service, as have been available throughout our past activities? If so, permit me the prediction that you will find yourselves attempting to sow sterile seeds of safety in the barren soil of apathy. I look with hope upon complaints of dissatisfaction with the few activities of our Section throughout the year, for from these must develop the realization that we have indeed a larger service to perform and one in which it is worth our while to invest more of our time, money, and careful thought. It is not enough for any of us to neglect our Section just because we have not been singled out for some particular mission. Your chairman has solicited in the past your voluntary suggestions, criticisms, and support in sending in bulletin material, articles or descriptions of safety devices or methods, and accident statistics. What have you done as your share in this co-operative organization? Have you, "sponged" upon the willing enthusiasm of a few to devote for the common interest such time as they could steal from their regular duties? Be honest with yourselves and if you deserve this scolding consider that it is milder than you deserve and make effective resolutions now not to err again and show your Chairman for next year that you can and will help him as you have never done before.

But who will then have the time to correspond with all of these reformed members who should so co-operate with their ideas and knowledge? It is clear that no volunteer officer could devote the required time if he had any other business and so we are led to the conclusion that this



Section must have a paid Engineer-Secretary to co-ordinate our individual activities and inquiries. This suggestion was made by your Chairman last year and was unanimously endorsed by the delegates present. According to their instructions several inquiries were sent out to the member companies but to date only one-third have replied at all. True enough, in accordance with the following tabulation, the large majority of those replying were in favor of having their dues doubled to pay for such increased service, but your officers and the Executive Committee of the National Safety Council could not neglect the overwhelming number who had not expressed themselves and who might sever their membership if called upon for increased dues. It was not felt, therefore, that the National Safety Council could assume the expenses and risks dependent upon such a contingency.

Your Chairman, therefore, puts the problem squarely before you. It is your problem and you must solve it. Are you going to be contented to drift along as you have or are you sufficiently convinced of your need of a paid secretary so as to labor in the cause of winning one? The summary of our members and their voting is shown herewith.

## Summary.

|               | No.<br>Voting<br>Yes | Dues              | No.<br>Voting<br>No | Dues              | No.<br>Not<br>Voting | Dues              | Total      |                    |
|---------------|----------------------|-------------------|---------------------|-------------------|----------------------|-------------------|------------|--------------------|
|               |                      |                   |                     |                   |                      |                   | No.        | Dues               |
| Metal Mining  | 25                   | \$1,327.50        | 11                  | \$ 457.50         | 46                   | \$1,890.00        | 82         | \$3,720.00         |
| Coal Mining   | 30                   | 1,372.50          | 15                  | 675.00            | 121                  | 4,687.50          | 166        | 6,735.00           |
| Miscellaneous | 3                    | 60.00             | ---                 | ---               | ---                  | ---               | 3          | 60.00              |
| <b>TOTAL</b>  | <b>58</b>            | <b>\$2,805.00</b> | <b>26</b>           | <b>\$1,132.50</b> | <b>167</b>           | <b>\$6,577.50</b> | <b>251</b> | <b>\$10,515.00</b> |

In closing let me emphasize by true examples the need for this increased service. During the year your Chairman has received a very few complaints but from companies operating respectively bituminous, anthracite, and metal mines. Each complained that the bulletin service dealt chiefly with the type of mining in which they were not engaged. The answer is obvious for actually our service has been equitably proportioned among these three different industries. It is evident that it has not been extensive enough to satisfy any one of them, and it will not be until we invest enough to secure a paid secretary.

MR. J. W. REED (Consolidation Coal Co.): A good many of the companies who have not replied are probably in the same fix that I am in with our company. I tried to get some definite answer, and they said, "Let them do whatever they want to; it won't affect us one way or the other."

CHAIRMAN TILLSON: The first paper on the program is that by C. A. Mitke, Consulting Engineer, Bisbee, Arizona, on "Vocational Training as Influencing Safety and Efficiency in Mining."

Mr. Mitke has not found it possible to come such a long distance east to present his paper, and your Chairman will read it for him.

VOCATIONAL TRAINING AS INFLUENCING  
SAFETY AND EFFICIENCY IN MINING

CHARLES A. MITKE, CONSULTING MINING ENGINEER, BISBEE, ARIZ.

The purpose of vocational training is primarily to equip the man for the job. Besides qualifying him to handle his present work efficiently, it also prepares him for future advancement.

The advantages derived from vocational training by the man himself, are that his efforts become more productive, his earning power is increased, and his view-point broadened. The employer, on the other hand, benefits through increased efficiency on the part of his employees, and also from the fact that better material is available from which to select members of his operating department, and consequently the standard of his entire working force is raised.

With few exceptions, the maintenance of "all American" camps is a thing of the past, and the object of vocational training should be, therefore, not only to instruct the foreign employees in the most efficient method of performing the daily task, but also to train them to become better and safer workmen for the benefit of other employees as well as themselves. The necessity for education along these lines is ably emphasized in the following extract from a report of the late James E. Roderick, chief of the Pennsylvania Department of Mines, 1916:

"The individual must be educated and impressed with the necessity for looking after his own safety and the safety of his fellow workers. There exists a pressing need, therefore, for more thorough education of the worker. The more intelligent the worker, the more careful, other things being equal, is he in his work. The education of the foreign-born workers in the one branch of English alone is said to increase their efficiency about 20 per cent. Just to what extent the conditions of safety are increased is not known, but probably the percentage is as great as in the matter of efficiency."

The Federal Board for Vocational Training in its recent Bulletin on "General Mining" states that 71 per cent of the fatal accidents in the mines of Pennsylvania are among the non-English speaking employees, and 90 per cent of the fatal and non-fatal accidents in Oklahoma occur among foreigners. This bears out Mr. Roderick's statement and emphasizes the need for education along these lines.

Fewer accidents occur among trained workers than where unskilled men are employed. This was especially brought out in 1914 when it became necessary to curtail production in the various copper mines of the Southwest. The newer men were let out at most camps, while the experienced miners were kept on the job. The accident rate dropped immediately. Later on, when the demand for copper increased and it became necessary to hire a great many men, and the companies were forced to take what miners they could get, many of them being foreign, there was a noticeable increase in the accident record.

The fact should be impressed upon the miner that he is responsible for others as well as for himself, and that upon his knowledge frequently

depends not only his own safety but that of his fellow employees. It is a common law in mining that every place where blasting is taking place must be carefully guarded, so that no one can possibly go in before the shots are fired and be injured. Still, accidents of this kind occur time and time again, even in mines where there are a large number of English-speaking miners, and lives are lost needlessly entirely through carelessness and a lack of realization of responsibility for the safety of others. In one of the mines which I visited recently, through the neglect of an English-speaking miner to guard a raise in which blasting was about to take place during the shift, a member of the organization, quite unaware of what was going on, climbed up the raise only to meet his death at the top of the ladder. Such carelessness on the part of an English-speaking employee is criminal and there should be laws on our statute books to punish an individual for gross carelessness of this nature. In the case of a foreign-born employee, his duty to others should be one of the first things to be taught in order to prevent such useless sacrifice of life.

No underground employee can be neglectful of the lives of his fellow workmen. In many instances one careless act may endanger the lives of almost the entire shift. Too much stress cannot be laid on this feature of safety education. Ignorance can no longer be proffered as an excuse when every opportunity is being afforded men to learn not only how to perform efficiently the most ordinary acts of their daily task, but to acquire knowledge of a higher nature which, formerly, was only obtainable in high-class schools and colleges.

During the past few years many of the hazards in mining have been eliminated—no longer is it common practice to bring up a raise or chute directly under the track, and where these are occasionally used, strong grizzlies are made and placed over the opening, in order to prevent the men from falling through. Bars at manways are now the custom; bars and gates at shaft stations and on shaft cages; the guarding of trolley wires, etc. In fact, operators and managers, who are keenly alive to the situation, are sparing neither thought nor money in an effort to do everything possible to safeguard their men. However, no safety device and no large expenditure of money can safeguard a man from accidents which are the result of his own neglect or carelessness, such for instance, as the neglect in barring down the ground immediately when going on shift, rather than take the chance of working under loose rock; or deliberately returning to work in a dead-ended working place without first blowing out the gases produced by blasting. In such instances the only safeguard the operator can provide is to endeavor to educate the men to a keen realization of the dangers resulting from their actions.

#### VOCATIONAL TRAINING ON THE JOB

Incidentally, education develops a more intelligent view-point for the miner of what his employer is endeavoring to do for him, and thus paves the way for better co-operation. The thought and conversation of a man shoveling in a stope are to a large extent limited by his environment. Suppose he is told nothing more than "Muck this waste into a wheelbarrow, tram it into the other chute 50 feet away." This man cannot

possibly take the same interest in his work that he would if the special condition were explained to him. The above order, accompanied by the following explanation was given to miners by a wide-awake shift boss in the presence of the writer:

"See here, this is a heavy stope in which you are working. We have to mine as fast as we can in order to get away from a lot of bad ground. You can see the timbers breaking above your head which were only put in a few days ago. All this needs catching up. After you clear this waste put it into the other chute about 50 feet away, for the purpose of filling up that stope which badly needs waste. 'That stope is just crying for waste.' While the timbers are still holding up it happens to be a stope in which we are away behind with the fill, and I am anxious to have waste put in so that it will soon be producing ore again and help make wages for us all."

Explanations of this character are examples of profitable vocational training on the job. We should have vocational training both underground and in the class room. *More explicit orders should be given and an effort made to give the men a more intelligent understanding of the work they are doing.* Hasty orders, merely giving a few commands, without detailed explanations, are unsatisfactory, both to the miner and to the boss. The modern shift boss should give his instructions in a straightforward manner and thus enable the miner to obtain a *bird's-eye view of the constructive program which is before him.* For example, the commencement of a stope may be the beginning of a certain piece of work which will take anywhere from six months to several years to complete. The miner will take a much greater interest in his work and perform his duties far more intelligently if he knows what he is ultimately working for, rather than knowing only how many tons are to be produced that day. We should have vocational training both underground and in the classroom. There are some instances of classes in mining being actually conducted underground. However, in a great many cases this is impracticable. The instruction given underground by the shift bosses is individual, in a classroom it is collective and is given to groups numbering as high as 200 men.

Among the practical and technical studies taught in the classroom, those should first be taken up which deal with the miner's daily occupation, and should include methods of illustrating the best way of doing things. Simplicity in most cases will be found to be the guide to success, as the common mistake which is being made in most vocational courses is that too great stress is being laid upon the technical side, which is too far advanced for the rank and file of the employees to grasp and can therefore only be taken advantage of by the exceptional few, while the great opportunity of teaching the essentials of mining in the simplest form to the great majority of the men is being overlooked. The teaching of the principles of safety and the essentials of mining might be combined with the teaching of the English language to foreign-born employees, and thus expedite the transition stage through which the worker must pass while being transformed from an unskilled employee to a good safe workman.

# TRAINED MAN WILL OUTDRILL THE UNTRAINED MAN

It has been proved beyond a doubt that vocational training will greatly improve a man's efficiency. Take the miner who consistently drills the cut in the bottom of the face while driving a drift, and compare the results of his footage per day with that of the man who has been trained to drill a standard round, which has been worked out scientifically for the class of ground in which he is drilling, and the results will show that there is no question but that the trained man will greatly outdrill the untrained man, even though the latter may be a good miner.

Many a miner commences work underground without any previous experience in mining and slowly accumulates over a term of years the knowledge which fits him to be a first-class employee. Without instruction he must learn, discard, and re-learn various methods of doing certain work until he develops what he considers to be the best way of doing things. Even this latter may be a very inefficient and crude method. Through vocational training all this preparatory grounding in principles can be covered while the man is working at some of the elementary jobs underground and thus eliminate a great deal of waste time on the part of the man through having to work out these things for himself. He then starts off with the best known methods, and if he is intelligent will try to improve on these and his rise will undoubtedly be quite rapid.

In these days of variable mining methods, it is impossible for the ordinary miner to work long enough at different camps in order to become sufficiently expert at each, and the only solution is that the miner take advantage of the training offered and through this medium gain an insight into the various methods which he may not have an opportunity of seeing in practice. This information, is now available in a great many mining camps, free of charge, both through company classes and also in classes under the supervision of the United States Government.

The common labor at present obtainable for underground purposes is not as intelligent as formerly. Moreover, a large percentage of the labor is not American and has to be educated not only in its duties but in the English language. Americanization is, therefore, one of the most important subjects to be combined with vocational training.

The two great subjects which should come under the heading of vocational training are—Americanization (which includes a study of the English language, and the principles upon which our Government is founded, as well as citizenship); and practical and technical studies in the essentials of mining. Every employee should have loyalty to this country and also to the company by which he is employed. A man is a very poor workman who has not the interest of his country and his company at heart.

CHAIRMAN TILLSON: The subject is now open for discussion. Are there any remarks in regard to vocational training as applied to our mining operations?

## DISCUSSION

MR. E. E. BACH (Pennsylvania Americanization Bureau): I wish to emphasize the Americanization side. I wish to say to the people who are

here from Pennsylvania that they will all be given a chance within the next three months along this line. Pennsylvania has now a program upon Americanization in which every one in the entire state may take part. It is divided into three particular groups: First, the educational; second, the industrial agency; and third, all the co-operative agencies. We will have within your hands within the next three months the names of all the illiterates in Pennsylvania, and we will ask you to get them in contact with the public school system, where they may acquire the English language.

We hold that the American language, working conditions, living conditions, and citizenship are the four principal lines in Americanization for these foreign-born people. We can give you data which will prove to you that merely the learning of the American language increases the efficiency, the labor turnover, and makes for stability of labor. All these things have been worked out scientifically. We now have data by which we can prove these things.

CHAIRMAN TILSON: I am sure that all of us want to know what others here know of the activities of their own companies in regard to their methods of vocational training for mining. It is a subject that is not so well developed as many subjects, and for that reason it is of all the more interest to us.

#### VOCATIONAL TRAINING IN PHELPS-DODGE CORPORATION

MR. W. W. GIDLEY (Phelps-Dodge Corp.): The vocational training has been conducted quite extensively within the last two years by the Phelps-Dodge Corporation, located at Bisbee, and is continually developing to a much larger scale. The vocational classes are run weekly. They are in charge of a person who was formerly connected with the University of Arizona. Papers along practical methods of mining are written by the various members of the Mining organization, for men and bosses. Some papers are written by the superintendents, and some are sent in by the management. One paper on some particular branch of mining operations is read each week and thoroughly discussed and all the students of these vocational classes are required to study these papers and to answer all the questions that are embodied in these various papers, by having standardized methods in that company.

The students at this vocational school are given preference for promotion, etc., depending, of course, upon the examination that they have had. This year they are going to go into the vocational work on a much larger scale, and probably if I am able to be with you next year, I can tell you more about it. But as to the results of the vocational training, there can be no question, and I think it is fast becoming quite a necessity among all corporations. Efficiency is the crying need of the hour, and mining at the present time is advancing with tremendous rapidity. New methods are being introduced constantly.

We have endeavored to standardize every method—standardize in certain ways of raising, drifting, and stoping. All rounds must be drilled the same way, all headings and shaft work—there is one standard method,

and all the students who attend this vocational school are taught these methods.

One feature of the results is this: Many of us who worked in mines and who have handled men in mines probably have had this experience. You hire a man; you put him to work. He has had previous experience in mining. You state to him what you want done and how you want it done. Perhaps you go on then and see your next men throughout the mine. This first man will say, "Well, I know more about this work than the boss does; I have a better way to do that." Perhaps he goes at the work in the opposite direction from the instruction given him by the boss. But when men are taught the one standard method by which to do things in this vocational school, it is of great assistance to the foremen in handling men, because they know the one standard way of doing things and when the boss or foreman goes along and instructs the men along these lines, the men as a usual thing know no other way of doing things.

#### THREE TYPES OF SCHOOLS

Mr. REED: In 1914 I was connected with vocational training. It started at the University of Kentucky and ran in connection with local assistance rendered by the Consolidation Coal Company. Our experience was that where a local man takes care of this work, it requires a great deal of effort on his part to keep it up so it would almost be out of the question to expect it to be carried on by some one who had something else to do unless he is especially paid for it.

That work, as I outlined it to you, was not strictly vocational. We ran three schools; one dealt with the instruction of the foreign born, teaching the non-English-speaking man on conversational English dealing with tools of his trade and things that came up in everyday life so that he could understand the foreman's orders.

The second dealt with the instruction of the American who did not know how to read and write his native language.

The third was a school that I spent most of my time on and that dealt with getting the miners and others who had a little bit of ambition to get ahead and instructing them along the lines of this profession. We started with arithmetic and went through the entire course. You will find among coal miners that their education stops at a very primary point in public schools. In addition to that we taught the subjects that were outlined in the schedule by the University of Kentucky, namely, mine gases, ventilation and drainage, and running throughout the entire ten weeks. We carried a subject which was called "Safety and Dangers", and that was instruction in the safe and dangerous practices inside of coal mines, dealing with how to prevent accidents. We usually start with about forty or fifty men and we finish up with anywhere from eight to ten, so it is a considerable task upon the person who carries on that work to keep it going, but I must say this, that out of those eight or ten men who completed those courses under me, there is not a single one of those men who had ambition enough to go ahead and finish up his work who

has not gone to a pretty high position in our company or in other companies that he has moved to. One of those men is now general manager of a good-sized coal corporation in the Southern part of Kentucky. A great many of the others have reached the position of superintendent, so we have that to show to the men that it does pay. It is an inducement to make them stick to it, but you will find that only the best grade of men will stick through to the end, but I think it is well worth the time and trouble of any person to get those men weeded out and that is about the only way you can get them weeded out, by seeing if they have inside of them that which is necessary to stick to a thing and finish it.

CHAIRMAN TILLSON: If there is no further discussion we will pass on to the next subject.

We will ask Mr. George Martinson, Safety Inspector, Pickands Mather and Company, Gilbert, Minnesota, to give us his paper on "Industrial Nurses in Mining Communities."

#### INDUSTRIAL NURSES IN METAL MINING COMMUNITIES

GEORGE MARTINSON, SAFETY INSPECTOR, PICKANDS, MATHER AND COMPANY,  
HIBBING, MINN.

My experience in the metal mining regions is confined to the Lake Superior district, and particularly to the Minnesota ranges. Therefore, I can deal with this subject as concerning only this district. However, since conditions throughout the metal mining regions of the United States are no doubt similar, there may be some points discussed that may be of interest to all of you.

Before considering the question of Industrial Nurses in Mining Communities, it might be well to describe the conditions under which our employees live. Approximately, one-half of them live in what are commonly called "Locations." Locations are communities in which practically all of the houses are owned by the company. They are, as a rule, located in the vicinity of the mines. Many of these homes have water and electric lights and are rented to the employees at a nominal rate, usually \$1.00 per month, per room. That is, if a family occupies a five-room house, they pay \$5.00 per month. In addition to this, they pay a very low rate for electricity and water. All of these homes have large lots, usually 70 by 125 feet, affording plenty of sunlight and air. The remainder of our employees live in villages near the mine. These villages are much cleaner, and more attention is paid to sanitary features in them than in the average municipality. Given these excellent conditions one ordinarily would assume that the field for the services of a nurse would be limited to caring for the sick, and to first-aid work. We feel, however, that we have found a much larger field for her services.

It has been established beyond any doubt that a contented workman is more efficient than one who is discontented. Inasmuch as the success of an industry depends upon the efficiency of its employees, it is therefore wise to consider their happiness and contentment. If it is within



the power of an organization to remove any causes of inefficiency and unrest, it should be done. There are numerous causes of unrest and they present as many problems and remedies. Not the least of these problems is that of keeping the family contented.

Elbert Hubbard said:

"True life lies in laughter, love, and work."

The metal mining industry is well able to, and has been, furnishing the latter essential to a true life for some time. But what have we done to further the laughter and love?

#### UNHAPPY HOMES MAKE DISCONTENTED WORKMEN

The larger proportion of our miners are of foreign birth. They have settled in our communities with their families. Their wives, being of foreign birth, have come to this country, usually leaving their relatives across the water. They have been brought into our midst and have been left to shift for themselves. Having no warm friends, they have missed the social life to which they were accustomed in the country from whence they came. Finding no social life, it seemed to them that an insurmountable barrier prevented the enjoyment of the social diversions they craved. If this condition existed for a considerable period, what would be more natural than to have them become disgusted with America and its industries which, to their minds, was responsible for their unhappiness. This unhappiness would eventually affect the work of the husband, for instead of finding his helpmate waiting for him with a smile, he would be greeted with a tale of dissatisfaction. With these conditions prevailing, it makes no difference how good the working conditions, or how large the pay check, the man will eventually leave the community for one in which he thinks his family will be satisfied. They will move and find conditions in their new home about the same. After a few more moves, always looking for that better place but never finding it, the workman becomes dissatisfied also, and he begins to feel that the industry is responsible for his unhappiness. When this idea begins to enter his mind, he becomes a comparatively easy prey for the sleek-tongued agitator.

It makes no material difference upon whom the responsibility for this condition rests. It is here. It concerns us as an industry, and we must prevent it. In other words, we must help supply the joy and happiness which will supplant the tears with laughter, the first requisite of the true life. I am reminded of a few lines by C. E. Bowman:

"There is not a place in earth or heaven,  
There is not a task to mankind given,  
There is not a blessing or a woe,  
There is not a whispered yes or no,  
There is not a life, or death, or birth,  
That has a feather's weight of worth—  
Without a woman in it."

There, I believe you have the answer—the industrial nurse.

## NURSE MUST HAVE QUALIFICATIONS OF SOCIAL WORKER

Now, let us assume that we are all agreed that a nurse may prove a profitable investment, and that one or more will be employed. Possibly you may think that a trained social worker would be more satisfactory. Since the adoption of the eighteenth amendment, the liquor question is not acute. There is no great problem of unemployment to deal with and, as I stated before, the housing problem is better taken care of than in most communities. This being true, we can eliminate the idea of a social worker. There is some need, of course, for work of this kind, and it is my opinion that we should have a person who will be able to fulfill the duties of a nurse and social worker as well. By virtue of her professional training, the nurse can be of service to the workers at the time when they are in trouble and most responsive to kindness. After having gained their respect and love in this way, she can begin her social duties.

The foreigner in common with the rest of us has a certain pride about himself and his home, and we should respect the privacy of the home at all times. It is therefore patent that the nurse have tact, in order to get the confidence of the folks with whom she is to deal. Little Joe Krakovich needs a new romper suit, and his mother would love to have him dress like Jim Fisher who lives next door, but she is unable to cut the cloth and make it. On a friendly visit the nurse learns of the mother's wish and assists her. In a few days little Joe is playing with Jim and looks just as much an American. Are the mother and father pleased? Of course they are. When selecting a nurse, don't forget that qualification—she must be able to do plain sewing. She, of course, should be a graduate of some reputable training school and, if possible, one who has had a good education before going into training should be engaged. The nurse should be able to take the lead in the little social gatherings which she must promote. But after all is said, outside of her professional training, tact is really the fundamental requirement.

A brief explanation of our plan might be of interest to you. Our nurses are members of the safety department, and do their work under the direction of the safety inspector. They are also, of course, responsible to the General Superintendent or manager of the group of mines in the district in which they work. Their responsibility to the physician concerns only the cases which he is caring for. That is probably better illustrated in this manner. The physician who is caring for a family where there is illness advises the department of the fact. The nurse visits them, and tries to make the sufferer more comfortable and cheerful, explaining in detail any instructions which the physician may have left. Her responsibility to that physician ends when his case is disposed of. In this way, it is almost impossible for the physician to make use of her as an office assistant, or send her out to apply dressings or do other work for which he is being compensated. The nurse then, being responsible to the company, may feel free to make any suggestions as to the improvements in our medical service, without feeling that she has overstepped the bounds of professional etiquette. Our instructions to our nurses are simply this:

## INSTRUCTIONS TO NURSES

"Here is where our people live. Go out and do your best to help them keep their bodies healthy and their minds free from worry. Sympathize with and help them in their sorrow. Try and leave each home happier because you were there and, finally, try to inculcate in them the spirit of love, not only within the family, but for their neighbors and for America. Remember always, that in their eyes YOU are the company."

The instructions to our nurse may not seem explicit, but it is utterly impossible to lay out a specific plan for her to follow. She, of course, makes weekly and monthly reports of what she has accomplished, but the written and spoken words cannot begin to do her work justice. The real report can only be obtained by going into these communities and noting the changes which have taken place since the advent of the nurse. For example, let us take the case of an ordinary family. One of the children is sick. The nurse calls and helps make the little sufferer comfortable. Before leaving she teaches the mother a few things relating to the care of the child. She calls at this home often during the period of illness, becoming acquainted with the other members of the family and with their immediate neighbors. She learns the birthdays of the children, calls them by their first name, inquires about their school work, in fact she is interested in every affair of their daily lives. Soon she has established herself in the neighborhood. She remembers the birthdays of the children and comes to them on that day with some little gift. Soon the people begin to look forward to her visits with pleasure. The mother of this family has not been in good health and has dreaded to go to the hospital for an examination. Soon, however, the nurse will suggest this and will make an appointment with the hospital, accompanying the mother on her visit. Perhaps a few decayed teeth are the cause of the trouble. She will prevail upon her to have the necessary dental work done. After this work is done, the mother, being again in good health, commences to take a new interest in life. Then comes a desire to improve her home. She will want new curtains and new furniture, and of course the friend of the family, the nurse, is called upon to assist in the selection of this material. She will then wish to associate with her neighbors. The first step in this is usually taken during the canning and preserving season. The folks are brought together in a home, where the nurse has arranged for a demonstration by a person skilled in that work. The friendships formed at this little gathering grow, and probably during the winter they begin to meet at little-neighborhood parties, sponsored by the nurse. After she can associate with Americans, and have the family dress like them, the mother learns to laugh and to live. Then, instead of the workman coming home to a harping, nagging wife, he finds that joy has supplanted gloom and his home is, as it should be, a temple of happiness. In the home where happiness reigns, there you will find love, not only in the family, but also love of America, its institutions and industries. When this attitude prevails among the workmen, and America's industries recognize the blessed trinity of laughter, love, and work, we will have made a real start toward the solution of one of the great problems confronting us.

CHAIRMAN TILLSON: I know your applause indicates that you all greatly appreciate this fine paper that Mr. Martinson has been kind enough to give us, and I feel sure that it isn't out of the way that we should have a paper on such a subject come before our individual Section.

I should like first to have Mr. McIntyre open the discussion on this subject.

#### DISCUSSION

MR. M. D. MCINTYRE (Pickands, Mather & Co., Cleveland): I know of one place in particular where we had a home fitted up for the nurse and our folks provided funds for her to select first-class furniture but by preference she got some old furniture. She wanted to do that because she wanted to show the wives what could be done with old stuff fixed up. I think a whole lot depends on the tact of the nurse.

MR. S. C. REYNOLDS (Aetna Life Insurance Co.): In the anthracite fields one of the large anthracite operators has established just what Mr. Martinson speaks of—community nurses and hospital units in isolated mining communities. It is wonderful what this feature has done in a moral tone for that mining community. It has built up the relationship that should exist—which, unfortunately, we haven't had existing in the past—to the extent that we might have had of which Mr. Martinson speaks, natural love. I thought of it this morning when I was over in one of the other sessions when we were dealing with how to get this safety-first idea across, who was the most responsible, the foreman, the superintendent, the manager or the workmen themselves.

It seems to me that what we want to do is to get a closer relationship, and that is one of the means of doing it. The owner of the mine I am thinking of now told us that they had fixed up that little brick building that had been used primarily as a lamp house until it was too small. The nurse was there in her white uniform. This work leaves the feeling with the workmen who go by and have had their minor injuries attended to that the employer is really interested in their welfare; it brings the workmen and the employer closer together.

CHAIRMAN TILLSON: I would like to know whether or not you take advantage of the services of the visiting nurse to follow up absent employees, to visit the homes of those men who have been absent say three days in succession to find out if they are sick or on a drunk or whether the children are sick or what is the matter that they don't come to work.

MR. MARTINSON: Our nurses are hired primarily for the tact we feel that they have. In fact, we have had authority to put on more nurses for nine months and haven't found a girl that I thought had the qualifications, and rather than put on some one whom I wasn't satisfied with, I let the job go.

MR. RHODES: A visiting nurse went to a house where there were five sick children and the wife thought that the nurse should give her entire time to her family. The husband was making nine dollars and a half a day with the Case Threshing Machine Company. The wife said the Case Threshing Machine Company had inaugurated this thing and had money enough to allow this nurse to take care of those children. She asked her

husband to resign his position, which he did. It aroused resentment in that case.

MR. MARTINSON: We have never had any trouble of that kind. Our people have always felt, I believe, that they have had all the service from the nurse they were, in fairness, entitled to.

MR. RHODES: What would you personally instruct your nurse to do if she came back and reported to you that a family expected her to give her entire time to them?

MR. MARTINSON: I believe I would tell her to do just as she had been instructed before, not to give them any more time than she felt was necessary at that home. We have been working with the nurses for about four years and that question never has come up.

MISS M. MCKAY (Industrial Nurse, Hydro Electric Power Com., Toronto, Ont.): We quite frequently come across cases in visiting where the nurse cannot remain and give her entire time but, as a rule, we know of some one we can put in there and give the help that is needed. We can't always put an experienced person in there but we can put a person in who, with supervision, can give the help that is needed, and that often gets us over the difficulty.

MR. MCINTYRE: In a case of that kind; I think that we wouldn't care to have a visiting nurse devote her entire time there but we could handle that as an individual case. We could hire some one there to take care of the situation, to help the family out before they had a chance to start any resentment.

MR. REYNOLDS: During the last six months our company has installed hospitals and nurses at mining communities, both in the anthracite and bituminous fields on their own initiative and at their own expense. I have in mind a mine where we had three hundred employees and I don't think I have ever heard anything of that sort coming up; and I don't think any one of those non-English speaking families would expect a nurse to devote her whole time to the family. They readily understand that she is covering the whole community, the men and the employees and is giving what service she can.

We don't want her to go into a house uninvited. She approaches that in a roundabout way. She gets acquainted with the children and gets to know the family and the little peculiarities and gives the service we desire.

CHAIRMAN TILLSON: I think we realize that Mr. McIntyres' remarks on that question in a broad sense covers the situation as well as anything can.

I would like to ask Mr. Martinson to consider a former question, and that is as to whether, if the community is large enough, even though only representing one mining county, it might not serve to some advantage for the visiting nurse to be employed by the Borough Council, or whatever form of organization the community has, instead of directly by the mining company, although without doubt the mining company is paying the expense of those things through public taxation, but human nature realizes that they have to play fair to a certain degree where they are dealing with their fellowmen and they get a wrong idea when they

are thinking of something as a corporation, that they can dip their hands into its money-bags, that it is theirs for the asking. That is a psychological impulse that exists in all of us. When we realize that the nurse belongs to the community, we realize that others have just as big a right in that nurse as we do.

MR. R. D. HALL ("Coal Age"): There is a great deal of feeling around the mining camps that the doctor doesn't give enough attention to the individual patient, and there is a great deal of resentment. It is sometimes alleged that the doctor neglects his patients, and sometimes, in fact, he does. That is met very well by the trained nurse who comes in there and takes care of that patient during a period when the doctor can't be there and she is able to make the excuses for the doctor—and sometimes the excuses are perfectly reasonable—and help to avoid the resentment that would otherwise be felt, and there is very little question but what, if she had managed to ingratiate herself sufficiently with that family, her explanations for her own absence would be sufficient. I think in the particular instance mentioned, the man's back was very much to be preferred to his face, and I don't think anything would be lost by his leaving the camp. There are some people who are so unreasonable in their demands on a corporation that if they left it would be a source of joy to the whole community. I think he was probably one of that class.

MR. WILLIAM CONIBEAR (Cleveland-Cliffs Iron Co., Ishpeming, Mich.): My Company has had industrial nurses for ten years. Whenever we find a woman is run down, if it is in the summer months, we have a summer rest house where she can go for from one to three months to rest. If we find a mother is run down and it is necessary for her to go to the hospital, we send her there. If her husband is making eight or nine dollars a day at the mine, he pays for it; if he can't afford it, we pay for it. There has never been any friction or any trouble come up at all and we have employed nurses for ten years.

MR. G. J. JOHNSON (Homestake Mining Co., Lead, S. Dak.): We have established standard nurses all on salary. We have had that for so long the people have gotten used to it and like it quite well. Our nurses don't go out on cases. Whenever there is need of a nurse, the case is brought to the hospital and in that way the individual case can be given more time. Very seldom do we have any overcrowding in the hospital and thus we have found no need of visiting nurses.

MR. GIDLEY: I paid a visit to Mr. Johnson last year and I was very much impressed and very much interested in the method by which the Homestake people conduct their hospital operation. The physicians are allowed absolutely no outside practice, working under a strict salary basis. I know that in a great many mining communities a great deal of dissatisfaction often arises from the fact that where physicians are allowed to do much outside practice (They, of course, like the ordinary run of human nature, are looking after the monetary side of the question) they very often given more attention to the outside patient than to the employee of the company, and that causes much discontentment among the employees; I believe the Homestake people have that problem solved.

MR. JOHNSON: They visit the homes. Not only the employees but the families are covered by these calls. If the case justifies it, we ask them to appear at the hospital; if not, the people are at liberty to call for any specific physician on our staff, but they do not make the calls to the houses to a great extent.

CHAIRMAN TILLSON: How many physicians are on the staff and how many employees have you?

MR. JOHNSON: We have sixteen hundred employees and we have ordinarily five or six physicians. The service is free to employees.

MR. BROWN: What salary is paid the physicians?

MR. JOHNSON: I have never paid any attention to that.

MR. GIDLEY: With reference to the salaries, the Chief Surgeon of the Homestake Company told me last summer that the salary of physicians ranged from \$250 a month up.

MR. ORR WOODBURN (Globe-Miami First Aid, Globe, Ariz.): It is amusing; they come to me in first-aid work and ask me about this and that, and complain of the service they get from the different doctors.

The private physician down town usually has the railroad work and those railroad boys come up to the Mining Company hospitals and pay cash money for their treatments because they get better treatment, and some of the mining boys go off to this same railroad physician and pay cash money because they think they get better treatment. I know of so many instances that it is very amusing, and I doubt, if you would run it down, whether you would find any instance where the doctor was slighting the company patient, as he wouldn't enjoy the respect of the community if he gave that kind of service.

#### SHOULD NURSE BE USED TO LOOK UP ABSENTEES?

CHAIRMAN TILLSON: I haven't heard any one discuss the question in regard to the visiting nurse trying to reduce absentees. I might say that in our experience that is one of the most valuable functions that the visiting nurse has. It means more in dollars returned directly to the company.

MR. MARTINSON: I believe that most of the men have missed the point entirely that I was driving at in my paper. We absolutely divorce the nurse from the doctor. We don't hire the nurse because we want her to help the doctor in his work. We figured that if he wasn't getting enough money or had too much to do, he would have to have an assistant, or if he didn't get enough money we would have to arrange that some other way.

Our idea is this: That the nurse could be of some social service. We could hire a social worker but she wouldn't have the way of worming into these families and getting under their skin, if you want to use that expression, and trying to do something for them in the way of removing some of these ideas that people are getting or have been getting in the last few years concerning industry and capital. That is the point we made. We feel that is the big point in the nursing proposition. We don't provide the nurse with a place to dress injuries; we are paying a doctor to do that and he has to do it.

The nurse has been able to tell us of instances where the doctor has alighted or hasn't done the proper thing by his patients and in such cases we like his back better than his face.

Now, this question of looking up absentees. We have not used our nurse for that to any great extent because we have felt that if the nurse comes into a home and inquires (particularly in a boarding-house) as to where Joe, or Pete, or whoever she is looking for is, they will feel that she is some one sent out by the general superintendent or the mining cabinet at the camp to see what he is doing, and, of course, he resents it. He should. I wouldn't want a nurse to come into my home to find out why I wasn't at work. I feel that my employer should feel that I was honest enough to do the right thing and I think these men would feel the same.

Our absentees are looked up by our local safety inspectors who put in a great deal of time looking up absentees. We have found that has worked out a great deal better.

Now, in regard to the community employing the nurse instead of the mining company, I might say that our communities are particularly fortunate in the fact that they have plenty of money to spend and they all have nurses. Our school districts have nurses; they have a number of them.

We want our people to feel that they are absolutely working for the squarest and best outfit and that is the only way we can keep our operations going properly, that is, to get that idea home to the men, and unless we can give them this little service why they feel that it is a problem of the community and doesn't help us in their eyes, and we want to feel that the people are benefited by the services of the nurse.

MR. R. H. SEIP (The New Jersey Zinc Co.): I would like to take issue with Mr. Martinson. He said he did not feel it was good policy for the nurse to look up absentees, that that would cause resentment, that they should send a man from the safety department.

Now, if the nurse is as tactful as she should be, I don't believe that that would cause as much resentment as it would to send a man from the safety department to find out where this man is. The point I am making is that a great many absences are not due to the sickness of the man himself but it may be due to the sickness of his wife or children. We have found that to be the case and when the nurse goes around to find out why the man is not working, she immediately finds out the other cause for his absence—that he has to stay at home and look after his wife or his children. Now, if that is the case, the nurse takes care of the sickness and arranges with the company to look for some one to take care of the work. Now if there was a man sent around to do that he would have to go back and report that condition and the nurse would then have to go to take care of it. That is one reason why we do send a company nurse out to follow up absentees.

MR. REED: I believe that if nurses go around to find out if it is sickness that is keeping the man from work they will be welcome. I think that when you want to find out just exactly how many men are drunk and lazy and just simply don't want to be on the job that you ought to send around a man in the capacity of a policeman or a safety man.



CHAIRMAN TILLSON: The fact that a nurse goes into the home and finds out the condition that is keeping the man away from work increases the number of men coming out to work, and that is where you make money by having a visiting nurse. I think that wasn't properly emphasized when I mentioned that the visiting nurses could return very materially and directly to companies for their services.

#### THE INDUSTRIAL VISITING NURSE FROM THE DOCTOR'S VIEWPOINT

DR. A. J. LANZA (Medical Director, Hydraulic Pressed Steel Company, Cleveland): Mr. Martinson's paper was very fine. There is no question at all but that a visiting nurse is worth her weight in gold.

I have spent a great deal of time in the mining camps of the Rocky Mountain District and I am perfectly free to say that I could not have accomplished a tenth part of my work if I had not been assisted by able, conscientious, and efficient visiting nurses. There is absolutely nothing like them and nothing to take their place.

On several of these other points I find myself very much at issue with some of the things that have been brought up, particularly in regard to the correction of absentees. I think all of us are inclined perhaps to get away from the fundamentals. In the first place, what is a nurse? A nurse is a woman who has put in three years of her life in getting an education in a first-class hospital in the care of the sick. She has three years of arduous toil and it is a very hard life. She has to take the examination from the State Board of Health to show that she is fit to take care of the sick. Her education and her training, therefore, entitle her to take care of the sick, and they don't entitle her to do anything else. Don't mistake me for a minute when I say that because I am fully aware of the enormous value that a visiting nurse or any other nurse can be, but when you get right down to it, her function is to take care of the sick, and I feel like the gentleman over there, that if you employ a nurse in other departments to run down absentees or the like, you are hiring a person for one thing who is trained in another.

I have in mind a very large corporation not very far from here that employs from ten to twelve nurses in the employment department for the purpose of visiting absentees, their idea being that the nurse, because she had a uniform on and a sweet smile, could go around to John Jones' or Jack Krakovitz's house when he didn't come to work and find out why he didn't come to work and go back and tell the employment department. They take advantage of the fact that the family's first idea when they see a nurse in the nurse's uniform is that she has come to take care of the sick; that is what she is for but instead of that she comes to find out whether Joe is drunk or gone to the baseball game or his mother-in-law's funeral, and the men resent that and they call them "dog-catchers."

Fundamentally, the purpose for which a nurse functions is first in the care of the sick and then in so far as her contact with the people and the families in the care of the sick enable her to be of help and assistance in other lines, and just in so far as she does that, she becomes more and more valuable to the organization that hires her; but I cannot see the

proposition of hiring a trained nurse to be a record clerk or a stenographer or running down absentees or half a dozen other things that you find in the various places.

I can't quite see Mr. Martinson's point when he says he doesn't hire the nurse to be a help to the doctor. If primarily the nurse is educated to help a physician in the case of the sick, which is absolutely appropriate, as it is the only education she gets and is carried out to a very high degree of specialization, why hire her to be other than a help to the doctor? I can't conceive of a first-class medical system in an industry not needing nurses.

In all my wanderings over a great many mining camps and a great many mining corporations where the medical service is handled in many different ways, I have come to certain rather clear-cut conclusions. The system may vary and it is bound to vary in so far as local demands make it necessary. I can't compare a medical system, for instance, in a remote place in Arizona where they have to do everything, with a more settled community in Michigan, or in New Jersey. You can't compare them. Therefore, the thing by which your medical system falls or rises, efficient or not efficient, is the spirit behind it, and where you have a medical system that is run for profit, it is no good. If the medical system is based upon profit for the physician or hospital or corporation running the medical service, why you inevitably get one result—a maximum of price with a minimum of service.

Let us remember in all this talk about the function of the nurse that the fundamental thing is that she is educated through a long and arduous process to take care of the sick and just in so far as she dovetails her duties away from that solid foundation, the proposition falls down.

(The following paper by Mr. Hubbell arrived too late for presentation at the meeting.)

### GETTING THE SAFETY MESSAGE TO THE INDIVIDUAL MINER

N. D. HUBBELL, GENERAL MANAGER, DAVIS AUTOMATIC CRADLE  
MANUFACTURING COMPANY, UNIONTOWN, PA.

The best known safety device is a careful man. Safety appliances and safety rules are of course essential, but their effectiveness is limited by the extent to which the safety idea is a controlling factor in the lives of your workmen. It behooves us then to get the safety idea to our men in such a way that it will make an impression,—an impression vivid enough to dominate their every act, not merely for the time being, but all through their industrial lives. And in order effectively to get the safety message into the minds of our workmen and to keep it there continuously, the whole atmosphere must constantly be kept charged with the safety idea. This called for a comprehensive, well balanced program of safety propaganda; comprehensive in that it effectively reaches all classes of workmen;

well balanced in that it covers all phases of the safety idea and lays the proper emphasis on each.

The safety man then, in order successfully to put across a program of safety propaganda, must study his problem thoroughly and systematically. As I see it, there are six steps or phases of this task:

1. Study your safety problem, especially your Analysis of Accidents by Causes, to determine what ideas you need to instill in the minds of your men to prevent accidents.
2. Study the psychology of all classes of your workmen to learn the best ways of reaching them.
3. Study the other fellow's methods with the purpose of adapting as many of them as possible to your own problem.
4. Work out your safety messages so that they cover the whole field and in addition have enough novelty to attract attention.
5. Send out your safety messages in enough different forms and through different channels to reach all workmen effectively.
6. Change the subject matter and channels of presentation often enough to keep them from going stale.

I now want to outline rather briefly several features, some of them started and some only projected, for a safety campaign in the bituminous coal mining region. Time does not permit me to go into detail regarding the organization and workings of the whole safety department, so I will confine myself to the principal methods or mediums used to get the safety message to the individual miner.

#### I. THROUGH PERSONAL CONTACT WITH OFFICIALS AND SAFETY COMMITTEE MEMBERS

Personal contact is the best way to get any idea across. Consequently the most effective way to get the safety message to the individual miner is through his contact with the local mine officials, foremen, assistants, fire bosses and safety committee members. The officials meet the miners at work in the pit where they can illustrate and drive home safety lessons as the need for them arises. Workmen respect suggestions coming from officials whom they know to be practical men, especially since they can be enforced by disciplinary means if necessary. However just because the foreman has this personal contact with his workmen, you can't simply "pass the buck" to him on safety work and expect permanent results through his efforts. The foreman is primarily a production official, safety is a side line with him and properly so. It is a mistake to try to make the foreman put safety first and production second. The thing to do is to show him how to handle it effectively as a side line and to keep pushing it. There are several ways of keeping the foremen keyed up to safety.

Apply the personal contact principle to your foremen. You as safety men should visit the various foremen at work in the mine and go over with them their specific safety problems. This also gives you a chance to cultivate the acquaintance of your foremen. A little time spent on such missionary work will yield big returns in getting the co-operation of your

local officials. Pass along to them some of the new ideas you get from magazines, meetings, and other sources. Get their opinions and ideas, you will find that they have some good ones which they will give you in conversations, but which they never would express in a meeting.

I don't mean by this to discredit meetings, for they are splendid features. You should hold an informal meeting of your local officials at each mine during the fore part of the month. In addition to being present yourself, arrange to have one of the higher operating officials present. At these meetings give them some facts and figures covering accidents for the preceding month. Give them the standings of the various mines or units figured on some such basis as the number of days lost on account of accidents per average hundred men actually working. This will stimulate the element of competition and works pride. Give them the analysis of accidents by occupations and causes, pointing out any special features, either good or bad. Give them also the cost of accidents and compensation for their mine. Very few foremen have any idea as to what accidents cost, and an insight into it stimulates them to better efforts because they are interested in costs. Take up in detail each accident happening at that mine during the previous month, having the official in immediate charge of the injured workman give a report of his investigation of the accident. No man likes to report that an accident happening under his supervision could have been prevented, consequently this plan is particularly effective in reducing accidents. In addition you can also discuss any accidents happening at the other mines that have a special point of interest. Have an open discussion giving every one a chance to bring up any safety suggestions or ideas that they may have. Occasionally you can give the men a short inspiring safety talk. We all need such inspirations occasionally; that is why we are here.

Supplement these meetings with a weekly letter to all of these officials. These letters can take up peculiar accidents of the previous week, digests of current magazine articles, or other safety topics of general interest. A short letter each week will accomplish wonders in broadening out your foremen and giving them a safety background.

Carry the meeting idea one step farther. Once in a while get the major officials from all local mines together for a dinner meeting. Have a good speaker from the outside give them a talk on some phase of safety. They get tired of home talent no matter how good it is.

Give your foremen the ammunition for the fight against accidents, help them map out their campaigns, show them how to reach their men with the safety message and keep their interest up by the same means that yours is stimulated—facts, figures, new ideas, and inspiring talks. You will find that they will respond by doing their share to permeate the atmosphere with the safety idea.

## II. CONDITION AND CONDUCT OF THE PLANT

The second medium for presenting the safety message is the condition and conduct of the plant. The general impression a workman gets as to the way a plant is run has much to do with his attitude toward safety.

If safety rules are made and enforced, and if everything is kept safe, clean, and orderly, it will be reflected in the workmen. The opposite is also true. It is useless to preach safety to the men if the company is not doing its share to make working conditions safe. I have placed this second in importance, it could be elaborated on to considerable length but I will leave it for you to fill in your own details.

### III. BULLETIN BOARDS

The third medium of presentation is the bulletin board. This topic has several aspects. Location, lighting, arrangement, and changing of bulletins has to be considered but these phases have been quite thoroughly covered in the N. S. C. literature so I will pass on to the main topic,—the bulletins themselves.

In the first place you need a high-class series of general accident bulletins. For this series you naturally want the N. S. C. bulletins because they are the best obtainable. They are the cream of all the accident bulletins produced in the country. But, although each one forcibly drives home a safety lesson, they are necessarily of an impersonal nature and do not draw men to them as a rule.

Consequently in the second place you need a feature series that will draw your men to the bulletin boards. The comic cartoon is the most effective drawing card or headliner. In addition to the comic feature, these cartoons can also be used to drive home some point in connection with the safety or industrial relations program. The house organ exchange list.—Life, Judge, The Literary Digest, and other magazines will furnish good jokes on almost any subject if you are on the lookout for them. These can easily be worked over into themes for cartoons. Have your main characters continuous, running through the entire series and if you are getting a laugh in each issue, it won't be long before your men will be watching to see what has happened to them next. If you don't have both the time and talent for drawing cartoons, you can usually find some one in the organization or in school who will make the drawings for you on tracing cloth at a reasonable cost. They can then be photostated or made up as reverse blue prints for posting. It is surprising how easy they are to work up.

In the third place you need a series of bulletins of your own accidents. Local color is an attraction even if the bulletins are rather crude. If the trouble and expense of making photographs does not justify this method, have sketches made and printed in the same way as I suggested for the cartoons. Use the more serious accidents due to carelessness and you will find that they are very effective.

In addition to the regular bulletin board, you should have a large device of some kind, a safety target, a safety thermometer, a safety race, a safety and accident battlefield, or some unique device for showing inter-departmental or inter-works standings. Advertise this competition feature conspicuously to foster works pride. It may not appeal strongly to every one but it will react the live ones.

## IV. FIRST AID AND MINE RESCUE CLASSES

Your first aid and mine rescue classes include quite a number of your most intelligent and enthusiastic employees. Their classwork is closely allied to safety so if you handle them properly you can get from them some good support for your safety campaign. Give them safety talks, discuss with them some of your plans and scheme. They may not be able to give you many original ideas, but they have the workman's viewpoint and can give you some worth while pointers on his psychology. Give them something to do in connection with the safety program and they will feel a certain responsibility for it and help put it across.

## V. HOUSE ORGAN

The fifth medium of presentation is the internal house organ or employees' magazine. The point that we are interested in is how to dress up the safety message in the house organ so that our employees will read it. We all know that only a small percentage of our employees will read the ordinary, well written, heavy article on safety. There are several methods however, by which the safety message can be put in the house organ so that it will at least be noticed. Use illustrations freely, pictures and cartoons always attract attention. Put in photographs or sketches of some of your accidents, safety devices, or some individuals or groups that have done some real good safety work. Use some good safety cartoons even if you have to make them up to fit your own needs. Use jokes to illustrate points in your safety articles. We all like to read funny stories, so weave appropriate ones into a safety talk and it will be read just to get the stories. The man who can't be reached through his sense of humor is the exception so capitalize this characteristic. Verse is also good. Almost anything written with rhyme and rhythm will be read. Write some short verses on safety themes; if they are funny, so much the better. Write some parodies on popular songs using safety themes and you'll soon hear the kids singing them. Unique wording appeals to the more intelligent, try parables or fables for a change. If you have a number of more intelligent men who are live wires and on whom you can depend to help put it across, try a free for all poem. Take a character like a goat or a mule, let him go into the mine and have some of the more common accidents happen to him. Write up the first installment in a humorous strain, using a simple meter. Then throw the poem open by inviting every one to send in verses for the next installment. It will be pretty generally read and some will do some intensive safety thinking in writing up the verses. Safety slogans can be used to advantage all through the magazine for fillers and in this way you get safety on every page.

## VI. CALENDARS

The sixth medium of presentation is a safety calendar. Take a dozen of your best accident bulletins or cartoons and make up a calendar similar to the N. S. C. calendar only on a smaller scale, and put one in each

home. Calendars are used constantly so they will be continually preaching safety for you.

#### VII. THE SAFETY RULE BOOK

The seventh medium is the handbook of safety rules. Opinions differ as to the effectiveness of such a booklet, but if you have men who can read and understand it, a book of specific safety rules, carefully and concisely compiled, will get the safety message to your men. You should however have some means of checking up to see that they are read and understood.

#### VIII. MEETINGS AND SHOWS

The eighth medium of presentation is meetings and shows. If your workmen understand English well enough to warrant it, hold safety meetings or revivals occasionally for them and their families. Cover public safety in addition to safety as applied to the mine. If most of your men cannot understand English use motion pictures, the universal language. Get one of the Bureau of Mines' films on mine safety, run a comedy in addition to it, and give your workmen tickets for themselves and their families. These shows are good attractions as a rule and you will have no trouble getting a crowd out.

#### IX. THE CHILDREN

The ninth medium of presentation is through the boys and girls. In connection with your playgrounds, boys and girls clubs, boy scouts, juvenile first-aid classes and the regular schools, arrange to have safety taught to the children while their minds are still plastic. They will have a great influence on their parents and then, too, they are the next generation of workmen. Instill the safety idea in their minds and it will bear fruit for years to come.

Now there is just one more thought I want to leave with you, the success of the safety program depends largely on the personality of the safety man. He must be a live wire, energetic, resourceful, diplomatic, and a good organizer. He must have that rare quality of being able to get the whole organization behind him, but not too far behind. I have been able in the time allowed to only hit the high spots, details that I wanted to give have had to be omitted. If any of you are interested in more details regarding any of these ideas I will be glad to give them either in the meeting or outside.

ADJOURNMENT.

### WEDNESDAY MORNING SESSION

**T**HE meeting was called to order at 9:45 by the Chairman, Mr. B. F. Tillson.

**CHAIRMAN TILLSON:** The Chairman of our Committee on Standardization of First-aid Practice, Major Shields, has, during the past year accomplished a piece of work which it had been our desire to get accomplished

for the past three or four years, and we had not been successful in reaching the conclusion which Major Shields has brought about in his Committee this year. I think that we owe a great deal to Major Shields for putting the matter through in its entirety, that is the co-ordination of the National Safety Council with the United States Bureau of Mines and the American Red Cross upon a final, uniform set of standards for training men in first aid and for judging first-aid contests.

Dr. Hunter, of the American Red Cross, who was Secretary for Major Shields' meeting yesterday, will present Major Shields' report which I said would be postponed. It will be really a report of the Secretary of the Committee, and I will ask Dr. Hunter if he will present the resolutions which that Committee voted upon.

REPORT OF COMMITTEE ON STANDARDIZATION OF FIRST-AID PRACTICES

DR. E. R. HUNTER (American Red Cross, Washington): It was recommended:

1. That all classes of employees should be taught first aid and men in supervising positions should be specially trained.
2. Minimum number of hours for a course in first aid to be fifteen.
3. Physicians who have specialized in first-aid work and laymen who have received card of appointment as first-aid instructors from the U. S. Bureau of Mines or Red Cross to teach first aid courses. (Doctor Sayer and Colonel Conner to confer with reference to issuing a list of qualified instructors, etc.)
4. Endorsement is given to the two standard first-aid text-books to be issued with identical text by U. S. Bureau of Mines and the Red Cross Miners' Editions which are now in the course of revision.
5. In the revision of the Bureau of Mines and Red Cross text books standard materials be advised or named for instructive purposes. Also, the triangular bandage be emphasized as preferable for first-aid use as compared to the roller bandage. The teaching of the use of the roller bandage to be confined to special cases.
6. Judges at first-aid contest to act as a committee of three, two physicians and one lay judge. The lay judge to be acquainted with the industry represented in the contest. No contest to be held unless a physician be represented among the judges.
7. Contest to be held in accordance with rules formulated and approved jointly by the U. S. Bureau of Mines and the Red Cross and National Safety Council. Recognition in drawing up rules for first-aid contests to be given to suggestions submitted as to discounts, team rules, etc., as made by Mr. B. F. Tillson of the New Jersey Zinc Company and Dr. H. W. Gentles of Chicago and others.
8. Any first-aid contest to be regular and standard or to be officially recognized shall be first authorized and held under the auspices of either the American Red Cross, the U. S. Bureau of Mines or the National Safety Council, and that a representative of one of these organizations be present at the contest and that no reward of Red Cross medals or U. S.



Bureau of Mines and National Safety Council prizes or awards be given unless the above is complied with.

9. The National Safety Council Mining Section has a permanent first-aid contest committee composed of a representative from the U. S. Bureau of Mines and the American Red Cross to act in co-operation with the Mining Section and the National Safety Council in authorizing and supervising contests and awarding prizes and medals.

CHAIRMAN TILLSON: Having heard the report of the Committee on Standardization of First-Aid, I would suggest that we have Major Shields' paper and any discussion of that report will come in conjunction with the discussion of his paper.

### STANDARDIZATION OF FIRST-AID TRAINING AND FIRST-AID CONTESTS IN MINING

MAJOR M. J. SHIELDS, FIELD DIRECTOR, FIRST-AID DIVISION, AMERICAN RED CROSS, WASHINGTON, D. C.

I was asked by your Chairman, Mr. Tillson, to prepare a paper on Standardization of First-aid Contests, but it is obvious that in order to accomplish anything in regard to Standardizing First-aid Contests, we must first have a broad standardization of the methods of First-aid Training and Instruction.

I fully realize that it would be impossible to make a standard that will apply to every kind of mining and quarry or to fit every condition in each individual mining operation. But there are some basic facts connected with all mining accidents (and for that matter with accidents in other industries) and certain modifications that can be made by the individual plant to apply to their peculiar type of casualties and working conditions without seriously changing the standard method.

There are other important reasons why we should have First-aid Training standardized besides for First-aid Contests. A principal one is the labor turnover; not only miners going from one mine to another, but the changing of instructors whether doctors or laymen. A first-aid man is trained in a certain way at a certain mine or plant. He then goes to another mine or district where they have first-aid technic, materials, and methods that are radically different, although perhaps getting the same results in the end. The man will have to be instructed over again and to be instructed over again will be a loss to both employers.

As I stated above, we have now a few standard practices that are nearly universal such as:

The Schaeffer or Prone Pressure method in artificial respiration.

The universal treatment of open wounds with iodine and a sterile dressing and the condemnation of washing wounds by first-aid men except possibly the use of gasoline in dirty greasy wounds.

The non-interference of the first-aid man in all eye injuries. The first-aid being only to protect the eye on the outside with compresses and bandage and send the injured man to the surgeon.

The treatment of shock by application of external heat, wrapping the patient in blankets and getting him to the doctor or hospital as quickly as possible.

Unfortunately nearly every instructor has a different way of treating burns and scalds. There is a great divergence in the instruction in regard to bleeding and the treatment of fractures.

#### FIRST-AID TEXT-BOOK

Some instructors teach first-aid that is too superficial, others go beyond first-aid. The crux of the whole matter, can be solved I think by a first-aid text-book, that will be adopted and universally used by all mining companies in their first-aid training. I am happy to tell you that such a book is now in the course of revision and will leave the press about January 1, 1921.

Your sub-committee on Standardization of First-aid, of which I have the honor of being Chairman, and the U. S. Bureau of Mines Red Cross Committee on First-aid have agreed to certain changes in the American Red Cross First-aid Text-books, Miner's Edition, and it is now being revised by Colonel Charles Lynch, and when issued, it will be adopted by the U. S. Bureau of Mines, Red Cross, and your committees and a report submitted the N. S. C. Mining Section for approval.

This book will contain the following standard methods of first-aid treatment of the following:

- a. Wounds, Contusions, Sprains and Burns
- b. The Arrest of Hemorrhage or Bleeding
- c. Treatment of Dislocations and Fractures
- d. Rescue and Resuscitation. Methods After Electric Shock, Drowning and Suffocation from Gas, Smoke and Other Fumes
- e. Methods of Handling and Transporting the Injured
- f. Standard First-aid Methods
- g. Standard Methods of Organizing and Maintaining First-aid Classes
- h. Qualification of Instructor
- i. Rules for First-aid Contests

As to the value of first aid in the mining industry little need be said, as its untold value has been proven by actual results years ago. I would like to add just one tribute by quoting from Mr. C. L. Close, Manager of the Bureau of Safety, U. S. Steel Corporation, who states that, since the inauguration of first-aid work, approximately 16,881 men have received this instruction. Mr. Close, speaking of the value of first aid, says: "The primary object of first-aid and rescue work is to have available specially trained men to take immediate charge of the situation where a life is imperiled, as in the case of a serious or extraordinary accident; to give prompt and proper attention to injured men, and to provide clean and aseptic dressings that will prevent infection in the wound. The excellent work of these first-aid and rescue crews has been effectual in reducing the number of infected cases to a minimum. When we consider that infected cases require three and one-half times as long for recovery as non-infected cases, there can be no doubt that the work

of these crews is of the greatest value to the workmen and to the employers.

"The first-aid and rescue crews also render very valuable services in cases of asphyxiation, electric shock, heat exhaustion, freezing, and minor accidents. In cases of cave-ins in the mines and in severe asphyxiations at the blast-furnaces, they render all possible assistance in excavating the injured men and in giving first-aid until they can be moved to an emergency station. Many workers who have been entombed and overcome by gas owe their lives to the splendid work of these crews."

Not only has first-aid training proved its value in actual accidents but it has also demonstrated its worth in "First-aid to the Uninjured or safety. For when you have a trained first-aid man, you have a well rounded out safety man.

#### FIRST-AID CONTESTS

Now as to First-aid contests, "The First First-aid Contest" in the United States was held at Scranton, Pa., on November 6, 1906, and was sponsored by Captain W. A. May, President of the Pennsylvania Coal Company, the Patron Saint of First-aid in Mining. This contest was arranged by me and participated in by first-aid teams from each mining district of the Pennsylvania Coal Company and from the beginning the First-aid Meets have extended to every mining section of the country.

The original idea of first-aid contests came over from England in St. John's Ambulance Association first-aid competitions and are intended to promote, extend, and stimulate interest in first-aid work. Contests are also highly educational both to the participant and the onlooker. A contest takes on somewhat the excitement of a real accident, teaches men to be self-reliant, cool, and collected.

Unfortunately contests in the past have been the cause of a great deal of dissatisfaction and thereby dulled the interest in first-aid work, greatly retarded and in some sections seriously injured first-aid work.

One of the principal causes of this dissatisfaction has been inefficiency and inexperienced judging. Having physicians who have had no experience in either first-aid instruction or first-aid work, who either expect very superficial work or expected highly trained-nurse bandaging, judges who played favorites, etc.

From first-aid teams that have been trained differently by different instructors, the almost universal protest is, "Our doctor told us to do it this way" and in this sentence you have the strongest argument for standard methods of training, and I feel assured that nearly and perhaps all these causes of dissatisfaction can be eliminated by a standard text-book, methods of training, rules and discounts for first-aid contests.

Anticipating the report of our sub-committee in regard to first-aid contests, I submit the following:

All judges of first-aid contests shall have had experience in teaching first-aid work, or previous experience in first-aid contests.

That the judges shall be both physicians and laymen, in the proportion of two physicians to one layman. This layman can be a safety engineer, mine foreman, or any one connected with mining who has taken

a full course of first-aid and holds either a Red Cross or U. S. B. M. First-aid certificate and who has had practical first-aid experience in or around the mine.

That the judges shall work as a committee, two physicians and one layman judge, progressing from team to team in each event or problem.

That contests shall be to the maximum of 50 teams for each day in preliminary contests and in final contests 20 teams. This will prevent the employment of incompetent judges and tiresome prolongation of the contests. When State and National meets are held, a sufficient amount of time or days shall be allotted for the contest so as to prevent hurry in the contest or haste in running off ties. No contesting team will be allowed to wear a spectacular or distinctive uniform; they shall be dressed in ordinary working attire.

That the Standardized American Red Cross First-aid Text-book Miners Edition Revised, should be the authorized book for reference and guidance. That the following table of discounts shall be used. That the judges shall be remunerated at least for their expenses, as this makes for competent and efficient judging.

#### STANDARD TABLE OF DISCOUNTS FOR FIRST AID CONTESTS

|                                                                                                                             |   |
|-----------------------------------------------------------------------------------------------------------------------------|---|
| 1. Not doing the most important thing first:                                                                                |   |
| a Failure temporarily to control hemorrhage previous to application of tourniquet.....                                      | 7 |
| b Failure to remove patient from dangerous gas, roof, electric wire, etc., at proper time.....                              | 4 |
| c Failure to do the most important thing first otherwise than specified in a and b.....                                     | 6 |
| 2. Slow and indifferent work:                                                                                               |   |
| a Slowness in work—Deduct one point for each minute or fraction thereof consumed over time allotted for working problem.... | 1 |
| b Lack of attention on part of one or more team members.....                                                                | 2 |
| c Lack of neatness.....                                                                                                     | 1 |
| 3. Defects in Bandaging:                                                                                                    |   |
| a Failure entirely to cover wound.....                                                                                      | 2 |
| b Bandaging or treating wrong location of injury.....                                                                       | 2 |
| c Tight bandage .....                                                                                                       | 2 |
| d Loose bandage .....                                                                                                       | 2 |
| e Improperly applied bandage.....                                                                                           | 2 |
| f Insecure or granny knot.....                                                                                              | 1 |
| 4. Defects in artificial respiration:                                                                                       |   |
| a Improper or insufficient preparation of patient for artificial resuscitation .....                                        | 3 |
| b Incorrect timing of artificial respiration.....                                                                           | 2 |
| c Ineffective method of artificial respiration.....                                                                         | 9 |
| 5. Splints:                                                                                                                 |   |
| a Splint improperly padded.....                                                                                             | 2 |
| b Splint improperly applied.....                                                                                            | 4 |
| c Use of antiseptic material .....                                                                                          | 3 |

7. Failure to be aseptic.....
8. Failure to have on hand sufficient and proper material to complete dressings .....
9. Awkward handling of patient.....
10. Assistance lent by patient.....
11. Arterial bleeding:
  - a Application of tourniquet so as not to stop bleeding.....
  - b For non-application of tourniquet charge additional to a.....
  - c Tourniquet applied so as to stop bleeding but at wrong points, or in such way as to injure patient.....
12. Not treating shock.....
13. Failure to command properly.....
14. Improper treatment not covered by above, such as wrong dressings, etc. ....

These suggestions and others that I will make to the Sub-committee are based on the fifteen years' experience in holding first-aid contests and on the replies to a questionnaire that was sent out through the Council to a number of mining companies. I have also had access to the report of National First-aid-Standardization Committee appointed by the President, in 1915, and the Sub-committee on Health and Medical Relief report to the Director General of Railroads February 20, 1920.

The following is a preliminary summary to the questionnaire sent out by your Sub-committee on First-aid Standardization, etc.

#### SYNOPSIS FROM 45 REPLIES

Number who have First-aid, 42.

Number who do not have first-aid, 3.

Question No. 2, As to the value of First-aid, the replies are unanimous.

Question No. 6, Which First-aid Text-book do you prefer?

|                                        |    |
|----------------------------------------|----|
| Red Cross Miners Edition.....          | 14 |
| U. S. B. of M. Advanced First-Aid..... | 11 |
| No Preference .....                    | 15 |
| Other Text-books .....                 | 3  |
| No Answer .....                        | 12 |

To Question No. 8. What percentage of your men are trained in First-aid?

|                                          |
|------------------------------------------|
| 5 per cent of Employees in 13 Companies  |
| 10 per cent of Employees in 10 Companies |
| 15 per cent of Employees in 2 Companies  |
| 20 per cent of Employees in 3 Companies  |
| 25 per cent of Employees in 3 Companies  |
| 50 per cent of Employees in 3 Companies  |

Question No. 11, Is First-aid given on the company's time?

|                 |    |
|-----------------|----|
| Yes .....       | 24 |
| No .....        | 10 |
| Part Time ..... | 11 |

**Question No. 13, Who gives your First-aid Instruction?**

|                              |    |
|------------------------------|----|
| Given by non-physicians..... | 21 |
| Given by physicians.....     | 10 |
| No replies .....             | 4  |

**Question No. 15, Do you hold contests?**

|                    |    |
|--------------------|----|
| No .....           | 13 |
| Yes .....          | 15 |
| Noncommittal ..... | 17 |

**Question No. 17, Do you consider that a proper discount table is the best method of judging contests?**

|                |    |
|----------------|----|
| Yes .....      | 28 |
| No .....       | 2  |
| No reply ..... | 15 |

**Question No. 18, Do you approve of the Red Cross rules and Discount tables?**

|                     |    |
|---------------------|----|
| Red Cross .....     | 19 |
| U. S. B. M. ....    | 6  |
| No preference ..... | 6  |
| No reply .....      | 14 |

**Question No. 21, What proportion of lay judges do you have in contests?**

|                      |    |
|----------------------|----|
| 1 to 3 .....         | 2  |
| 1 to 2 .....         | 3  |
| 2 to 1 .....         | 2  |
| 50-50 .....          | 1  |
| All lay judges ..... | 1  |
| No answer .....      | 36 |

**Question No. 23, What is in your opinion the desirability of having lay judges?**

|                               |    |
|-------------------------------|----|
| Percentage of lay judges..... | 17 |
| All Physicians .....          | 9  |
| No reply .....                | 19 |

I would like to state in closing, that a complete report will be made to your General Committee of the Mining Section at the final meeting of our Sub-committee both in regard to Standardization of First-aid Instruction and First-aid Contests and I would like to add that I have, in an effort to have in future better and more satisfactory and successful contests, collected and arranged by States a roster of the names and addresses of 250 physicians and industrial surgeons who have had experience in judging first-aid contests. The list covers thirteen states. The Red Cross, U. S. Bureau of Mines and the National Safety Council have copies, and copies or a list of judges in your state can be had by addressing either of them.

I shall during the coming winter, make an effort to collect a similar list of competent non-physicians or lay judges.

## DISCUSSION

MR. D. HARRINGTON (U. S. Bureau of Mines, Denver, Colo): In the first place, any engineer or any person that has anything to do with first aid work or training cannot be opposed to standardizing. I have been around in the Bureau of Mines about five or six years, and we have had an immense amount of trouble in the past because our trainers were trained according to different systems. In the last few years we have been trying to standardize our work as far as we are concerned, and at the present time we do not have any difficulty that we had four or five years ago by having one fellow being followed up by another who said his training was all wrong.

As far as the first-aid contests in themselves are concerned, as Major Shields has said, the main trouble in the past has been the method of judging, and the method of judging has ruined first-aid work in a number of instances.

When we had our International Meet recently in Denver, we decided upon a new system of judging, and as far as I can find out we have had a minimum of complaints. We adopted the system of committees. I have heard absolutely no complaint whatever.

Another thing we did was to eliminate the elimination contests. The first-aid contests were held on two days. I would like to suggest that in the future elimination contests be eliminated.

In the past, the success at the National Meet has been largely predicated upon the number of teams attending. I don't think that should be. It seems we would be in better shape if every mining district or even state should have an elimination contest and the winner of that elimination contest should go to the National Meet and not have such an enormous number of teams to handle at the National Meet. In the first place when a Meet is held on the Pacific or the Atlantic Coast, teams sent from the other side find it costs them several thousand dollars. It puts too much burden on them. If you held a state elimination contest, you could state that the winner of that contest would be sent to the National Contest and the expense sustained by the entire mining public of that state, and then the expense would be practically negligible on any one company.

MR. GEORGE MARTINSON (Pickands-Mather Company): I am thoroughly in accord with Major Shields' idea of the standardization of practices. I think it is a fine thing. I believe that the time spent on arranging standard methods for judging contests is not well spent. Personally I am not in favor of first-aid contests for this reason: That before a contest is held, in a certain period during which you do intensive training, you get an over-dose of stimulation, and after the contest is over reaction sets in. We have found that a better way is to have our first-aid classes regularly each month. Then we don't need the stimulant and there is no danger of getting an overdose of it.

MR. ORR WOODBURN (Globe-Miami Dist. First Aid): I take exception to that. The only way that we develop good, extraordinary first-aid work is through contest. As far as there being an over-stimulant and then let

ting it die, it is to be understood that it is just like these safety drives—it does not mean that is the only safety work we do during the year; it means that at one period we pick up speed and get enthusiastic and store up enough energy to go along for another year. We are just simply setting a higher standard and a better standard.

I happened to be instructor of the Old Dominion Company in that line of work and had charge of first-aid work for several years. Our general manager was keen for contests. I used to beg him not to get up contests because they made so much dissatisfaction. But they have developed some wonderful first-aid men, and those men who are the very prominent and reliable men forget all of the unpleasantness of the contest.

About the contests making the game unpopular and causing dissatisfaction: You have one team out of a hundred coming home with first prize. Most of the others have to go home and stand the brunt and take the slurs and kidding of all the other members of the plant for the rest of the year if they get beat. It is hardly fair to take a team that finishes fortieth place and gets a score of ninety and two-tenths, and subject them to that criticism. They have represented their community and their company very well in the National Contest, and yet coming home with fortieth place sounds bad.

To offset that, I made the suggestion that instead of finishing up one, two, three, etc., in order, we finish up in classification. For instance, take the teams that finish between ninety and one hundred per cent and call them Class "A" teams. We will agree that one is as good as another even though the score is different. Put all those between eighty and ninety in Class "B", and below that in Class "C", very poor. There was only one team of the sixty-eight at Denver that fell below eighty. The sixty-seventh team had a score of eighty-two per cent. The first forty teams were above ninety, and yet there were only four or five teams that could go home in good grace. It is all right for the boys who go to the contests; they realize what they are up against; there is nothing unfair about it; but at the same time it is very difficult for a team to go home with fortieth or forty-fourth place and yet have a score of above ninety per cent. I think it could be arranged to grade them in that way and not limit the number in any one class.

MR. J. P. HAWKINS (Clinchfield Coal Corporation, Dante, Va.): I want to bear up what has been said in reference to speeding up the contests. We have done what we think is wonderful work in first-aid contests in one year's time. Last year we sent our team to Pittsburgh and it held forty-ninth place. This year we sent our team to Denver and they got fourth place. Our experience has been that the speeding up of first-aid contests is a good thing. Probably the enthusiasm after the contest is not so great as it was just before, but you find yourselves getting into a rut when there is no contest.

We have had state contests held in Virginia in the last two years, and in neither of these contests have we won first place, but we have sent teams to the National Contests and in both cases we have come out ahead of the teams that won in the state contests, which shows that the stand-



ardizing of judging in contests should be applied not only to the national contests but to the state contests.

Some one has suggested that the winner of the state contests be the only team attending the National Meet, but if such were the case should have been out of the National Meet the past two years; but have sent our team and have come out ahead of the teams that won the state contest.

DR. HUNTER: At the Denver meet I recall a team that took first place at the state meet; there were several teams from that particular state and a team that had made a poor showing at the state meet made better showing there than the team that made the best showing at the state meet. When we first consider that, it may appear to us that it is due to misjudging. At Denver, the team that made such a fine record in the state contest made such a poor showing that it couldn't be compared to the others. It was due to a complete bonehead trick. The things will happen in both state meets and national contests, and, therefore, I don't think we are justified in using the record that was made at the state meet in comparison with the one at the national contest.

MR. WOODBURN: As far as your standardization goes, surely it was working in best form at Denver in all the contests. Never was a contest conducted in any better manner than that. There were sixty-eight teams there two days without any confusion; the contests didn't run until long after dark; there was nothing of that sort, and it was a wonderful exhibition. It just goes to show what can be done in the way of standardization. Those of us interested in mine rescue hope that we can get that up to the high standard reached by the first-aid branch.

There was some propaganda started around the Denver meet to have these national contests every other year instead of each year. We were very much interested in having this meet once in a year at least. It would seem too bad to carry on a national advertising campaign after all these contests—that is what they amount to—and have it only in one issue of the year and then drop down to one every other year. You couldn't expect the advertising to go very far if you did that.

CHAIRMAN TILLSON: Of course, the question of first-aid contests is, to a certain degree, allied with any major sport; it resembles, for instance, baseball, which is a sport which has certain rules, regardless of the reasons why those rules exist. We know that a baseball team may win a series and then lose, and the same thing is likely to happen in first-aid contests. The people have to get used to their misfortunes in first-aid the same as they do in any other sport.

MR. J. W. REED (Consolidation Coal Company): I want to thank Maj. Shields for his excellent paper. We are ordinarily interested in a number of contests each year in different states, and it is quite a problem to supervise and prepare those teams under the various conditions which exist in those states. It is a job to keep track of what the judges want in each state in first-aid work, and I had to make up three sets of standards to train the teams with in order to comply with what I knew they were going up against when they got on the field. It certainly is going

to give relief in not only the national contests but the state, county, and all contests. These rules can be considered standard.

In respect to what was said about first-aid work being boosted up by contests, I feel that is perfectly true, but I want to try and find out if it wouldn't be possible to boost it oftener. I think there should be a national contest at least once each year, and I think that our local contests should be more on the order of our baseball games, that we should not hold an extensive course of training and let it culminate in just one contest. The plan that I want to try and work out for our own team this coming year will be to concentrate our training work pretty well towards the Spring and then try and hold a contest every month, having the winner of the series to represent that section, and have the National Meet take the same place in first-aid work that the National Series used to take in baseball. I believe that if we can get more contests and get them frequently in the small sections where teams are competing and there is considerable rivalry, we will build up an interest in the work a great deal more, and the states will want the standards. The spectators will want to become acquainted with the standards when they know that there is an actual standard, and it will result in their having a better idea and considerable knowledge of some portions of first-aid work which will be of benefit to them. That does not mean they will be first-aid men, but they will have certain knowledge of the essentials such as preventing infection, necessity of protecting wounds, artificial respiration, and a few other things which it would be impossible, in ordinary instruction work, to get scattered around through the mining community.

CHAIRMAN TILLSON: You have a very important proposition before you, of definitely coming to certain standards. In the resolutions of your sub-committee and in Major Shields' paper you have certain definite suggestions. I would like to pin you down and get you to say yes or no, whether you approve of these standards, and I think it would be entirely in keeping with this meeting, after you have finished such discussion, to pass a positive vote of approval of the minutes as they stand and the suggestions made by your sub-committee on which other doctors have co-operated and upon which there has been a good deal of time and attention put by Major Shields. May I ask you to indicate your feeling in regard to these definite proposals that have been made in regard to the nature of the judges, the proportion of the judges, whether lay or physicians, and the adoption of certain practices as proposed by Major Shields?

MR. JAMES THIRTLE (Inland Collieries Company, Indianola, Pa.): We sometimes get competition between teams and the men on the various teams are not working with one mind. The sooner we get down to standardization the better it will be for everybody.

It is impossible to instruct a man fully in five lectures. I would like to see this Council adopt the system of graduated training adopted in England by the St. John's Ambulance. They go through an examination every year. For six years in succession I went through an examination. I think it would be very helpful and it would dispense largely with some of this intensive training that we have to put our teams through to get

them to a contest. This graduated system would keep the men in training the whole of the time.

We have a system of weekly meetings in first-aid and rescue work we have two factions. We train them separately. The course is their own choice and we pass them from one class to another and graduate them from one stage to another. We find that that system is beneficial to us as instructors and to them in learning. I would like to make a suggestion that that be included in the new work of standardization.

CAPT. G. R. G. FISHER (American Red Cross, St. Paul, Minn.): I believe that the vital thing in standardization is a uniform text-book. I spent a year in England and took particular pains to study something of the St. John's Ambulance Association. England is fortunate in this line because there is only one text-book in England, for that matter the British Empire, and that is the handbook of St. John's Ambulance Association.

I really feel, not because I am a member of the Red Cross but after going over the various text-books of this country, that the Red Cross books are the reliable ones to be had.

Along the matter of the contests, I would like to suggest what the people of Britain are doing in first-aid work. Instead of having quarterly contests, the teams have weekly quizzes. I would like to suggest that because it is one way to keep the enthusiasm up and keep before them the correct methods. The quizzes are conducted in this way: A man or woman, as the case may be, would have a distinct question to answer "A man has fallen from the first story. You run to him. He is unconscious and fluid is oozing from the nose and ears. What is wrong?" To answer a question like that you have to be up on first-aid work. That way they keep up the spirit of enthusiasm and particularly correct methods in diagnosing and dealing with accidents.

I would like to urge the adoption of our friend's suggestion, instead of rating from one to one hundred, as the case may be, to classify them as "A," "B" and "C". That would eliminate a great deal of criticism and bantering that naturally comes to an unfortunate team.

MR. E. E. BACH (Pennsylvania Americanization Bureau): I didn't want to say anything because I am a member of the sub-committee, and I was anxious to see what would be said about the committee's report. I think the right procedure would be to vote on the report of the Committee and then have the discussion on the report. It would bring it down to essentials.

DR. W. A. LYNORR (Empire Gas & Fuel Company, Bartlesville, Okla.): I have been very much interested in first aid for years. My connection with the U. S. Bureau of Mines brought me in contact with first-aid contests and the training of people in first-aid work. It is needless to state that every one of us here is familiar with what has been done in first-aid since it was first started in Scranton, Pennsylvania, in 1906, but the contests have become a joke by reason of our incapable or incompetent judging of them by doctors. I am a physician but I have attended first-aid contests where I was positively ashamed of my profession. The

absolutely knew nothing about it. The laymen knew more than they did. I am unalterably opposed to any doctors judging contests unless they are taught themselves in first-aid.

Standardization is an absolute joke to me. We spent two years in the U. S. Bureau of Mines fixing up a standardized work. I am not egotistical in saying it, but I spent two years on that book myself. I wrote every bit of it, and when it had been finished, Dr. Shields and four other doctors were brought in to go over my manuscript and their names were put on as co-authors and I was the third man on the list alphabetically arranged, but they agreed to it that that was the proper work and they standardized it. If that is out of date, let's get the new one that is coming and in two years that will be out of date. I believe we ought to do something and stand by it. If we are going to pull credit for this man or that man because he is the author of it or because the Bureau of Mines has it or the Red Cross, that is foolishness. I say, "Do away with the Bureau of Mines book if the other one coming is going to be all right, but let's stick to what we once do." The railroad men have a book, the Bureau of Mines has one, somebody else has another one. Standardization doesn't amount to anything unless you stand by it. If you are going to use the Bureau of Mines' book, go to the Red Cross and say, "Put your stamp on this," or vice versa.

I believe in contests as an incentive to the men to work all year. They know they are going to be sent to a distant city to see something and they work hard for it.

There are some suggestions made by Major Shields that are wonderful, but there are some that I don't like, but I believe in standardization if we will stand by it.

SECRETARY R. H. SEAR: I realize Dr. Lynott's position in this matter. We have changed books continuously from year to year in the past. In England they have one text-book, but England has had, or the British Empire, if you please, first-aid training for a good many years more than we have. The St. John's Ambulance Corps is certainly a greater work than the first-aid work of the United States, and they have been able to work out a standard of first aid which they can stand by. We haven't got to that stage yet, I believe, and it is going to mean that we will have to continue our work for standardization slowly and surely until we reach a book that we can stand by. I appreciate Dr. Lynott's stand in the matter, and yet I think that we are justified in going ahead until we get to the point where we can't go any farther.

I think one of the biggest things that this committee has done touches upon another of Dr. Lynott's points, that is the judging by physicians. That has been the chief cause for discontent in all contests in the past. I know the judges were more interested in the moving picture machines than in the teams that were working, and yet I believe that the Denver contest has shown what the suggestions made by Major Shields' committee have accomplished. Judging by physicians is of no account if they don't know first aid. You fellows that teach first aid and are called upon to go to some other company and assist them in the judging of their

contests know how difficult it is to judge teams that are not trained under your system. Now, then, can a doctor who doesn't know any system of first aid, not even the principles, judge properly? We are coming to this by combining our lay judges with our physicians and surgeons. It is only a matter of time until we shall have sufficient doctors and surgeons trained so that they will be efficient judges. I believe that when the time comes our judging should be done by physicians.

DR. HUNTER: I want to say a word in behalf of the doctors and I am going through. We have heard a lot of criticism about doctors in judging first aid contests. A lot of it is no doubt true, but I don't think we are hardly fair to the doctors. It is decided to hold a state meet. About two days before the meet is held somebody asks who are going to be the judges. They call in some doctors, there is no preparation made as to the rules or what should be done. Some of the doctors don't know anything about mining conditions and yet you expect them to go there and judge a contest and come away without any criticism.

Dr. Sayers went out to Denver to get the doctors together and go over the rules and the regulations and demonstrate the bandages and bandage forth that would be considered standard. As a result of his work I believe the success of the Denver meet is due, and I think that before we criticize the doctors any further in any of the state meets, it is up to the people that hold the meets to see that the doctors are gathered together in sufficient time and instructed as to what is expected of them. Then if they don't measure up we are justified in criticizing them.

MR. HARRINGTON: I think everybody has lost sight of one point. In the last three or four years, there were very few doctors that knew anything about or cared very much for first aid. During the war period we had a number of doctors that went into the war and they had to learn and teach first aid. Now we have all through the country any number of doctors that are as familiar with first aid and maybe more so than before. In Denver, we canvassed the town to see how many doctors had experience in first aid. We found out we had to have a considerable number of doctors more than probably ever attended before, and we found that we had any number of doctors who had plenty of experience in first aid. We didn't have a doctor on the field who didn't have.

DR. LYNOTT: I perhaps am misunderstood. I said where doctors didn't know first aid they shouldn't be used. In the past we have had too many who didn't know anything about it.

CHAIRMAN TILLSON: The recommendations of the Committee were that doctors or laymen be properly qualified in the knowledge of first aid, making no discrimination in regard to professions but in the qualifications of a man.

DR. R. R. SAYERS (U. S. Bureau of Mines): I would just like to emphasize Dr. Hunter's point. I don't care who you are, doctors or laymen, if you are away from it from two to three years you don't know the method if it is a standard method. You can't remember what to do on if it isn't reviewed for you right there. We went over the rules. Laymen judges had been teaching it recently, therefore they did not

the demonstration, but the doctors that had not been teaching it recently did need the demonstrations. If I had been away from that two years I would know nothing about these dressings. Why? Because I put on so many other dressings in the meantime. An ordinary practicing physician puts on a hundred and one other dressings, and you have to review these dressings that you call standard for him.

Another thing that you have to do is call their attention to all the rules that they are to discount by so they will know what to expect. There are a number of different things that will be taken up, and they are all taken care of by your sub-committee.

MR. WOODBURN: Just preliminary to making a motion, I will say that Dr. Lynott could be very proud of his profession, because the way they handled the contest in Denver was wonderful. They demonstrated the value of the demonstration and how well it had been taken up throughout the country. Here was a team here, there was another—teams from some twenty-two different states, and it didn't make any difference what the problem was, each team was identical no matter what the chances to vary were. You would have thought they had all been instructed by the same instructor even though they used different equipment. That was one of the most remarkable things in the contest.

I would like to make a motion that we accept the report of this Committee and approve of these recommendations as presented. I am quite sure we shall not have a dissenting vote. That, of course, is to include Major Shields' recommendations.

(The motion was seconded.)

MR. REED: I want to ask, in connection with the rules on holding the contests, if there is any provision made as to the selecting and giving out of questions for the contest. In other words, there is a great deal of trouble that arises sometimes due to questions getting in which are in no way covered by the standard and they are of such a nature that each team has to work out individually some method to do it. I wondered if you people, in getting up standards, were making any provision where-by the men that made up the questions would be governed in making them up.

MAJOR SHIELDS: That is a good point and the sub-committee, which will continue its work in regard to the rules and discount tables, will take that matter up. I thank Mr. Reed for bringing up that point; we will certainly make the problems conform with the set of rules that we have.

MR. REED: There was one other thing I wanted to mention. There are two terms used frequently, one in the standards and one in the problems. One is "crushed bone" and the other is "fracture". I wondered whether the new standard would have any information for first-aid men on crushed bone—what to do with them. We get a number of problems about crushed arms, legs, hands, and elbows and the like. We know what to do with a fractured bone, but the question often arises, "Well, this is crushed, what will you do?" We don't have anything definite on it. How are we going to be judged?

**MAJOR SHIELDS:** When we speak medically of a crushed foot or crushed hand, we don't mean a fracture. That, I think, is another point that we can take up so as to specify whether it is a fracture just simply a crushing or contusion of the flesh. The way I understand it is that when you say a crushed hand you don't mean a fracture. It could possibly extend it into a fracture, but we will take that point under advisement, too.

(The question on the motion was called for and the recommendations of the committee were adopted.)

**CHAIRMAN TILLSON:** The next paper on our program is entitled, "Safety Devices on Winding Engines".

## SAFETY DEVICES ON WINDING ENGINES

L. F. MITTEN, VULCAN IRON WORKS, WILKES-BARRE, PA.

Only in comparatively recent years, and entirely within the last decades, have any worth-while attempts been made to apply to mine hoisting engines devices to prevent injury to life or damage to property due to failure of the engines, mistakes of the engine operator, or to accidents to the operator. To realize the importance of adequate safeguards in this respect, one has only to consider that millions of men are now being handled by hoisting and lowering machines operating with danger almost always imminent.

We will not attempt to account for the indifference and neglect of years, for in these days of Safety propaganda and Workmen's Compensation Acts, the necessity of maximum safety in so important a phase of the mining industry is becoming quite generally understood and a live interest in the matter is being taken by responsible mine officials as well as by legislators, inventors, and hoist manufacturers.

Probably the greatest impetus that can be given to the development and use of safety devices on mine hoists are adequate and intelligent laws and Workmen's Compensation Acts. Mine laws should inform mine officials just what is expected of him in the way of safeguards, Compensation Acts make it to his financial advantage to make every possible effort toward safety.

Generally speaking, the inventor and manufacturer have stimulated the interest of the mine officials so that today safety devices for mine hoists are very thoroughly developed and far beyond the laws' requirements and it is possible today to obtain complete protection to life and property in so far as the hoist machine and hoist operator are concerned.

Therefore, in the writer's opinion, the best way to utilize the opportunity afforded by the invitation to prepare a paper on this subject is to outline in concrete form the dangers incident to mine hoisting in general and to show briefly what protection from these dangers is necessary and obtainable.

Almost all accidents in hoisting are due to two general causes, namely: Failure of the hoist machine to function, and Failure of the hoist operator or engineer to act correctly.

Failure of the hoisting machine to function is caused by faults in design, defective material, poor workmanship, overloading and neglect. Of course no safety devices can prevent the failure of a hoist under any of these conditions, but they can prevent to a large extent injury to life and property due to hoist failure from such causes. But in some cases the finest of safety apparatus will be powerless to prevent accident unless backed up by sufficient strength, proper design, and care of the hoisting machine.

It must, therefore, be accepted as of prime necessity that hoisting machines be of ample strength and proper design for the work they are to perform. Just what constitutes ample strength and proper design is usually found to be a matter of opinion of the designer. As to strength, however, a factor of safety of not less than five should be used. As regards design, it will be well to mention a few features that some state laws already require in hoists. Most hoist drums should be provided with an indicator positively driven by chain or gearing from the drum or other hoist part having motion coincident thereto. These indicators should show to the operator the position of the cages or trip throughout the lift or haul, the exactness with which they should show such position being dependent upon the definiteness of the travel limits. Drums should be provided with flanges at each end, extending well above the top of the rope to prevent the rope from winding off. Where multiple layers of rope are wound the flanges should be exceptionally strong to resist outward thrust of rope jamming on the top layers, causing breakage.

Of the utmost importance are adequate brakes, and every hoist should have at least one efficient brake applied to the drum. For long hauls or for deep shafts where heavy loads are lowered by gravity, two brakes are advisable, to be used alternately in order to prevent overheating and probable breakage due thereto. Brakes should be powerful enough to bring the hoist to rest against the maximum load traveling at full speed. Means for adjusting brakes for wear on shoes should be required on all brakes.

Where clutched drums are used their operating mechanism should be such as to prevent slipping out of engagement, and means should always be provided to adjust them for wear.

In the case of steam hoists to prevent breaking of cylinders, large size relief valves should be fitted to both ends of every cylinder to relieve the cylinders of water.

The hoist operator should also be protected as much as possible, and the operating levers should be so placed as to keep him out of the way of a possible flying rope. Safety devices or other mechanism that cause operators' levers to move are dangerous and should be avoided.

The hoist should be designed for the maximum load it will be called upon to handle, and this load should be known to operator and cage tenders. Before men are handled on any hoist, trial trips should be made to test the equipment for possible flaws in materials and workmanship which do not always come to light in the course of manufacture.

Even the best equipment requires care, and laws should require periodic tests and inspections. The laws of some states require that before men



are handled a trial trip be made whenever the steam engine has stood idle for an hour or more, also that there should be definite hoisting signals between hoist operator and cage tender, different signals being used for men than for material, and that all signals for men be given by cage tender and returned by the operator before hoist is started.

In the failure of the operator or engineer to act correctly we have reason for safety devices. It must be understood, however, that the devices are not to be considered as taking the place of the operator. They are intended only to prevent his mistakes causing damage. Only competent men who understand the action and care and use of the entire equipment should be permitted to operate a hoist where damage to life and property may occur. Operators should be given thorough instructions in the operation of a hoist before they are given full responsibility of operating it.

By the foregoing remarks, which are intended to apply to mine hoists in general, it is hoped that the necessity for adequate hoisting equipment and competent operators is duly emphasized.

#### PROTECTION TO LIFE AND PROPERTY PROVIDED BY SAFETY DEVICES

We will now consider the specific protection to life and property, which must be provided by safety devices, so that to as great a degree as possible failure of hoisting equipment and hoist operators may be guarded against and kept from causing damage.

Briefly expressed, the most common dangers incident to hoisting may be enumerated as follows:

1. Cage or trip passing prescribed or safe limits
2. Traveling beyond a prescribed or safe speed
3. Starting the hoist in the wrong direction
4. Improper application of brakes
5. Failure of brake to hold
6. Accidental release of clutched drum
7. Backing away of hoist due to power failure
8. Inability to stop hoist in emergency

Protection from these dangers cannot be had without some form of power-operated brake engine, which automatically applies the brake and brings the hoist to rest through actuation of the safety devices. Such brake engines may be of steam, compressed air, or oil type, according to the power available or preference of the hoist owner. Usually they are of the weighted type, the engine being provided with two cylinders, each having a movable piston, the piston being fitted to a common rod to which, by suitable means, a set of weights is attached, and which also acts to move the brake bell crank. In one cylinder the motive fluid acts to keep the weights in a suspended position ready to be released for application of the brake. The other cylinder contains oil, which is by-passed through an adjustable valve from one end of cylinder to the other, effecting a smooth motion of the piston rod. There is a valve provided at the power end of the brake engine to release the pressure against the piston, allowing the weights to apply the brake. When weighted brakes are not used, the brake is both held in the released position and

applied by direct fluid pressure on the engine cylinder. Either type of brake is normally controlled by the operator by means of hand lever or valve which governs the admission of motive fluid to the brake engine cylinder and its release therefrom. But when the operator fails to act properly, the safety devices take control of the brake from him and use it according to their functions. These two types of brake engines are preferable for high-speed hoists, and on hoists which handle men. On hoists where the rope speed is slow a less expensive form of engine, known usually as the deadweight type, may be used. This engine acts only upon actuation of the safety devices to apply the brake which is normally operated manually, and the weights must be raised to the suspended position by a handcrab after each emergency application. When any weighted type of brake engine is used either to apply or release the brake the arrangement of the weights and the position of brake engine must be such as to preclude the possibility of any obstruction being placed under them, rendering the brake ineffective.

With these introductory remarks concerning the brake engine we will discuss the various dangers enumerated before.

#### I. PASSING PRESCRIBED OR SAFE LIMITS

Practically all hoists have well defined limits of cage or trip travel, movement to any material distance beyond which may result in hoisting the cage into the head sheaves or hauling a trip up to the drum, causing considerable damage to property and injury to life. In balanced hoisting overwinds of this nature, damage is done at the foot of shaft or slope as well as at the top. When self-dumping cages are used to handle material or men, a man-landing is provided usually at the surface, below the cage dumping horns. Should the operator fail to stop the hoist at the man-landing, they will be carried on the cage and somewhat rudely deposited in the chute or hopper, an entirely unpleasant experience and a dangerous one.

For the prevention of this overtraveling or overwinding (as well as for some of its other functions) the safety device usually takes the form of some mechanism positively driven from the drum or other portion of the hoist having movement at all times coincident with the drum. The mechanism moves in ratio with the drum and has a rotating member, which moves from one limit to another and back again, representing the movement of the drum in winding and unwinding the rope in moving cage or trip from bottom to top and from top to bottom. This rotating member is arranged with cams, lugs, or other required projections so arranged that when the cage or trip draws near its travel limits these cams come in contact with switches or catches, which either act to cause the hoist to slow down in approaching the travel limits or force the operator to retard the movement of the hoist under penalty of an automatic application of the brake, which will cause him to have a complete stop of hoist before the cage or trip reaches its travel limit. Should the operator retard the hoist properly, but fail to stop at the limit of travel, the device acts to shut off power and apply the brake, bringing the cage or trip to rest before the safe limit has been passed.

When men are to be handled, where there is a separate man-landing, another set of switches or catches set for the proper limits of travel are automatically brought into effective position when the signal to handle men is given and properly returned. These switches or catches are automatically replaced and rendered ineffective when the signal to handle material is given, bringing the dump limit switches into effective position.

#### II. TRAVELING BEYOND A PRESCRIBED OR SAFE SPEED

Speed limits for handling men are usually set by law, and very often the condition of the hoisting shafts or tracks is such as to limit the speed at which hoisting of men or material can safely be done. Serious damage may also occur to hoisting equipment, especially the motors of electrically operated hoists, if a certain speed is exceeded. The safety device should therefore be capable of preventing the hoist from exceeding a predetermined speed. When the same hoist is used for handling both men and material, it is usual to operate at a much greater speed when hoisting material than when hoisting men. In order to insure the men being handled at reduced or partial speed, the safety device should be such that, when the signal to hoist men is given the operator is prevented from handling men at a greater speed than that prescribed.

For the prevention of overspeeding a centrifugal governor is usually used, so arranged that when the governor balls expand beyond certain limits they lift the governor rod which is provided with means for shutting off the power and applying the brake in case the operator should permit the hoist to travel faster than prescribed.

#### III. STARTING THE HOIST IN WRONG DIRECTION

This mistake in hoists, where no means is provided to prevent it, is quite common and often results in serious accidents as the operator may not notice his mistake until too late. It may happen when beginning to hoist or lower, or after an emergency stopping of the hoist due to overtraveling. On steam hoists it happens when the operator forgets to change the position of the reverse lever, and in electric hoists when the operator carelessly leaves the control level in the wrong position. Safety devices should correct the position of levers or prevent the operator from starting the hoist in any direction until he has corrected the position of the levers.

#### IV. IMPROPER APPLICATION OF BRAKES

By too violent an emergency application of the brake damage often occurs to the brake or hoist mechanism. If such an application occurs when the trip or cages are in rapid motion very serious accidents usually take place. If men are on the cage or trip the sudden stop may cause death or injury. There is a further danger in the case of slope hoists of the trip over running the rope under force of acquired momentum, and then, when the momentum has spent its force, running back and stopping with a jerk, severing the cable or pulling out a drawbar or coupling and allowing the trip to run away and cause great damage on or at the foot of the slope. Emergency application of the brakes through action of the safety devices should therefore be gradual when resulting from overspeed-

ing, causing a gradual slow-down of the moving parts. However, the brake should be completely and immediately applied when travel limits are reached.

#### V. FAILURE OF BRAKE TO HOLD

This may be due to some fault in the brake mechanism, which, of course, no safety device can rectify, but it is usually caused by the operator's neglect to keep the brake adjusted to take up wear of shoes. This danger may be eliminated by mechanical means automatically to take-up brakes as shoes wear, or by a device to cause an emergency action of the brake before wear becomes such as to render the brake useless. This emergency action will prove a rather gentle hint to the operator to adjust the brake, a hint he will probably not require a second time.

#### VI. ACCIDENTAL RELEASE OF CLUTCHED DRUM

Danger due to this cause usually occurs on double drum hoists where one or both drums may be driven by a toothed type of clutch to permit of adjustment of ropes to permit of hoisting in balance from different levels or readily to take up slack rope. The adjustment to hoist from different levels is done by holding one drum, brake applied, clutch disengaged in such position that its cage is at the level from which hoisting is to be done, and then revolving the other drum by action of drum shaft, clutch engaged until its cage is at the desired level. In this operation the operator may fail to apply the brake before he disengages the clutch or neglect to engage the clutch before releasing the brake. Unless he can very quickly stop the drum, which is thus totally released and left without the counterbalance effect of the other drum, rope, and load, it soon acquires a speed that prevents any stopping except the sudden one which comes at the bottom of shaft of slope when the run-away cage or trip gets there. The same thing may occur if the operator pulls the clutch lever instead of the brake lever, or in any other way has the clutch out when it should be in. This recently happened on a large hoist at an anthracite mine near Wilkes-Barre, and the momentum of the run-away drum was so great that it burst to pieces by action of centrifugal force until nothing but the drum spiders with arms broken off close to the hub remained on the drum shaft. Some pieces of the drum have not been found yet. Fortunately no one was injured, but the delay in hoisting and the cost of repairing all damage was rather expensive.

Such occurrences and fatal ones may readily be eliminated by mechanical or electrical interlock between clutch and brake, making it impossible to disengage the clutch from the drum until the brake is applied, or to release the brake until the clutch is fully engaged.

#### VII. POWER FAILURE

This is largely confined to electric hoists and may result, if the hoist is under heavy load, in the hoisting backing away and getting out of control. Means should be provided to apply the brake automatically in case of power failure and keep it applied until the operator has put the control lever in the neutral position.

## VIII. INABILITY TO STOP THE HOIST IN CASE OF EMERGENCY

Regardless of the mechanical perfection of hoists and safety apparatus, something may occasionally happen that will render them non-effective. It is therefore advisable to have some means of last resort when the usual means are non-effective. In the case of steam hoists, an auxiliary throttle to shut off steam is about the only protection in such emergency, and many engines are equipped with two throttles, both levers within easy reach of operator. In electric hoists, however, it is possible to shut off power and apply the brake by the operator's throwing a small switch.

So much for the dangers incident to hoisting and the desirable and obtainable protection therefrom. As it is entirely without the intention of this presentation to discuss in detail the construction and operation of various safety appliances now available, the writer has referred to the construction and action of devices only very generally and briefly. It might be well before closing to make a few remarks about the selection of safety apparatus. It should be as simple in construction as possible and its operation such as not to delay hoisting under normal conditions. It should require the least possible amount of care or adjustment on the part of the operator. The devices should not interfere with movements of the operator nor disturb him unduly—quite the contrary, they should give him confidence in his ability to control and efficiently operate the hoist in his charge. The operator should understand the operation of the devices. The price of the apparatus should be of secondary consideration as the prevention of a single accident may save many times the cost of the best obtainable devices. The protection afforded should be complete.

It might also be advisable for the advantage of any who may desire to pursue this subject further, to mention the most widely known and used safety devices now on the market with a brief statement of the protection they provide.

## SAFETY DEVICES

The "Lilly Hoist Controller" manufactured by the Duro Metal Products Company, 361 East Ohio Street, Chicago, Illinois. Adaptable to steam, air, and electric hoists. Advertised to prevent overspeeding, overtraveling, starting in the wrong direction, to retard the speed for approaching the landings, and to sound alarms to guide operator.

The "Roybel Emergency Governor" manufactured by George F. Royer & Co., 27-31 East North Street, Wilkes-Barre, Pa. Adaptable to steam, air, or electric hoists. Advertised to prevent overspeeding, overtraveling, starting in wrong direction and to compel retardation in approaching landings. This device may also be provided with a trip and signal recording feature, so arranged that the recording instrument will not function if the device is disconnected from the hoist, which insures against the hoist operator detaching the device from the hoist.

The "Nicholson Engine Stop" manufactured by the Vulcan Iron Works, Wilkes-Barre, Pa. Adaptable to steam or air hoists only. Advertised to prevent overspeeding, overtraveling, compel retardation in approaching landings, and prevent starting in wrong direction.

The "Welch Hoisting Engine Controller" manufactured by the Midwest Machine & Tool Co., 1115-1119 Nineteenth St., Denver, Colorado. Adaptable to steam, air, or electric hoists. Advertised to prevent overspeeding, overwinding, retard speed in approaching the landings, and prevent starting in wrong direction.

The "Vulcan Hoist Control" manufactured by the Vulcan Iron Works, Wilkes-Barre, Pa. For electric hoists only. Advertised to prevent overtraveling, overspeeding, starting in wrong direction, accidental release of clutched drum and accident from power failure, to compel retardation when approaching landings, and to compel the handling of men at reduced speed.

In closing, it might be stated that it is not to be inferred that all hoists are subject to the same dangers or are in need of the same protection. Many hoists because of the nature of their operation require no protection. Only a board of mechanical and electrical engineers and manufacturers, expert in mine hoisting problems and equipment, could make a complete classification of hoists and a recommendation of the protection that ought to be provided for each class.

CHAIRMAN TILLSON: Before asking for the discussion, I want to raise one point myself. In reference to the item that was mentioned of having some form of mechanism that would remind the operator if he hadn't kept his brakes in proper adjustment, my experience has been with one type of mechanism to perform that function, the operation being that the brakes had worn too much and had not been taken up and the brake mechanism caused a switch to be opened which really cut off the electric power to the hoist. The idea was then that unless an operator had his brakes normally in proper condition and taken up sufficiently to take care of any previous wear, he would find that he hadn't any current to start the hoist with at all. I want to condemn that particular application. An instance occurred that I know of where the connecting rod, although it looked very heavy and massive between the tops of the two post brakes, failed and the instant that the rod failed there was no brake control of the engine and the same instant that it failed it performed the same function of shutting off all the electric power from this electric hoist. The result was that the operator had no means of stopping the hoist at all. He could not stop it by reverse application of electric power and his brakes were useless. There may be some proper ways of performing that function, and it would then be admirable, but I want to call attention to one that is wrong.

#### DISCUSSION

MR. H. F. LUNT (Colorado State Bureau of Mines): There is one point that I would like to call attention to and that is in the matter of the hoist operator. They have a law in Utah that requires a man to take a physical examination before he is allowed to run a hoist—that is, a large hoist. I think that is a very wise law, and I hope to see it put into effect in other places. In the examination they made in Utah, I think out of several hundred men they only found perhaps three or four who had anything the matter with them that would prevent it, but it does

or occasionally the other way. I know one of my own inspectors in Colorado recently found a man who was quite deaf running a small hoist. They didn't handle over two or three men on the shift, but at the same time this man couldn't hear the signal bell. When he thought it was time for the bell to ring he would simply look at it, and no matter what mechanical device you have, if there is a man of that kind on the hoist you are going to have trouble sooner or later.

Mr. M. J. FLYZIK (Washington State Safety Board): The paper deals with practically modern equipment and there are some very vital suggestions. But what are we going to do with the many concerns that haven't modern equipment? We find that accidents are occurring frequently from lack of exercising proper care with the equipment they handle. We are encouraging in Washington the examination of hoisting equipment before men are hoisted or lowered into the mine. We encourage them, as far as possible, to designate inspectors to go and examine the rope, the cage, or whatever they are using, before men are lowered into the mine. We also try to regulate the speed in most of the mines of the State. We are encouraging the mine companies to provide regular man trips. In many cases we discover that the management use ordinary trips to lower the men. In many cases the cables were found defective and were found to break away while they were lowering the men into the mine. A lot of the companies are providing specially prepared man trips. Those trips are so equipped for safety with devices that in case of a break-away they are derailed. In other cases, they have a cable that they string right around the entire trip and attach it on to the main cable, preventing a break-away; that will, to a certain extent, if properly and constantly used, minimize accidents.

Coming to the question of having engineers properly trained and examined, here is what we are confronted with: There is some opposition, sometimes on the part of the men and sometimes on the part of the management, to putting them through a very strict examination. They say that cuts the incentive for promotion and so forth.

What the gentleman said over here is true. We should not only inquire into their physical ability to run the engine, but we should also endeavor to find out whether or not they are temperamentally fitted to hold such a responsible position. We found out that on one occasion a man came to work and he had had a little family quarrel which he admitted. He took his quarrel to work and he wasn't in the best of humor, and in handling his equipment he attempted to vent his feelings on the engine, which caused a run-away trip and the injury of one or two men.

Mr. WILLIAM CONIBEAR (Cleveland-Cliffs Iron Co.): We are operating twenty-two cages, 3,500 men, four times daily at depths from 600 to 4,000 feet. We pay particular attention to three features. We adopted most of these mechanical devices. All our hoists are electrically driven. No one has access to the engine houses. When the men are handled, going and coming to work morning, noon, and night, as a general rule two men are at the hoist, one man watching the other man. We pay particular attention to our ropes and our cages. No man enters or comes up from

the mine without a cage rider with him, and during the last eight years we haven't had an accident, except with the cage riders, in handling of men. We have had ropes break and hoists fail but we have never had a personal injury case.

CHAIRMAN TILLSON: You notice one question here in particular. I will express an opinion I have heard given in seriousness by men of considerable importance. Mr. Mitten raises the question that the location of the hoisting engineer in his labors should be such as to keep him from being injured providing an over travel of the trip should cause the rope to come over on the engine house.

In a case that happened in South Africa, which was investigated by the South African Governmental Commission, the decision was reached that if they could only locate that hoisting engineer so that the rope would surely hit him, there would be less danger to other men. That is a contrary viewpoint but there is sense in it. If the hoisting engineer realizes that he is going to suffer directly, perhaps there wouldn't be the occasional lapses of care which have happened in the past.

Mr. W. W. TAYLOR (T. L. Smith Company, Milwaukee): I think that hoisting equipment can be fixed nowadays with devices so as to make it almost impossible to have an accident. I have seen two installations recently where if there was any attempt to stop the cage after it was once broken away, it would be found impossible to succeed. I am interested in knowing whether any one has experience with devices which will successfully stop a heavy skip or cage with a load of ten or fifteen tons.

Mr. H. F. LUNT (Colorado State Bureau of Mines): In a vertical shaft I think the ordinary safety dogs will stop a cage. I know several instances where they have been stopped. I don't know of any as heavy as ten tons, but I think if the dogs are kept well oiled so that they work quickly before the cage or skip has a chance to get started, they will stop it. It has happened where a cable has broken high so that the inertia of the cable held the dogs open, a cage has gotten started and simply ripped all the guides out. I don't know of anything that is applicable to incline shafts. I have been looking for something myself and I have talked with a number of the Bureau of Mines engineers to try and find some safety device in a steep incline. There are devices that will work on a slight incline up to forty-five degrees, but when you get from fifty to eighty degrees there doesn't seem to be any device.

Mr. HARRINGTON: I can't give any solution to Mr. Lunt's steep incline problem. On the other hand, I can give an instance of failure of dogs to work in a shaft in Butte. About two or three years ago this happened. The men were ready to be lowered in the morning; there were probably 350 or 400 of them around the collar of the shaft, and in some way or other the engineer lost control of the empties. One cage started to go down and in some unaccountable way the hoist man lost control of the other cage also. Both cages landed at the bottom of the shaft and they picked up pieces of hoist a half a mile away. The cable did not break but the cages got away and went clear to the bottom.

CHAIRMAN TILLSON: A graduated control can be nicely worked out,



particularly with fluid rheostats if they are properly designed for that service.

I would call your attention to the fact that in the past the average custom has not been to take into consideration the desire to stop an unbalanced load by bucking a current against the direction of the motion of the hoist. We should bear that in mind in writing our specifications for hoists, because it can be done if you require people to do it. There is one difficulty that sometimes might arise in doing that, the overload relay would trip on your main circuit brakes because of the large current surge which might be brought into play in such an emergency condition. Of course, that could be taken care of by an entirely separate and emergency oil switch of sufficient capacity to take care of that condition if you install your plant with that in mind.

MR. S. C. REYNOLDS (Aetna Life Insurance Company): The hoisting apparatus problem, so far as it is affecting our mines today, is one of serious thought to mining engineers and men whose work has to do with safety, particularly so in Pennsylvania where we are getting into deep shaft mining right along. We have some splendid devices and splendid controllers and all that sort of thing, but still there remains quite a problem which conditions bring about from time to time. I recall now one of the largest operations in Pennsylvania some few years ago, of which I had charge as chief mine foreman. The hoisting apparatus with its load of coal weighed over twenty-two tons. We made regular inspections of the apparatus. We had a thoroughly modern safety device on the cages. In one shaft we hoisted the coal and in the other shaft our men. Our master mechanic made tests every thirty days of the hoisting apparatus. We placed heavy timbers across the top of the shaft, and by a trigger arrangement the cage was cut loose at a certain distance above the shaft, and it invariably worked. The dogs would catch. It would damage the good heavy guides, but they usually held the cage. On one occasion of which I am thinking on the coal hoists, there were two three-ton cars of coal on the cage, total weight of over twenty-two tons. This was hoisting about midway in the shaft—the shaft was 520 feet deep—and the load broke and it just tore the guides out and everything else in the bottom of the shaft. It went down.

Coming from the anthracite fields the other day, a Bureau of Mines man spoke to me of the steel guide proposition for deep shafts, and he mentioned a recent installation of such guides. We didn't have much opportunity to go into it in detail, but I am wondering if there is anything of that sort applicable at the present time in a practical way and if there is I would like to know of it. The companies I represent are very much interested in apparatus of this sort because in case of accident we always can use them.

We had a recent accident. The supervisor of our department told me we had an accident in New York City on an elevator where we have frequent inspections of the elevators and ropes. However, shortly after the inspection the apparatus failed and the elevator went down and killed three people. On examination of those ropes, the surface indications

were that the ropes were in splendid condition. However, the core, the inside of the rope, broke.

I had occasion, a couple of years ago, to investigate an accident that occurred over in the anthracite fields where eight or ten men, I think, were killed on a hoisting apparatus which was alleged to have been inspected frequently; so the cleavage is a matter of real interest to mining men on hoisting apparatus. We would like to get any enlightenment on this line.

In the different states we have certain standards. We are revising those standards from time to time to use such features as we feel are essential to safety. The standards, of course, are governed by what is most practical.

CHAIRMAN THILSON: Mr. Conibear, could you advise this gentleman of steel guide installations in Michigan?

MR. CONIBEAR: The only one that I know of is on a mine where the shaft was sunk about 240 feet. It was sunk before the days of compressed air, and when the shaft was finally ledged it was so small that we couldn't put in our usual compartments. It was, therefore, necessary to use a long, narrow skip. We were using steel rails as guides. They are not satisfactory. The continual wear of the guides and the skip cause constant repair all the time.

MR. REYNOLDS: Are there tests made to develop whether or not when the cage is cut loose from the top the guides will hold the cage?

MR. CONIBEAR: On the steel runners?

MR. REYNOLDS: Yes, on the hoists.

MR. CONIBEAR: We don't use the cage on them at all. We handle the ore in skips and the men in cages entirely. We use wooden runners; we are using the steel in skip departments but they are very unsatisfactory for they always need repairing and they wear constantly.

MR. J. T. BRADLEY (W. J. Rainey, Inc., Uniontown, Pa.): In our slope mines we had a dummy that we attached to the man trip and this dummy was made of twelve-inch eye-beams, and we had on it a governor and when the speed of the trip exceeded six miles an hour, the governor opened up and dropped the dog and retracted the trip immediately. We don't allow the men to ride in the first three or four cars, and when the trip breaks, the speed is not so great as to cause much damage. Therefore, there is not much danger of anybody getting hurt, whereas, if the trip broke and ran away with the man in it there would be the possibility of some one being killed. This dummy is not very expensive and it works effectively. It will wreck the trip in a few feet after the speed has attained six miles an hour.

MR. M. J. FLYZIK (Washington State Safety Board): At Cleveland when I attended the National Safety Congress, I observed in the exhibit department an arrangement that some one from Kentucky had; it was an equipment of steel on the safety principle as your present arrangement on wooden guide shafts. I do not know how practical it would be on a heavy cage, a rather heavy slope or shaft, but in giving his demonstration there at Cleveland, with a bunch of miners around him, he convinced

most of us that it was very practical. He had a four-ton skip on an incline of about six feet and five degrees. He would take the skip and put it up about three feet and drop it down and it wouldn't move two inches, it would catch. He had a similar equipment on a vertical shaft where he could put up the cage to a distance of about three feet and drop it and it would catch. It was the best thing I had seen.

CHAIRMAN TILLSON: I want to emphasize what Mr. Lunt said. All of those devices which depend upon the severing of the rope close to the cage in order to make them operative are dangerous when the rope breaks, as it usually does, at some point remote so as to cause sufficient inertia on the operation of that device to permit the cage to get to such a high speed that no mechanical strength of materials in the shaft will stop it even though the device attempts to operate. That has been the experience of most mining men, I think, in companies where they make a practice of testing the cage by severing the rope close to the cage every morning before the men go to work to make sure that the dogs operate. That doesn't take care of the rope breaking 100 or so feet away. If the rope breaks between the hoisting engine and the head sheave, you are almost sure to have a wreck in the shaft. The inertia of the rope and the striking of it against the timbers as it comes down will cause the dogs to be held off so that they don't hold the cage up. This should be remembered in regard to all of these devices that somebody demonstrates to you by lifting up the cage three feet and dropping it.

I will ask Mr. Harrington to present Mr. Allen's paper on "Signalling from Moving Cages".

#### SIGNALLING TO AND CONTROLLING MINE HOISTS FROM MOVING CAGES

C. A. ALLEN, MINING ENGINEER, U. S. BUREAU OF MINES, AND CHIEF MINE  
INSPECTOR FOR THE INDUSTRIAL COMMISSION OF UTAH

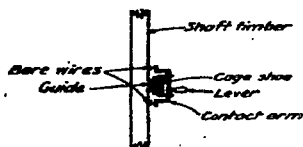
It is unnecessary for me to try to impress upon the members of the National Safety Council that any new device or method tending to improve methods of signalling in shaft mines is worthy of the most earnest consideration. Approximately 15 per cent of the fatalities in metal mines are shaft accidents and about one-third of the 15 per cent, or 5 per cent of the total fatalities, are caused by the skip or cage. Not only are these occasional fatalities happening but there is always a possibility of the occurrence of a real catastrophe in which all the men riding on the cage might be lost.

In view of these facts, the writer was very much interested in the methods that have been adopted in the metal mines of Utah to signal to the hoisting engineer from the moving cage at any point in the shaft. A summary of these methods was published in the Monthly Reports of the Bureau of Mines and this paper is intended to amplify that report and also present to you sketches of the methods so that they may be better understood, or in case it is desired to adopt the principles in other mines. The methods herein described not only provide for signalling from :

moving cage but they also may be so arranged that the hoist can be stopped by the cage rider, and there is a further element of safety in that the voltage is sufficiently low to eliminate any possibility of danger from electric shock.

The first installation in Utah was at the camp of Eureka in the shaft of the Centennial-Eureka Mine. It was placed in operation, under the management of Mr. C. E. Allen, in the early summer of 1899 and has been in continuous and satisfactory operation for the twenty-one years that have since elapsed.

The arrangement consists of two bare wires down the shaft carrying a current at 60 volts potential, with a device on the cage for making a connection between these two wires, as shown by sketch in Figure No. 1. A similar arrangement



Contact arm carries a wire insulated from the cage, and when it is thrown out by the lever a short circuit is made between the two wires.

FIG. 1. SKETCH PLAN OF ARRANGEMENT FOR SIGNALLING FROM CAGE, CENTENNIAL-EUREKA MINE.

was also made in the Grand Central shaft at Mammoth, Utah, but due to the extreme wetness of this shaft, it was abandoned. At a later date the same plan was adopted in the shaft of the Eagle and Blue Bell Mine, at Eureka, substituting batteries for live current and reducing the voltage to about 10 volts, and this has operated satisfactorily even when the shaft was wet. The Eagle and Blue Bell Mine is under the management of Mr. Imer Pett, of Salt Lake City, and several improvements have been made by the mine electrician, Mr. James Strong, in consultation with Leonard Wilson, Consulting Electrical Engineer of Salt Lake City.

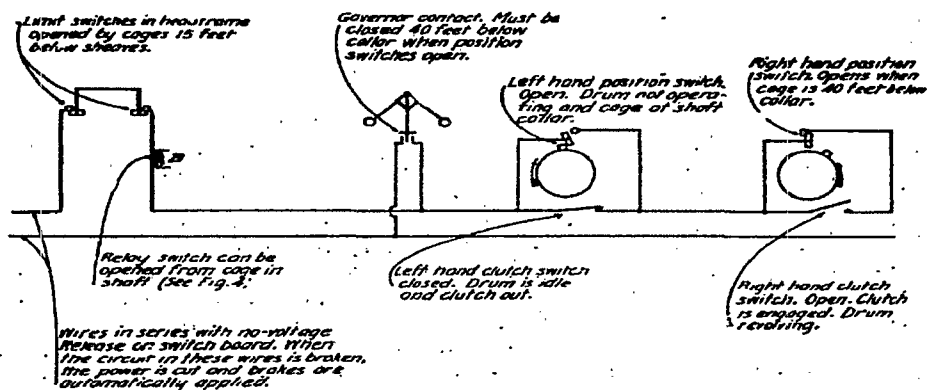


FIG. 2. SKETCH OF ELECTRIC WIRING FOR SAFETY DEVICES ON HOIST. EAGLE AND BLUE BELL MINE, EUREKA, UTAH

## WIRING FOR SAFETY DEVICES—EAGLE AND BLUE BELL HOISTS

In order to give a better idea of the possibilities and application of this system a sketch of the electric wiring for the safety devices on the Eagle and Blue Bell hoist is given in Figure 2. The hoist is double reel modern electric hoist with oil operated clutches and brakes, and with the clutch and brake on each drum operated by different movements of the same control lever.

Whenever the power is cut off, the brakes are automatically applied. The switchboard is equipped with a no-voltage release and a current must be maintained in the control wires of the safety devices or this release will operate, thereby shutting off the power and applying the brakes. As is shown in Figure 2, the control wires pass through limit switches on the headframe through a contact (B-Figure 2 and B-Figure 4) held closed by a Western Union relay, through the governor contact, through clutch switches, and through position switches for each drum or reel. By referring to Figure 2 it will be noticed that if either limit switch in the headframe is opened or the gap at the relay switch (B) is opened the circuit is broken in the control wires and the no-voltage release operated; also, if these connections remain closed but the switches and governor contact are open the same thing happens. The governor contact, however, is wired in parallel with the position switches, so that if the governor contact is closed the position switches may be open. The position switches are operated by the shaft, which operates the indicator, and, in order to allow one drum to operate independent of the other, there are provided two clutch switches which close when the clutches are thrown out, thus short-circuiting the current by the position switches.

This arrangement of wiring for the safety devices is not materially different from that used on other electric hoists, and is only given here in order to show how the hoist can be controlled from the moving cage, with the same wiring that is used for signalling.

## PRESENT WIRING FOR SIGNALLING FROM MOVING CAGE EAGLE AND BLUE BELL SHAFT

In Figure 3 is shown the present diagram for signalling from the moving cage, and, in order to avoid confusion, the method of controlling the hoist by the same wires is omitted in this sketch but is shown in Figure 4.

Discussing the signalling system only as shown in Figure 3, it will be noted that the same wires are used for signalling from the levels as from the moving cage, but there are two sets of dry cells. The wires down the shaft are No. 4 bare copper wires, supported on insulators every 40 feet. To operate the level signal system there are 6 dry cells in the hoist room. Whenever the knife switch for signalling is closed on any level, the circuit is made through the two wires and through an ordinary Western Union relay. The relay closes a contact in the bell circuit and the bell is rung by a separate battery of 30 dry cells, also located in the hoist room. Instead of the 30 dry cells connection could be made to a direct current power or lighting circuit, and by using the 6 dry cells

for the shaft circuit, this is maintained at about 10 volts, which is a voltage that gives no trouble due to grounding in a wet shaft and which is also free from the danger of electric shocks to any person who might come in contact with it.

In order to ring the bell from the moving cage there is a contact, as

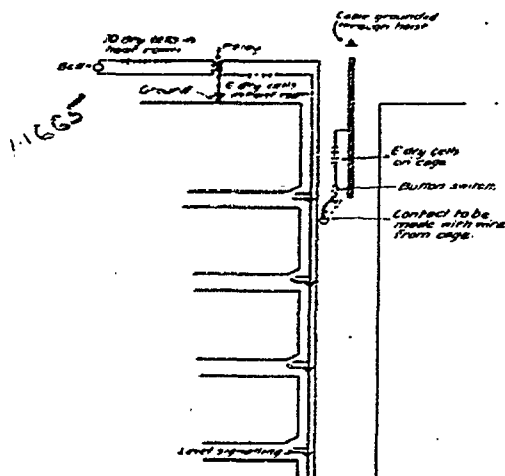


FIG. 3. DIAGRAMMATIC SKETCH OF PRESENT WIRING IN SHAFT, SHOWING METHOD OF SIGNALLING FROM THE CAGE. EAGLE AND BLUE BELL MINE, EUREKA, UTAH.

shown, which can be pressed out against one of the wires (the right hand wire shown in the sketch) by means of the lever arm shown by the dotted lines. This contact is simply a curved piece of brass about 5 inches wide, properly insulated from the cage and the lever arm which operates it.

At one time this contact was accidentally pushed out by timbers on the cage, thus giving a signal unintentionally, and to obviate the possibility of this happening again a push button is placed in the circuit on the cage, so that it is necessary to push this button at the same time the contact is pressed out against the bare shaft wire. The current for this circuit is furnished by 6 dry cells placed in a pipe on the cage and they are connected from one terminal with the cable and from the other terminal through the push button to the contact. The bare shaft wire is also grounded, as shown in Figure 3. so that when

the contact is made from the cage the relay closes the bell circuit and the bell is rung exactly the same as when a signal is given from the level.

#### WIRING FOR SIGNALLING FROM MOVING CAGE AND STOPPING THE HOIST

Mr. Strang, the Mine Electrician, informs the writer that, in his opinion, it would be better to have a separate wiring for the level signals and the moving cage signals, with a different bell to be rung from the cage. In order to show the separate wiring for the moving cage signals and also to show how this same arrangement can be used to stop the hoist automatically, Figure 4 is given. The dry cells, and contact (with the push button) on the cage, are arranged in exactly the same manner, but there is only one bare wire down the shaft. It will be noted that when the contact is made from the cage with this bare wire the current will ground through the cable and will also flow through the bare wire through the relay (A) to the ground and through the relay (B) to the ground. The relay (A) is arranged so that the current passing through

it will close the bell circuit and the bell will be rung by the dry cells in the hoist room. The relay (B—see also "B" in Figure 2) is so arranged

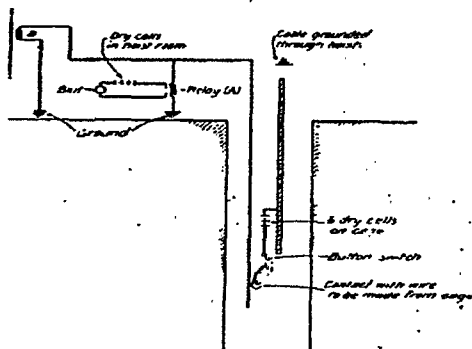


FIG. 4. DIAGRAMMATIC SKETCH OF WIRING FOR SIGNALLING AND STOPPING HOIST FROM CAGE AT ANY POINT IN SHAFT.

that the current will open the control circuit on the hoist, which means that the no-voltage release will operate, power will be cut off from the hoist and the brakes automatically applied. In other words, by the arrangement shown in Figure 4, whenever a person on a moving cage completes the circuit with the bare wire, a bell is rung in the hoist room and also the hoist is automatically stopped. Whether it is advisable to make it possible for a person riding on the cage to stop the hoist is a question on which opinions differ; and if such is not desired the relay switch (B) can be removed, which would still leave

it possible to ring the bell from the cage.

PROPOSED MODIFICATIONS OF THE SYSTEM FOR USE AT THE DALY-WEST SHAFT,  
PARK CITY, UTAH

Mr. O. N. Friendly, General Superintendent of the Judge Mining and Smelting Company, is now installing a modification of the Eagle and Blue Bell system for use in the Daly-West shaft at Park City.

By this system it is planned to do all the signalling from the cage and have no signal device on the levels except the flash or buzzer system for calling the cage. A sketch of the arrangement is shown in Figure 5. Double deck cages are being used, and, to make it possible for a cage tender to give signals from the cage while standing on the station at either side of the shaft, four push buttons will be used. Also, in order to avoid using four levers to get contact with the bare wire, there will be one contact maintained at all times. This will be sliding contact, held in place by a spring, or a pantograph type, such as is used on some trolley wires.

GENERAL REMARKS

In looking over the mining papers, the writer has found two articles describing similar signalling devices: One appeared in the E. & M. J. for June 1, 1912, and described a patented device in which a flat strip was used instead of a bare wire. The other article in the Bulletin of the A. I. M. E., February, 1914, describes an arrangement similar to those herein described, which was being used at the Penn Iron Mining Company in Michigan.

As before stated there are two very important safety considerations

involved in the use of those signalling systems, the first being the ability to signal from a moving cage, and the second the low voltage current used. By using such low voltage there is no danger from electric shocks, and, if the bare wires are continuously charged, the danger of a short

to wet timbers is very slight. The Eagle and Blue Bell shaft is 2,000 feet deep and wet in places, yet no trouble has been experienced.

In the method being installed at the Daly-West shaft another danger is also avoided, which is the possibility of a careless or ignorant employee giving a signal from the station when the cage is at some other point in the shaft. Accidents not infrequently happen from this source, despite the fact that signs are placed warning all employees (except the cage tender) to keep their hands off of the hoist signalling system.

The experience which we have gained in Utah, in the matter of signalling, makes us believe that not only are these methods for signalling from the cage, which have been described, very valuable from a safety standpoint but we also feel that it is absolutely neces-

sary to have low voltage on any signal wires with which employees might come in contact. In coal mines there are frequently bare signal wires along the entire length of a slope or incline and, formerly, the voltage on these has been as high as 500. We have records of two men having been killed on 230-volt signal wires. To avoid further accidents of this kind, no bare signal wires are permitted in Utah that carry more than 25 volts, in the metal mines, or 50 volts in the coal mines. The higher voltage being permitted in coal mines on account of the fact that on long slopes—say two miles long—this voltage might be necessary to give proper signals. We have learned from experience, however, that by using a relay at the hoist that this voltage would be sufficient for any distance over which haulage is practicable. It is also required that all shafts placed in operation hereafter, which are over 500 feet deep and through which 50 or more men are hoisted or lowered daily by means of cages, shall have the signalling system so arranged that the hoisting engineer can be signalled from the cage, while it is in motion, at any point in the shaft between levels.

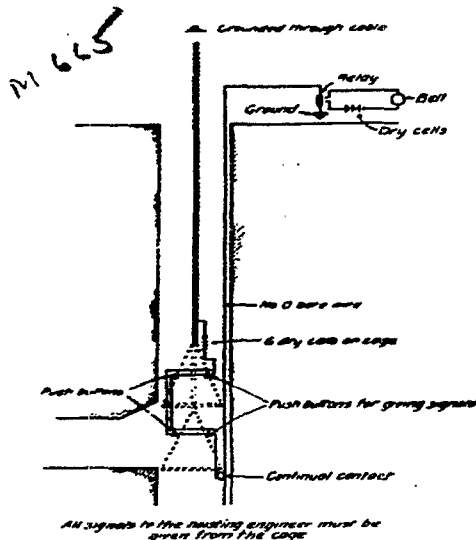


FIG. 5. SKETCH OF WIRING FOR SIGNAL SYSTEM. DALY—WEST SHAFT.



## DISCUSSION

CHAIRMAN TILLSON: Does any electrolysis result from the use of this system as outlined in Mr. Allen's paper? Trolley wires are usually pretty well insulated. It is a little difficult in vertical shafts to maintain the same insulation.

MR. HARRINGTON: I don't know how they are insulated. I don't know exactly how you get that, because trolley wires are extremely bare in some places. They are causing a number of electrocutions.

CHAIRMAN TILLSON: The wires are not insulated, but they are insulated from the ground. How are these wires supported in the shaft so as to avoid the same difficulties?

MR. HARRINGTON: I am not at all familiar with the details of these insulations. I am very much interested in the system, however, and I know of a number of cases where if there had been such a system they would probably have prevented some accidents. I know of one case where a number of men were killed that would probably have come out alive if the shaft had been equipped with a system similar to this.

CHAIRMAN TILLSON: Another thing that came to my mind in this paper was the system which relies on the source of electric energy from a series of batteries on the cages to make it possible to send the signals through to the hoisting engineer. The reason that that appealed to me was that it is very dangerous to have any cage suddenly stopped in its travel, and it should be impossible, in my view-point, for anybody to interfere with the motion of that cage normally except the man who is riding on the cage and is prepared to see it stop. Of course, there may be emergency conditions which make it advisable to stop a cage in travel and have it stopped by somebody who isn't on the cage, as a piece of timber falling across the shaft at a landing point which would cause the cage to be wrecked at that point. Under those conditions the signal system can be so designed with boxes, if you will, similar to fire alarm emergency boxes, whereby a man has to fracture a glass or perform such an operation which is unusual in order to be in a position to stop the moving cage from a station point. That, I think, is very advisable, and I know personally, in systems with which I am familiar, of sixty-two serious accidents that have been avoided by such an emergency station in stopping a cage before it struck something that had fallen across the shaft.

MR. CONIBEAR: The conditions in our mines vary so that it doesn't appeal to me at all. We have very wet shafts. We base the entire responsibility of the manipulation of the cages upon our cage rider. Nobody in any of our mines dares touch a bell. We see no need of stopping a cage once it leaves a shaft station, and personally I do not see that it will improve the conditions existing in our mines at the present time.

## SIGNALLING IN MINE FIRES

MR. HARRINGTON: I am interested in this from the view-point of mine fires. In the Bureau of Mines work a large portion of my time is taken

up in mine fires and a considerable portion of those fires are metal mine fires rather than coal mine fires. In the last four years I have run across probably fifteen or twenty metal mine fires. I know of several cases where men have lost their lives and shafts have become completely lost where if they had a system of this kind the men probably would have been saved and certainly the shafts would have been saved, so it is a very vital thing in places where mines are set afire. Possibly in the Lake Superior region in Michigan and Minnesota they haven't the fires that we have in some places in the West. I know in metal mines in the West that is one of the hardest things we have to combat. Anything we can do to help save lives or shafts is very vital.

MR. SEIP: I would like to ask Mr. Conibear if he has any means whereby he prevents other people from ringing the signals at the landing except the cage man.

MR. CONIBEAR: At each station in addition to the cage rider is the skip tender. All our ore is handled in skips. The skip tender is always there. It is his duty in addition to the cage rider's to prevent men from doing it. But men won't do it because they know the rules and are examined on the rules and regulations.

MR. WOODBURN: As a means of preventing that, one copper mine has put in an arrangement in a new shaft they have constructed; it is an electrical device that works with the indicator on the hoist so that when you are fifty feet above or below a station, anything past that, you cannot signal. We found that if we tried to apply that to many stations it would take so many wires that it wouldn't be practical. But it prevents any one on another level signalling the engineer.

MR. SEIP: Mr. Woodburn, the reason I asked that is because we have a system in our shaft whereby nobody but the cage tender can signal to the engineer. Our signal boxes are so arranged that the cage tender carries a key and he inserts his key in the box and then by turning the key he can signal to the hoisting engineer. When he takes his key out, the hoisting engineer cannot be signalled from any shaft station, but all stations in the shaft can signal to each other. That is, when one signal is sounded all of them are sounded so that if a cage is at any other level the cage tender can be signalled to, but the signal does not go through to the hoist house until the cage tender puts his key in and turns it.

MR. WOODBURN: But that has this disadvantage: If you are on the station and see something is wrong, you have no chance of stepping over and pulling a signal.

MR. SEIP: We can.

CHAIRMAN TILLSON: We have a glass window in the signal box whereby you can make an emergency circuit by breaking the glass. I have done it twice myself to stop wrecks personally.

MR. WOODBURN: Did you avert the wreck?

CHAIRMAN TILLSON: I did, absolutely.

MR. LUNT: I am not very well up in this signalling from the cage, but I know that fifteen or twenty years ago nearly all the shafts were equipped with signals. There were simply two bare wires, and there was

a lever on the cage which, by pulling down, made the contact between these two wires. I don't think there are any of those in use today. I don't know why they took them out. I suppose they got out of order and gave trouble. There is only one shaft that I know of today in Colorado that has a signal system that you can reach from any place. That is a small inferior shaft, a short shaft. They have two bare wires there. They have no device at all. The cage tender carries a little piece of iron, or he could use anything. The wires are only about four inches apart. He just simply touches them with that. It is a very crude apparatus and it wouldn't be practical, probably, in a shaft where there was a great deal of hoisting going on, but this is a very dry shaft, too.

CHAIRMAN TILLSON: I think it is advisable that we should have both sides of the question, and I am going to ask you if you will be kind enough, upon your return to Colorado, to make as rapid an investigation of that surmise of yours and write that to go in the discussions of our transactions so that this will be a matter of complete record. If it has been tried extensively and now isn't, if there was any reasonable reason for its being abandoned outside of those mines being abandoned, we ought to have it in the discussion of the paper.

MR. LUNT: The shafts are still in use. I will do that and I hope that inside of a week from the time I get home I can find out what the reason is that they stopped using that.<sup>1</sup>

MR. REED: I am very much interested in the signalling from the cage. It strikes me as being a very good thing. It was mentioned particularly in a case of mine fires. Although we have had no accidents to people, we have had two accidents to equipment which has shown us how it would be very easy for accidents to happen to people.

It also brings up another question which was not covered in safety devices on shafts. That is the possibility of the cage, where it is supported by an extra set of slides to the guide to hold the cage from rotating—a self-dumping cage—or where it automatically locks at the top and bottom and the lock is damaged so that it does not operate, swinging loose from the guides so that on arrival at either the top or the bottom where there is sufficient room for the cage to turn over it will turn over and dump the car off on to the people at the bottom of the shaft or coming back down the shaft. We had both happen, although the cage when it turned over didn't happen to dump it on top of men as they had just barely got out of the road. If the same thing had happened when we were hoisting men, it would have dumped the men and killed them all. It was due to neglect not to notice a small amount of wear on the guide and to notice that when the cage struck the bottom it struck a little harder than usual and caused it to swing to the side allowing the set of guides which hold the cage simply to jump out of posi-

[From Mr. Lunt's letter to Mr. Tillson, dated October 20, 1920. \* \* \* The method for signalling from the cage, formerly used in some of the mines in Cripple Creek, consisted of two wires, one on each side of one of the guides, and a forked lever attached to the cage, by which connection was made between the two wires. So far as I can learn, there was no difficulty encountered in the operation of this system, but the maintenance of the two trolley wires was expensive and for that reason the use of the system was discontinued.]

tion. If men were going up on that cage they would know at once that the thing would drop, because the cage would tilt over a certain amount and they would be able to signal and stop the cage before it came out of the compartment.

MEMBER: It seems to me that Mr. Reed's trouble might have been avoided by more careful inspection. I think that is a point that could well be brought out. Mr. Reynolds, I think it was, mentioned inspecting the cable and hoisting apparatus generally once a month. I don't consider that often enough. I think that in a well-conducted mine that ought to be done thoroughly once a week, and I think it is usual for the master mechanic or the foreman or somebody to give at least a casual inspection to the cables every day. A great many of these accidents are due to not having any systematic inspection of the hoisting apparatus. If something gets out of order, if they have monthly inspection, it may be several days before the next inspection comes around. Something may get out of order just a few days after the inspection and then it is about twenty-five or twenty-eight days before the next inspection. There ought to be somebody on the job whose business it is to watch that almost constantly where heavy hoisting is done.

MR. REYNOLDS: I would like to make a correction. The inspection that I referred to, or rather the test, was cutting loose the cages. Thorough and complete inspection of the rope, the hoisting apparatus, the safety catches and the cage hoisting apparatus is made regularly and religiously every day and a record kept of such inspection and placed on file at the mine.

MR. W. W. GIDLEY (Phelps-Dodge Corporation): It appears to me that efficient inspection in hoisting shafts has a great deal to do with the accidents. I am rather surprised at these figures quoted here that approximately fifteen per cent of fatalities in metal mines are shaft accidents. Our experience has been this: We are operating nine shafts from 500 to 1,800 feet deep. We have had no fatalities in the shafts for sixteen years, to my knowledge, and personally I think the fewer electric wires installed in the shaft, particularly where the shaft is wet, the better off we are.

Another point with reference to signalling from the cage is this: How many men in case of an accident would have the presence of mind to act on the impulse of the moment? It seems to me that the vital point is very rigid and efficient inspection. We require our cages to be examined thoroughly every twenty-four hours. Our cables are inspected weekly and our cables are built upon a safety factor of seven. The shafts are thoroughly examined every twenty-four hours. In case a cable should break or anything like that, of course the examination of the dogs really doesn't mean anything. The enormous weight, if the cage is in motion, particularly if the cage is loaded, is going to tear out guides and everything in the shaft. If a cage once gets a start, there is hardly any device that could be contrived that would hold that enormous weight. It seems to me that the vital factor lies in efficient and frequent inspection.

MR. WOODBURN: It seems to me that we are discrediting a very valuable suggestion. Mr. Allen is perhaps not putting this out entirely for

operating purposes, but in many shafts we have the advantage of having a good signalling system right on the cage. It is for the unusual condition that this will be of the greatest value.

This case in Butte is of particular importance. Those men went down on that cage with no means of signalling, and I might mention that about the first thing that happens in the case of a mine fire is that your signalling system is out. If any of you have ever been present when the entire mine is threatened with fire and you are limited to signalling by pounding on pipes, you possibly appreciate the value of some system of that sort that might serve, and for that purpose we are arranging to have a field telephone set available to put on the hoisting platform and followed up on the cages. I realize that we have a disadvantage there on the up trip because we have to reel this on the cage as we come up and they have to hoist at a speed that will permit us to do that.

Another thing that could be added to his plan is that instead of making contact by the push button and lever, it could be made so that we have a telephone set for emergency use that could be put on the hoisting engineer's stand and also put on the cage so that they could be in constant conversation and not be dependent entirely upon those signals for unusual conditions.

MR. C. A. HERBERT (U. S. Bureau of Mines): I have a suggestion to offer in regard to the telephone. Locomotives in coal mines have a reel that is operated by a motor and when the cable is unreeled you work against the torque of the motor and it keeps a constant tension on the cable. You might use that for your telephone. When your cage goes down you are pulling your wire down against the torque of the motor; when your cage goes up your motor automatically rewinds your telephone wire.

MR. WOODBURN: We are going to apply this to about twelve open shafts. We cannot break it up in advance to fit.

CHAIRMAN TILLSON: You wouldn't need to. It is like a spring.

MR. HERBERT: The motor acts like a spring to rewind your cable.

CHAIRMAN TILLSON: Where are you going to get the power?

MR. HERBERT: You have your motor on top of your own shaft. If you don't have current you will be up against it naturally.

CHAIRMAN TILLSON: It seems to me it might be a subject of well-merited criticism to have any installation whereby flow of electric current through your hoisting cable could cause electrolysis because it is a dangerous situation to have anything that may influence the nature of the wires in your hoisting cable as something difficult to inspect and make sure of. I would say that it ought to be a subject of very serious consideration before using any signal system whereby you rely upon the flow of electric current through your hoisting cable, but I don't think that is an objection that can't be overcome by some other means of wiring, and I am not sure but what Mr. Allen suggested a system not using a hoisting cable for part of the circuit.

You were speaking of signalling under these conditions. The question of wireless telephony as applied to underground working is something that ought to prove of considerable interest. Some years ago your Chair-

man went into that matter with the wireless companies who were then experimenting, but nothing has been developed. However, I look forward to the opportunity of such a thing being developed and due advantage taken in such a system by making use of return rails in the mines or air lines or any other pipe lines in order to simplify the system of wireless telephony.

MR. WOODBURN: I want to ask if anybody knows anything about such devices. Somebody on a mining trip told one of our mine superintendents of some such apparatus and we tried to get in touch with people that might know about it. So far we have been unsuccessful. We have even corresponded with Belgium and all over the world trying to find out if in connection with this war work some device of that kind had been developed. We are in the market for any information and for any such contrivance of that sort.

MR. CONTIBEAR: In the case of mine fires we don't depend entirely upon our electric bells. We have a pull wire in the cage compartment paralleling the sides of the shaft that the cage rider can always reach. If he is down 2,000 feet he may not be able to pull that wire, but if he takes the handle of a shovel with clamps fastened on it, which is kept on the side of the cage, in two minutes he can clamp that on to the wire and it gives him perfect control and he can pull to the collar of the shaft.

Wherever they find a bad runner they have to stop when inspection is made. They can do that by using this pull wire. There is inspection of pull wires every week and a report is made to me. There are something like twelve reports from each mine, so I have about 300 coming in every day.

CHAIRMAN TILLSON: I want to suggest that Mr. Harrington get in touch with Mr. Allen and that we receive also under discussion of this paper a little clearer description of the emergency conditions under which such an installation is particularly desirable.

One condition that hasn't been mentioned that I might add is in normal inspection and repairing of any shaft or slope shaft, the gang that is working on that can most conveniently and most safely do their work if they have some means like the pull wire or an electric signal system whereby as they move along from one portion to the next they are in absolute contact with the hoisting engineer so far as signalling or telephoning is concerned. That and this fire condition are two conditions. A third condition would be in the operation of sinking a shaft. Under those conditions where men have to light their fuses and make sure that the signal gets up to the hoisting engineer and that they get away in time, it is highly important that they be so that the extension of the signal system is very readily made right down to the bottom where the men are working.

In South Africa the mining laws are very stringent and the laws are that no hoisting engineer shall move a cage under any circumstances without receiving the proper signals. In one instance the hoisting engineer was familiar with the operations of shaft sinking that were going on, and he received the preparatory signal that they were going to light

the fuses and he stood ready to pull the skip away when he received the final signal. He waited and he waited. The final signal did not come and he finally decided that laws or no laws something must have gone wrong with that signal system and he took it upon himself to pull away. He barely saved the lives of those men. They were very seriously injured by the blast that went off before they got far enough away. He got the skip of men to the surface, shut down, put his brakes on the hoisting engine and he disappeared and was no longer seen in the country because he was subject to punishment for criminal action by the laws. There a man had nerve enough to do what he thought was the right thing contrary to the law, but if there were sufficient precaution taken in our signal systems and the extension of our signal systems (so that a man didn't have to climb up a distance to get hold of a signal) we would be safer in shaft sinking operations.

MR. HARRINGTON: I want to suggest that there are any number of cases in which the system could be used to advantage in ordinary operations irrespective of mine fires. I placed emphasis on that because that is the major portion of my work. If a cage is coming to the surface and something goes wrong with one of the cages, the man on the cage has no chance of stopping that cage until the hoist man finds out by a jerk of the rope that something is wrong. If there was a signal system in the cage he could stop it. The same thing is true in hoisting and pulling up cars. A car gets caught in the timber, perhaps. I had a case of a man being killed on a cage. The cage was supposed to be closed and it was not closed. The man got his head in between the side of the cage and the timbers and he was dragged probably 100 feet and dragged to the bottom of the shaft. The man on the cage couldn't do a thing. If there had been some device on the cage, he could have signalled and handled it himself. You might use the pull bell, the pull wire in the shaft, but it is an impossibility to do it if your cage is moving fast. You are helpless when the cage is going.

MR. CONIBEAR: I don't think a man should be driving a cage unless the cage door is closed.

MR. HARRINGTON: They do it all over the country.

MR. CONIBEAR: Not in our mine.

MR. REYNOLDS: If I am right, this problem is one that is being considered pertaining particularly to metal mines. As yet our coal mines haven't, of course, gotten to a depth that makes it so pertinent in matters of this kind, but what experience I have had with metal mines—

CHAIRMAN TILLSON (Interrupting): May I ask you if you see any reason why it isn't equally applicable to coal mines?

MR. REYNOLDS: Yes, the distinction is this: That the average depth of our coal mines is such that the means of communication, even by the voice from the landing points, are very fair.

MR. SEIP: Anthracite?

MR. REYNOLDS: I am thinking now of bituminous. There ought to be some means of communication between the points as outlined in the paper, and I believe it will be worked out. It is bad for a cage to start from a

certain point with no means of communication to the next landing point. I think that it will be worked out and I appreciate the paper.

CHAIRMAN TILLSON: I happen to think of another instance along the lines that I have suggested on which we have more information. It happened to be your Chairman's unpleasant experience once to be riding upon a cage in a vertical shaft when contrary to rules the lander at the bottom had gone in to the sump when the cage was not under his control to clean out some of the rubbish which gradually accumulated in there, and he was ambitious in trying to do things without wasting any time; he was working in there and I was on the cage when it came down upon that man. I realized it and had no way of stopping that cage quickly enough to keep that man from being crushed to death. It was a pull bell system and I did the best I could. That was in a shaft not now in operation and doesn't correspond with our present system, but that is another lesson.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

THE meeting convened at 9:45 a. m., Mr. B. F. Tillson, presiding.

CHAIRMAN TILLSON: The first paper on our program is by Mr. R. A. Walter, "General Rules for Gas Explosion Prevention (Bituminous Coal Mines.)"

(The Chairman read Mr. Walter's paper.)

#### GENERAL RULES FOR GAS EXPLOSION PREVENTION (BITUMINOUS COAL MINES)

R. A. WALTER, SUPERINTENDENT, MULGA WORKS, WOODWARD IRON COMPANY,  
MULGA, ALA.

Instead of giving you a twenty minute talk on the chemistry of "Gases I Have Met in Coal Mines," and on "Ventilating Formulae," I shall endeavor to condense into a few readily understandable rules the results of many years of experience with mines, which prior to the adoption of the methods herein outlined had a continual tendency to blow up, upon the slightest provocation.

The mixture of air, methane, and accompanying gases, commonly known as fire damp, will be intended throughout whenever the word GAS is used. Other explosive gases and mixtures occur, but more frequently as an after accompaniment to explosions and in connection with mine fires. Their presence will be detected by the experienced observer who must decide upon such precautionary measures as may be necessary in addition to those which control methane.

Coal dust in suspension will lower the ignition point of gas-laden mine air to about 1 per cent gas content. As this ignition point is above 5 per cent when no coal dust is present, the importance of humidification



becomes readily apparent. Gassy mines are frequently dry and dusty and the most elaborate system of gas control will not make these explosion proof unless the dust is rendered harmless by sprinkling or other appropriate treatment.

Gas explosions in bituminous coal mines can be prevented by the observance of two rules:

#### VENTILATION

PROVIDE SUCH VENTILATING CURRENT UNDER PROPER CONTROL AS WILL DILUTE TO A HARMLESS MIXTURE, AND CARRY AWAY ALL EXPLOSIVE GASES.

#### PRECAUTIONARY MEASURES

PREVENT ALL CONTACT BETWEEN DANGEROUSLY GAS-LADEN MINE AIR AND FLAMES OR SPARKS SUFFICIENTLY HOT AND SUSTAINED TO CAUSE IGNITION.

Only by faithful observance of these two rules can gas explosions be entirely prevented. Immunity to explosions varies in direct proportion to their observance.

#### VENTILATION

There must be delivered at the working face one hundred and fifty cubic feet of air per minute for every man, and five hundred cubic feet for every mule, with such further volume as may be necessary to dilute to one-half of one per cent the gas content in individual splits, and to one-third of one per cent the gas content in the entire return from the mine.

A fan must be selected that will deliver air to meet the above requirements after due allowance has been made for leakage and friction. The fan wheel must be substantially constructed and well balanced. Bearings and drives must be designed to permit continuous operation.

There must be two separate drives, preferably from entirely different sources of power. Clutches should be located outside the fan chamber. They should be so arranged that not over five minutes will be required to change from one drive to the other.

The fan should normally operate exhausting, but must be reversible. Fan housing and fan house must be of fireproof construction. The fan must be equipped with explosion doors.

The fan must be provided with an accurate continuous recording pressure gauge and with an automatic low pressure alarm signal.

Too much importance cannot be placed on proper proportioning of air courses and the construction of overcasts, stoppings, regulators, brattices, and doors. Splits should be taken off with relation to gas trapped, number of men worked, air velocity, and location of old workings.

If a shaft mine, the entire shaft, or all the shafts, should be concrete-lined, but should this not be feasible, the air compartment at least must be lined with concrete from top to bottom.

Air courses must be of such size and number as will reduce to the minimum, commensurate with cost of driving, the friction on the ventilating current. Local conditions vary too much to give any formulae that will cover all cases, but in every instance this problem can be reduced to simple figures and solved. In old mines this becomes more

difficult, but even then a careful study and calculation of air course construction versus power costs generally results not only in better ventilation, but in an appreciable reduction in operating costs.

Overcasts should be constructed of fireproof material to standard design, and must cause no constriction to either haul-way or airway.

On all headings the inside cross-cut only shall be left open, all others shall be closed with air-tight stoppings constructed of fireproof material. These stoppings should be strong enough to support the roof or it may subside and cause serious leaks through crevices in the roof. These crevices once open, cannot be closed except at prohibitive cost.

Regulators should be constructed of fireproof material. They may be of the sliding or door type, but in either case must be so constructed that they can be locked to any desired opening.

Brattices should be built from all inside working cross-cuts to within fifteen feet of the working face—or nearer if this fails to sweep out the gas. Use only closely-woven brattice cloth of strong texture for this purpose, supporting it at the top and bottom with wooden strips.

Doors must have attendants, or be of the automatic type. They should be arranged in pairs, with room between them for a full trip of cars.

Splits from the main ventilating current must be so proportioned that each individual return will not contain more than one-half of one per cent gas, and so far as possible that the maximum and minimum velocities will not exceed five hundred, or be less than one hundred twenty-five feet per minute.

Not more than seventy men shall be permitted to work on one split.

It is desirable to arrange the splits so that old workings may be ventilated with return air, rendering unnecessary the diversion of fresh air for this purpose.

Abandoned and worked-out sections should be sealed off with heavy, fireproof, air-tight stoppings provided with bleeders opening on return air. Frequent analyses and measurement of the gases escaping from these bleeders will determine the extent to which the sealing off operations shall be carried. Should a large quantity of explosive gas accumulate it must on no account be turned out on men in working sections of the mine. Should gas accumulate in large quantities under pressure, bore holes should be driven from the surface into an open space in the sealed-off section.

In event of total stoppage of fan for an interval sufficiently protracted to permit dangerous accumulations of gas, open all switches to inside power lines. Upon resumption of ventilation every working face must be tested by the fire bosses before the power is again turned on in the mine.

A sufficient number of skilled fire bosses shall be provided so that each can cover the territory assigned to him, in two hours. After making his run each will make his report to the mine foreman, check every man into his section, return to it and utilize the remainder of the shift in hanging brattice cloth and performing such other work as may be necessary to maintain ventilation. This definitely fixes responsibility and invariably results in better work than can be secured where the fire

boss merely tests his section and does not supervise the work necessary to secure ventilation.

The fire boss shall mark out, with a board bearing the word "Gas," in large letters, all places in which gas has accumulated in dangerous quantities, and shall make note of them in his report to the mine foreman. These boards shall be removed by the fire boss only, and then only after the gas has been removed.

Each fire boss shall be provided with a closed electric cap lamp and with a flame safety lamp which will detect a one and one-half per cent to two per cent mixture of gas. Places which will show no gas cap with this lamp are safe if no coal dust is in suspension. Should there be coal dust the safe gas content becomes so low that nothing but a special lamp or detector in the hands of skilled observer can detect it. In ordinary hands the extremely sensitive lamp may become a menace and it is not properly a fire bosses' tool. The best results and greatest speed and safety will be attained by using for testing purposes a flat-wick, naphtha-burning lamp, with double gauze, hood, magnetic lock, and internal relighting device.

At regular intervals analyses shall be made of the air in every return. If any individual split shows gas in excess of one-half of one per cent, analyses should be made daily. If below that sum once a week will be sufficient. For approximate work a Burrell Gas Detector is satisfactory. For more precise results the Haldane type of apparatus is preferred. Both should be part of the equipment of every gaseous mine. The latter is a laboratory instrument and necessitates the use of containers in which to take samples of the mine air and for this purpose nothing should be used except glass pipettes either of the evacuated type or the type provided with two stop-cocks.

When gas readings, or samples are taken, simultaneous observations should be made of volume and humidity, using a properly calibrated anemometer and a wet and dry bulb thermometer in a sling mounting. From this data can be calculated the total amount of gas transpired, its point of origin, and the amount of moisture carried in and out of the mine by the ventilating current. All of which information is essential to efficient control of gas and ventilation. It should be compiled in tabular form for ready reference.

A recording barometer shall be installed at the mine, and comparison made between the barometric chart and the tabulated gas readings. A correspondence will be noted between the two, which will be an invaluable guide in regulating fan speed and special precautions.

#### PRECAUTIONARY MEASURES

Permissible explosives only shall be used and no holes shall be loaded with more than one and one-half pounds of powder.

All shots shall be fired with electric detonators and battery.

All shots shall be loaded, tamped, and fired by men instructed and skilled in the work. All shooting shall be done when none but shot firers are in the mine. All shot firing systems require constant vigilance

and the most careful supervision or they may become sources of real danger.

Use sand or clay for tamping and tamp all holes full to the collar. No dust may be left in the hole, nor shall any hole be shot on the solid.

No open lamps shall be permitted in a gaseous mine. Electric cap lamps are recommended in preference to the flame safety lamp; shift leaders, machine runners, shot firers, and all inside officials to carry in addition, a locked, flame safety lamp of the type standard at the mine.

No machinery driven by internal combustion engines shall be permitted inside the mine.

No fires shall be permitted inside the mine. Smoking is prohibited and matches shall not be carried.

No electric locomotives shall be operated on return air. Electric or air locomotives may be used on intake air, but air locomotives or mules only may be used on the return.

All switches, fuses, and electrical machinery on return air must be enclosed and explosion proof.

Mining machines and controllers must be approved explosion-proof type.

Machine men while cutting must make tests for gas every thirty minutes.

#### ECONOMIC FEATURES

The first question you will ask after a perusal of these rules is, "Will it pay?" I answer most emphatically, "It will." Not only from a humanitarian standpoint and in protection to property, but in lowering operating costs as well.

I have in mind an operation producing half a million tons of coal annually. Twelve thousand dollars expended on two of the main air courses eight years ago would have reduced power costs for fan drive alone six cents per ton. Rather than spend this twelve thousand dollars the owners have thrown away thirty thousand dollars annually for eight years in forcing the ventilating current through inadequate air courses.

Another operation prides itself on erring on the side of safety. Some of their air courses are unnecessarily large and expensive. Twice the necessary amount of air is being delivered at many of the working faces. The available data is insufficient for precise figures, but I conservatively estimate that amortization of excess capital tied up in ventilating accessories, plus excess power costs, adds eight cents per ton to their operating cost.

The first of these operations is merely "getting by." Men are frequently being burned by gas in the working faces. Many places are marked out for gas daily. A serious explosion may occur at any time. Strange to say the second operation is no more safe than the first. Face velocities are too high. During the winter months it is almost a physical impossibility to lay the dust by humidification and sprinkling. Much dust is carried in suspension, there is no shot firing system and some day a blown-out shot may cause fireworks.

In either case revision of the ventilating system in accordance with the

foregoing rules would result in increasing the safety factor and in reducing operating costs.

Another instance—a mine producing fifteen hundred tons of coal per day was using sixty dollars worth of brattice cloth daily, hanging it from prop to prop with no intermediate supports. The cloth sagged away from the roof; shots tore it down; at least ten places were marked out daily on account of gas. It was decided to support this cloth on wooden strips—top and bottom. Within a month the consumption of cloth was cut to thirty dollars per day—a saving of two cents per ton—and not over two or three places were being marked out on account of gas accumulations due to defective brattices.

These are not isolated cases. The ventilating system of seventy-five per cent of the bituminous coal mines in this country are susceptible of improvement. All are not such flagrant instances as those quoted, some are far worse.

Parallel instances can be cited as we go down the list of explosion prevention rules. For example a special man may be needed to take daily gas, air, and humidity readings, but his wages and laboratory expenses can be saved many times over through scaling splits and reducing fan speed and power, as opposed to the common system of supplying excess air in an effort to make the mine safe when there is no knowledge as to the exact requirements.

As to the precautionary measures. With one exception these will show no direct economy in operation. On the contrary they may involve expensive changes if the present practice is very dangerous. Nevertheless all are essential to safety.

The exception noted is that of installing electric cap lamps. These should be installed in every mine generating explosive gases, no matter how small the amount given off. It will be discovered after trial that these lamps cost less to maintain than open, or flame safety lamps; that the light is satisfactory in every way and that increased efficiency will be obtained from all employees because no time need be wasted in filling, or nursing refractory lamps.

#### IN CONCLUSION

Gas explosions can positively be prevented. It is probable, however, that they will increase rather than decrease in number unless radical changes are made in ventilating practices. Mine workings are daily advancing under deeper cover and to greater distances from the outcrop, and the old hit-or-miss ventilating system, which like Topsy, "just grewed," must go.

Take for instance an average mining development. Millions are spent to secure the last word in efficiency of prime movers, haulage, and cutting equipment. More millions in tipples, housing, etc., but the ventilating system is selected by guess, and the fan, through lack of definite knowledge, by performance promised by the salesman. This is a most reprehensible practice the penalty for which is inefficient or unsafe operation and excessive costs for thorough gas control.

The ultimate solution of the problem of efficient gas control will be

found by a new type of mining technician, the ventilating engineer, who will have a thorough knowledge of the chemistry and action of mine gases; of fan design; of the action of the ventilating current under all conditions; of humidification and of the many other items entering into explosion prevention.

Air courses will be designed with as much care as the most complicated electrical installation. The fans installed will be selected as to type and will be designed for the service required. The proper amount of humidification will be added to the mine air. Stone dust will be applied just where needed. Splits will be sealed to the correct volume. Gas contents will be determined by analyses, not by estimation, and finally, half the money now spent for ventilation and gas control will be saved and carried over to the profit side of the operator's ledger, where it properly belongs.

#### DISCUSSION

MR. BRADLEY: Mr. Walter says, "Coal dust in suspension will lower the ignition point of gas-laden mine air to about one per cent gas content." How is it that the coal dust in suspension will lower the ignition point?

MR. HARRINGTON: The Bureau of Mines has gone into this subject pretty thoroughly and in the past it has caused a considerable amount of controversy with the anthracite mines. Anthracite dust is supposed to be non-explosive in itself. The Bureau has tested it out in the experimental mine, and while I am not positive in this statement I think their experiments show that anthracite dust itself is not ignited but as soon as one per cent of gas is admitted to the air the anthracite dust does ignite and propagate an explosion of thirty miles a minute. The anthracite people came back to the Bureau and denied the possibility of anthracite dust exploding and said the dust actually exploded with the ribs of the mine which were Pittsburgh seam. The ribs had been so thoroughly scaled off by about a thousand other explosions that there wasn't much opportunity for the Pittsburgh dust to get in there at all. There is no doubt in my mind that the anthracite dust is exploded with one per cent of gas in the air.

MR. BRADLEY: In a way that answers my question and in another way it does not. It appears as though they do not know specifically if the anthracite dust is explosive or non-explosive, and it is taking a great chance to allow the coal dust to accumulate in dangerous quantities with the idea of diluting the gas in a way.

CHAIRMAN TILLSON: Of course, Mr. Walter's paper deals with bituminous mines. This is all bituminous.

MR. BRADLEY: That increases the danger. Coal dust itself is considered explosive, highly explosive, and having an accumulation of coal dust with a one per cent mixture of gas gives you two dangerous elements right there.

CHAIRMAN TILLSON: I wonder whether in your mind you are thinking of temperature and the author is meaning the percentage ignition point that is present.

MR. BRADLEY: If you have got one per cent you have got two elements that cause considerable damage. You have got the coal dust and you have got the gas even if you only have one per cent.

CHAIRMAN TILLSON: The coal dust forms an explosive mixture with air and with one per cent of methane; that makes a mixture that is dangerous, whereas if the coal dust were not present it would require more methane to make a sufficiently dangerous mixture for explosion.

PROF. H. H. STOEK (University of Illinois): I think that what the author means is that with a percentage of gas in there it becomes more easily ignited. In other words, the methane is simply the match that sets it off as you put sulphur into a mixture of powder to start it more easily. As far as anthracite is concerned, I wish the Bureau would publish the results of some of these tests. A good many of us have been waiting now for about fifteen years for those tests that are said to have been made. No doubt they have been made and the results obtained, but the public does not know anything about it. In the anthracite field, if anthracite were explosive, you would certainly have a great many widespread explosions that you do not have now. No field has more gas in certain of its mines than the anthracite and I suppose there is no other field where men are burned by gas in groups of one, two, three, and so forth. So far as I know, there has never been a widespread explosion in an anthracite mine going over the whole mine as you have so frequently in the bituminous mines.

CHAIRMAN TILLSON: I might add to that that it was only last February that I raised this question with Mr. George S. Rice, Chief Mining Engineer of the U. S. Bureau of Mines, in view of the fact that I was materially interested in the installation of a transport system for pulverized anthracite coal, and I was attempting to determine what were the dangerous ratios of air in anthracite coal dust of less than 200 mesh in size. As near as I could find out from the literature on the subject, Welsh anthracite in the form of coal dust was explosive, and in the presence of methane it was particularly so. The experiments on this side did not seem to have indicated explosibility of anthracite coal dust, and I brought the question up to Mr. Rice. He finally gave me a very definite answer that it was not explosive and that there was an instance of a colliery in the anthracite district which had led to considerable question and criticism as to whether it had not blown up due to the coal dust present within it. He said that the best judgment that could be used in it was that the breaker had been blown up by an explosive charge which had been placed in it and had nothing to do with the coal dust. As I understand from Mr. Rice there is no history to indicate the slightest degree of fear in regard to the explosibility of coal dust, even the Lyken's Valley anthracite coal dust which is the highest in volatile constituents. I was quite interested in that because I was experimenting and built a pulverized anthracite coal establishment right within a boiler house where the dust would surely had been set off had there been any likelihood of it at all.

I would like to suggest that my limited familiarity with the literature

of ventilation gives only too few figures with regard to the proper coefficients of friction to be used in the design of fans to be used for different airways, depending upon the nature of the airways, the amount of timber and the quality of timber and the ratio of area to peripheral surface which you might call hydraulic radius if you were dealing with another branch of engineering.

If those of you here who have experience in laying out those things would only be kind enough to give us the benefit of the factors which you use in your own calculations for certain such conditions, I am certain they would be very valuable to us in our literature and transactions.

MR. HARRINGTON: I can't give you any particular figures of that kind, but as far as ventilation is concerned that is one of the chief kinds of work that I have been doing for the Bureau for about two years in connection with the metal mines chiefly, more than coal mines. The conditions are so vitally different that as far as I am concerned I don't see very much use in trying to apply any one coefficient of friction, because one man's guess is as good as another man's guess as to what the actual conditions may be on the ground.

#### EXPERIMENTS IN THE COPPER MINES AT BUTTE

In the Pennsylvania copper mine at Butte they erected three miniature shafts, one of them the ordinary timber shaft, another a timber shaft with smooth lining, and a third one a circular shaft—circular concrete shaft. They were all about 150 feet in depth. It was all done for experimental purposes. The object was to find out whether the rough-lined or ordinary-lined shaft had enough friction in it to make it any particular object in trying to decrease that friction. They put a small fan at the top of each one of these shafts, operated the fan with a motor of certain size and had a movable canvass pipe connection between the fan and the top of these shafts. All three shafts were in exactly the same cross-sectional area. They found that the ordinary shaft would throw a certain amount of air, would allow a certain amount of air to go through under a certain amount of power; that the same-sized shaft, smooth-lined like the walls of this room, would give one and nine-tenths times as much air as the same shaft without smooth lining; and that the circular concrete shaft, smooth-lined, gave three and three-tenths times as much air as the ordinary shaft unlined. Of course, those are only approximate, but it gave them the idea that by smooth-lining their main air shafts they would be able to increase the flow of air through those shafts at least twice or pretty close to twice in their rectangular shafts, and by sinking circular smooth-lined shafts they would be able to throw at least three times as much air for the same cross-sectional area. They are now preparing to sink a shaft in the Pennsylvania mine 2,800 feet deep—a circular, concrete-lined shaft for the purpose of supplying air to a group of mines and they expect to put in between 315,000 and 415,000 feet of air a minute.



CHAIRMAN TILLSON: Will there be any hoisting or traveling done through that shaft?

MR. HARRINGTON: It will be used for absolutely no other purpose than air.

One engineer will tell you that the use of the cages in the shaft has no influence. Another will tell you that it has extremely vital influence. I have been trying it out for the last three years and you can't convince me it hasn't very vital influence. I think the movement of the cages in the shaft will decrease the air flow as much as fifty per cent.

The Anaconda Company is going into it very definitely. They have figured that the smooth lining of their shafts is of enough benefit that they have decided to smooth line every shaft they have, and they have from twenty-five to thirty shafts.

They have adopted a new system. They drop some ordinary brattice cloth down the side of a shaft on the interior; they cover that with ordinary chicken-wire and then gunite. They claim that lasts for years in a shaft where there is no falling rock.

MR. FLYZIK: I desire to commend Mr. Walter for the able paper he has presented here, and I just wonder whether or not it would be possible for this section to forward that paper to at least all of the mine inspectors in the United States and see that copies are distributed around to different companies. It will furnish food for discussion. I know in Washington there is much suffering from serious explosions. Our fatality rate from that one cause is, I think, fifth on the list. Mexico, Utah, and Colorado are still worse off than Washington, so that in the Northwest this is one thing that is causing the greatest fatality.

I would also take the opportunity to state that I think we would profit very much from these investigations if the Bureau of Mines would publish them not so much in monthly periodicals, outside publications, and the like, but in a mining journal. I readily understand that there was a time when that information couldn't be made public, due to losses, indemnities, and damages, but since we have compensation laws in practically every state, eliminating damage suits between workmen and companies, I think the information should be given out at least to people who are interested as to their findings on dust explosions. The paper contains so many vital suggestions that we should make some effort to send it out to as many of the coal companies as we can. In doing so, I am confident it would tend to increase the activity in this mining department.

CHAIRMAN TILLSON: I think that I can probably be warranted in saying that undoubtedly some of the technical journals such as "Coal Age" will reproduce these papers, or some of them at any rate.

MR. R. D. HALL (Coal Age): There is no doubt we will publish this paper.

CHAIRMAN TILLSON: We have no means of finding out who the mine inspectors are, neither have we the money to distribute them as a mining section. Any funds that we have we ought to spend in a more intensified service ourselves in getting information, but by making them available to the public through technical journals of that sort, which mine in-

spectators should follow up if they don't, they are able to get the information.

MR. HALL: I think Mr. Walter, whom I know very well, is speaking about the conditions in certain sections of the country. My own experience in the West, in Wyoming and Utah, has led me to believe that ventilation there is more than usually good. Mr. Walter's paper would hardly apply. But Illinois and Pennsylvania mines, for the most part, are very well ventilated. While, of course, it is always well to spread such doctrines, I think that in many parts of the country they don't need it very badly. At the same time, I know that there are some, especially in the Southeast, which do need a great deal of this kind of propaganda. Relative to what you say about Wales, you want to remember the difference between the English and the American language. The word "anthracite" has a different meaning in Wales to that which it has in this country. Within the confines of what you would call anthracite in England, you have to include practically the whole of the New River and the Pocahontas fields, which have very bad explosions. It is true that there are parts of the Welsh anthracite fields which are, from what I have been told, as truly anthracite as anything in this country, but they have very narrow limits and only apply to the extreme western end of the field. Much of what is called anthracite in England would not be called anthracite in this country at all. Consequently, it is possible, in their mines, to have severe explosions as we have them in our mines which correspond to their anthracite mines.

MR. H. R. MILLER (Pittsburgh Coal Company): What is the life of the concrete lining of that shaft? What success has any one had with tapping gas with drill holes from the surface?

PROF. STOEK: I can say that in Western Pennsylvania it has been done for a great many years, and this summer, when traveling through, I asked if they had found it successful and they said they had.

MR. HARRINGTON: I went through a number of mines in Oklahoma about four years ago and I was told there that in one of the mines they had to abandon coal mining for a while on account of the excessive amount of gas that was being made in the advancing faces. The problem was so acute that they put down a churn-drill hole from the surface and through that were able to go ahead with the operation of the mine. Whether they put down a series I don't know, but they did put down one.

CHAIRMAN TILLSON: We have another paper on a kindred subject. Mr. Walsh is not here so I will read his paper on "General Rules for Gas Explosion Prevention (Anthracite Coal Mines)".

## RULES FOR PREVENTION OF GAS EXPLOSIONS IN ANTHRACITE MINES

JOSEPH J. WALSH, DISTRICT STATE MINE INSPECTOR, WILKES-BARRE, PA.

Casualties as a result of gas explosions in a coal mine are more nearly inexcusable than those occurring from almost all other causes. When one

considers the means available for the purpose of ventilating a mine, and the many devices and safety appliances invented for the purpose of detecting, and preventing the ignition of explosive gases, there can be only one answer in explanation of the frequency with which explosions take place in certain parts of the Anthracite field of Pennsylvania.

The casualties, as a result of gas explosions, in the Anthracite mines of Pennsylvania, during the past 47 years, were one every working day; the ratio being one fatal to three non-fatal.

Problems involving the element of human life, and particularly that problem influenced by conditions that can not at all times be foreseen, should be so guarded and surrounded by a safety factor that no element of danger can be reasonably seen by the inspector, or the mine manager. In the case of a shaft rope, the factor of safety can be expressed in numbers, but where the applications of the safety factor is for the purpose of preventing accidents from gas explosions, the factor can not be expressed numerically. Neither the intelligence of the workman, nor the action of the elements can be measured in a way that would permit the application of a factor that one could say would act as a barrier against gas explosions under all conditions. Therefore, greater care and a more liberal application of safety devices are required to insure a factor of safety, in the matter of preventing explosions, than would be required if such factor were susceptible to mathematical calculation.

Probably the greatest difficulty in dealing in a general way with the matter of preventing gas explosions is to understand just what is the underlying cause of explosions in a coal mine. Many mining men, ordinarily well informed, are in doubt as to the most effective means by which they might combat the evil. This confusion seems to be brought about by statements to the effect, that the miner is in complete control of the situation, and that his safety is entirely in his own hands, and if he will not exercise caution nothing can be done for him. It is true, the miner has certain statutory duties to perform, and it is also true that he sometimes violates those duties, in consequence of which explosions take place. Explosions also occur because of conditions that are entirely beyond his control.

We are told that the foreign-speaking miner is unskilled, and untrained in mining affairs, as a result of which, the underlying principles of the safety movement are imperilled. It is said he must be educated in order that any degree of efficiency be obtained from a well planned safety movement. While this statement is somewhat in conflict with the actual fact, education is, nevertheless, an essential element in any plan that might be adopted for the prevention of accidents. But in view of the importance of the question the educational scope should be extended to include the inspector, the mine manager, and all other mine officials. A man may be highly efficient in all the technical branches of mining, and at the same time be unable to recognize danger when he meets it.

Great things have been achieved as a result of the educational movement among the miners. Many have left the ranks and are now filling official positions. Regardless of this, there will always be found in every

coal mine the farmer, from European countries, who is unfamiliar with the customs, and who, because of being unskilled and uneducated in the matters of safety, will imperil, not only his own life, but the lives of others as well.

Since a chain is no stronger than its weakest link, likewise a mine will be no safer than the most careless, or the most unskilled man in it, if drastic precautions are not taken in matters that deeply affect its safety.

Therefore, regardless of any practicable effort that might be put forth in an educational way, there will always be unskilled workmen in every mine. This being true, no greater success in the matter of reducing the number of accidents from gas explosions will be achieved in the future than has been recorded in the past, unless those who are unfamiliar with the dangers are surrounded with all the known safety devices. This duty I conceive to be a function of the state and the mine manager.

The greatest impediment to the prospects of success in a safety movement seems to be our failure to draw the danger line at such time or place as would afford the highest degree of safety.

There is a group of mines in a certain part of Pennsylvania, from which 457 tons of methane, or about 4,323 tons of fire-damp are expelled each day; and during a period of four years more than 1,600,000 tons of coal were mined for each casualty as a result of gas explosions.

At a second group of mines bordering those mentioned in which the same conditions prevailed, and from which 390 tons of methane, or about 3,689 tons of fire-damp were expelled daily, the production per accident from explosion of gas was slightly over 300,000 tons.

Still a third group parallel in every respect, and generating about the same volume of gas, produced slightly less than 500,000 tons of coal per accident from the same cause.

In the first group the industrial efficiency which makes it possible to obtain so large a tonnage for each accident, can be attributed to the placing of proper safeguards around the workmen. For instance, safety lamps are used exclusively in a section through which 22,000 cubic feet of air is passing each minute and having a methane content of 0.26 per cent. In another section in which the methane percentage is 0.25, and the volume of air is 16,000 cubic feet, open lights are not used. In still another mine through which a volume of 25,000 cubic feet of air passes each minute, the methane percentage is 0.14, and the only means of illumination is the safety lamp.

In the second group of mines, open lights were used in an air condition containing 1.12 per cent methane; the volume of air being 28,000 cubic feet per minute.

In the third group, haulage was performed by means of trolley motors when the gas percentage was, in one case 1.02, and in another 2.30, the air volumes were 12,000 and 34,000 cubic feet respectively; and thus we may go on citing such extremes in many other instances.

#### CHIEF CAUSES OF ACCUMULATION OF GAS IN A MINE

The chief causes of the accumulation of gas in a coal mine are:

*First.* An insufficient volume of air, due to a weak or improperly located ventilating fan.

*Second.* Loss of the air through leakage, before it reaches the working faces. Conditions of this kind may be found in mines where the stoppings between the intake and return airways are poorly constructed. Likewise, in cases where a mine is developed by the single-entry system, a condition exists that will seriously interfere with the correct ventilating of the mine.

*Third.* The short circuiting of the ventilating current due to a neglected door; the breaking of a brattice, and the driving of openings too far in advance of the air.

*Fourth.* Under this head might be mentioned a cause for the accumulation of gas in a coal mine, that is becoming quite serious; namely, the frequent interruption of the air current on account of electrically driven fans failing to function.

#### IGNITION OF GAS

The ignition of gas takes place in a coal mine, chiefly as a result of the use of open lights; the use of a long flame powder, and the use of electricity. Smoking, defective safety lamps, and the careless striking of matches are also contributing causes of gas ignition.

#### RULES FOR THE PREVENTION OF GAS EXPLOSIONS IN ANTHRACITE MINES

It is not my purpose to enumerate the many rules that have been published from time to time, as precautions to be observed by the 130,000 miners of the Anthracite field of Pennsylvania, but rather to suggest to the 128 mine managers, a means by which they can eliminate, to a large extent, the possibility of an explosion, in case the commonly applied rules are overlooked by some member of the larger group.

1. When about to install a fan, its size and location should be determined with the aid of a ventilating expert. Remember as time goes on your airways will become congested as a result of roof falls. The falls will not be cleaned up, it is not practicable in many cases. Because of this your ventilation will be impaired; to provide against which the power of your ventilating equipment should be at least three times greater than that calculated by means of the volume of air and the ventilating pressure.

2. Build all stoppings between the intake and return airways with stone, brick, or concrete; this can be done regardless of the pitch of the seam.

3. Avoid the use of main doors as far as it is possible.

4. At the more gaseous mines use steam-driven fans for ventilating purposes. They are more reliable than those electrically driven. It was found by an examination of the records of eight steam-driven fans that they stopped without warning, on an average of once in 16 years. Under like conditions it was found by an examination of eight electrically-driven fans that they failed to function, without warning, once every four months. Accidents have occurred as a result of fans stopping.

5. At the moderately gaseous mines, if an electrically-driven fan is operated, the fan should be on an independent circuit. By the term "mod-

erately gaseous" is meant a mine or section of a mine in which is found a gas condition such as appears in paragraph 7.

6. Have the air in each section of your mine analyzed monthly, and remember, the danger lies not so much in the percentage of gas in the current as in the volume of gas generated each minute.

7. Because of the ignition of accumulations of gas by open lights, both fatal and non-fatal accidents have occurred in mines having the following air conditions:

| No. | Quantity of Air<br>Per Minute | Per Cent of<br>Methane | Methane Generated<br>Per Minute, c. f. |
|-----|-------------------------------|------------------------|----------------------------------------|
| 1   | 10,000                        | 0.29                   | 29                                     |
| 2   | 15,000                        | 0.44                   | 66                                     |
| 3   | 8,000                         | 0.52                   | 41.6                                   |
| 4   | 12,500                        | 0.18                   | 22.5                                   |
| 5   | 8,000                         | 0.32                   | 25.6                                   |
| 6   | 20,000                        | 0.24                   | 48                                     |
| 7   | 11,000                        | 0.26                   | 28.6                                   |
| 8   | 16,000                        | 0.15                   | 24                                     |
| 9   | 5,000                         | 0.23                   | 18.4                                   |

With few exceptions safety lamps should be used in mines having an air condition such as indicated in the above table.

8. A mine in which the direction of the air current is controlled by doors is, under like gas conditions, more dangerous than one ventilated without the use of doors. This should be considered in the application of safeguards.

9. Use permissible explosives in all mines where danger is imminent from explosive gases.

10. A section of a mine in which 125 cubic feet of methane, or more, is generated each minute should be classed among the more dangerous mines. By the term "section" is meant that part of a mine defined by the Anthracite Mine Laws, in which 75 persons are permitted to work. Such sections fully manned would comprise an area of about 10 to 12 acres actually being developed.

11. In gaseous mines electricity should be used only in the intake airways.

12. The practice of giving a miner a safety lamp for testing purposes, and at the same time permitting him to work with an open light, is a dangerous custom. Gas may accumulate because of a neglected door, while he is about his duties. It would be unreasonable to expect the most careful workman to avoid accidents in cases of this kind.

Unfortunately, it cannot be said that explosions are things of the past; they continue to occur in spite of all the skill and care of the mine officials, and the miners. It is usually the unexpected that happens, therefore, it will be found to be prudent to surround your workmen with every known safety device, and place in their hands such means as will insure protection in the event of a dangerous condition arising.

## DISCUSSION

MR. HARRINGTON: I notice that both of these gentlemen recommend strongly the use of permissible explosives in the mine. Of course, that is strictly in harmony with what the Bureau of Mines believes, but I would like to call attention to one or two phases about the use of permissible explosives. I am absolutely and totally in favor of the use of permissible explosives almost to the exclusion of any other kind of explosives in coal mines, but people should not get it into their heads that by using permissible explosives they are going to eliminate explosions or troubles coming from explosions. We in the West have had in the past six months three explosions in mines using permissible explosives. The mining companies were extremely concerned about it and called in the U. S. Bureau of Mines men to look into the situation. When we got there we were told that everything was regular, that they were not using more than a pound and a half of the explosives, that everything looked just as though the permissible explosive itself had gone wrong. After we had spent a considerable amount of time sending samples of explosives in for tests, analyses and so on, in all three cases we were told ultimately that the holes instead of being charged with one and a half pounds of explosives were charged—some of them—with seven and eight pounds, and then they expected the explosives to be safe.

MR. BRADLEY: The mining law of Pennsylvania states that an accumulation of explosive gases shall not be allowed to exist in any part of the mine. Should explosive gas be found, electric safety lamps shall be used and also permissible explosives should be used. If you find that element in the mine and use those precautions, I think the dangers from gas explosions will be eliminated.

This appears to be an awful statement—having one gas explosion about every working day in the anthracite region. A gas explosion in the bituminous fields is uncommon occurrence now. I think it has been five or six years since we had one, and we have as much gas to handle down in that region as any other in Pennsylvania, I think.

MR. HERBERT: There is possibly a little difference between an explosion and a man getting burned. The men may be getting burned every day and yet not have what might be termed an explosion.

MR. BRADLEY: What causes the burn?

MR. HERBERT: Of course it is an explosion, but a man might be burned and yet not be able to call the cause an explosion.

MR. BRADLEY: What ignites the gas?

MR. HERBERT: It might be ignited from several causes, electric current or open flame or defective flame safety lamps or explosives or any one of a number of causes.

CHAIRMAN TILLSON: May I correct the wrong impression you have. Mr. Walsh does not say there is a gas explosion in a mine in the anthracite district at the rate of one for every working day. He says there is one casualty for every working day.

MR. BRADLEY: Can't they be prevented? What causes them?

CHAIRMAN TILLSON: Mr. Walsh has been telling us about that.

MR. FLYZIK: That is what we have all been after—to find out as much as possible, but nobody ever came back to tell us what occurred. We theorize considerably about every big dust explosion we have had. We set up a theory. This might have caused it or that might have caused it. We are doing the best we can.

In the State of Washington we have had two serious explosions in the last four years—one causing us to lose thirty-one men. The Bureau of Mines helped the State Department to conduct an investigation. We couldn't exactly determine the cause, but we have set up a theory that the explosion occurred after a shot was fired and the miner went back in with an open lamp. In that particular mine we had mixed lights. From that experience we found out that it is very dangerous practice to permit men to have mixed lights in any vein where gas is generated. The other explosion was caused by what we think was an overloaded charge. The miner tamped the hole about ten minutes before quitting time and shot while they were in there and the supposition is that the charge was too heavy. It ignited the dust and we lost something like nine or ten men in that explosion.

In addition to our mining laws (we recognize that we have some pretty good mining laws in the various states), as a safety booster I am arriving at the conclusion that we have too much repressive legislation. We ought to say, "You don't have to do this but you ought to see that it is done every day of your own free will."

"EDUCATIONAL MINING SAFETY STANDARDS"

In Washington we got out this pamphlet, "Educational Mining Safety Standards," and we distributed it among the workmen. It contains several rules and suggestions on the various tasks; and we make a different appeal to the management. We are not going along and shaking the mining laws before their eyes and saying, "You have got to do this and you have got to do that." We try to appeal to them in a broad manner and try to encourage them to keep safe at the mine 365 days in the year instead of two or three days when the state mine inspector comes along. By pursuing that course I venture to say that we have been successful in reducing our accidents practically forty-six per cent in the year of 1919 over 1918. Thus far in the year of 1920 our accidents will still show a further decrease.

I think that these papers are very valuable and should be given publicity. In doing so we should not pick out technicalities. There was some suggestion that they may be theoretical and put on from a speculative standpoint, but each one of them contains many practical suggestions that are worthy of our consideration.

CHAIRMAN TILLSON: I think we note that Mr. Walsh puts stress upon the point that it is the total quantity of methane released in any working face which he considers of prime importance in consideration with the methods of ventilation and the care of the mine so far as gas explosions



are concerned, and that point is a little new as compared with the other points which Mr. Walter's paper has raised.

We are favored in having the next paper read by Mr. Woodburn, Director of the Globe-Miami District Mine Rescue and First-Aid Association of Globe, Arizona, which is an organization, as I understand it, supported by a group of mines in that district for their mutual welfare.

### MINE RESCUE AND RECOVERY OPERATIONS

ORR WOODBURN, DIRECTOR, GLOBE-MIAMI DISTRICT MINE RESCUE AND  
FIRST AID ASSOCIATION, GLOBE, ARIZ.

In presenting a paper on this subject it would seem pertinent to emphasize only the more important things and also to mention some of the neglected phases of the subject. This subject has been very completely covered from many angles by capable writers, all of whom are in accord on the general principles and many of the details. All that remains to be done in connection with the subject is to arouse sufficient interest and enlist aid in the establishment of, at least, the more important things in the way of preparation. Few mining men have attended or had personal experience with more than a very few mine fires or disasters. Disaster and fire, of course, are the best instructors on the subject but, unfortunately, the instruction is too late to be of much value at the time. As individuals each man must necessarily be dependent upon others who have limited actual experience. This would indicate that the principal source of information on the subject is based largely on opinion rather than fact. The United States Bureau of Mines has done a valuable service in collecting and distributing reliable information on the subject. Standardization of methods and plans is limited on account of the variable conditions and kinds of disasters. These limitations may be offset by each plant studying its own conditions and taking such preventive and preparatory measures as will have application. Such measures serve each other and are without differentiation.

The first thought in case of disaster is—what should be done. Naturally, human life is the first consideration, which is logical, and is followed by the thought of warning the men of the condition and conducting them to safety. Then, to relieve the condition—perhaps by means of facilities that may be meager and equipment that may have been neglected. Without warning, this equipment which was prepared for a battle that might be, and yet never really expected, becomes suddenly of vital importance. Rarely in the history of any mining plant is there a time that the condition of full preparedness exists. All of the local officials should meet frequently, and discuss, and become familiar with the facilities available for handling such exigencies.

Every surface dwelling and building is fully insured and protected by a separate system of fire lines, hose boxes, fire extinguishers, central hose station, and, probably, an alarm system. All of these are inspected by insurance representatives and kept up to the requirements by the operating departments as a part of the regular routine. All of this is to

protect buildings that are fully insured. In the mine insurance is not feasible and yet the hazard of fire is just as great, not to mention the much greater danger to life, and no such complete separate fire system is maintained. Not as much provision is made for the protection of a valuable stope as is made to protect fully insured surface buildings. The Rescue Crews must nearly always depend on water lines that are converted from air lines by cross-connections with a water supply, and probably make openings in the pipe where needed. Pipe lines of proper size must many times be laid and hose carried to the place. The surface building has at least one fire extinguisher and a fire hydrant with available hose at a specified distance.

With these facts in mind and this condition existing, it is hoped that every mining operation face the situation squarely and provide as complete a fire system for the underground workings as is provided on the surface. By so doing, fires could be extinguished at inception and serious fires from accidental means would be of rare occurrence.

#### OXYGEN BREATHING APPARATUS

In this brief paper it is only possible to touch on the more important facts and a few of the common fallacies. Many mining plants rely too completely on oxygen breathing apparatus, expecting much from equipment that has well-defined limitations and, many times, plays only a minor part in the recovery operations. Oxygen apparatus and trained crews are essential and must be maintained on a high plane, but such crews cannot serve except in a limited manner without the best of facilities and equipment as outlined in the many papers and publications on the subject. Oxygen apparatus occupies a most conspicuous place in the field of mine rescue and recovery operations. When such apparatus first came into general use so much reliance was placed in it that many lives were lost needlessly. For a time it appeared that the apparatus only added to the casualty list and its use would have to be abandoned. Then it was that a realization of the lack of knowledge concerning its use came about. The limitations were conceded and regarded together with an improved understanding. It is now an established fact that the use of oxygen apparatus is imperative and will serve within limitations in the same proportion as its condition and proper use will permit.

An almost general belief exists that the purchase of new apparatus eliminates all of the evils of defective or questionable apparatus. The new apparatus will not give the results expected unless it is kept in proper condition and this condition proven by frequent use. No apparatus can be expected to serve as intended unless kept in proper condition. If the old apparatus did not give proper service the same thing can be expected of the new apparatus. Storing the apparatus in a special cabinet and testing at frequent intervals does not insure its safe condition for use. The proof of the condition is the wearing, and the more often it is worn the longer the life of the rubber parts. Recharges and spare parts are often not kept in sufficient amounts. The continuous use of all apparatus for 36 hours would exhaust the recharges of most plants. With the numerous strikes and freight embargoes it is impor-

tant to maintain a high minimum regardless of the geographical location of the plant. A supply that will permit of 100 hours, or better still 150 hours, is advisable especially since the advantage of borrowing from adjacent plants has been limited through the increased number of models of apparatus in use. The high minimum of supplies only requires a greater investment as there is no deterioration or increased consumption.

One of the serious drawbacks in the use of oxygen apparatus is the time required to get the crews equipped and into action. The history of all fires shows that the critical period for life and property is during the first few hours and of that time the first thirty minutes is the most important. Providing cabinets with sets of half-hour oxygen apparatus that can be used by any one without special training, with a complete set of emergency tools, carbon tetrachloride extinguishers, pipe fittings, etc., has proven to be of great value. This will make immediate action possible and if a small fire is encountered it may be extinguished.

The location and extent of the area involved together with the conditions can be ascertained so that when the heavy apparatus crews are ready they can go about the work intelligently. This light equipment is of great value in the further exploration and inspection work. One instance is worthy of mention where the regular operating force controlled and extinguished a serious fire in a raise of a top-slice stope where there was a strong forced draft into a heavy matt. The heavy apparatus crews were ready for service in record time but powerless to help unless the fire gained headway and the situation became worse, necessitating indirect action. This is without doubt the most important, and yet the most overlooked field in the use of oxygen apparatus in metal mines.

#### CENTRAL MINE RESCUE STATION

Mine Rescue, First Aid, and Mine Fire Prevention work is a most important part of mining operations and should be in charge of a man or department of the specialist type to take care of this work exclusively. Where such work is made the part-time duty of some one regardless of his ability only a side line value can be expected when the emergency arises. Where there are several plants within reasonable distances all apparatus should be pooled and a central Mine Rescue Station established. With a large and efficient organization completely equipped at a lower cost per company the best possible service can be depended upon. By distributing the cost per company on the basis of the average number of employees the smallest plant will have just as good protection as the largest and at a cost that is not prohibitive.

Experience around fires has shown that large quantities of fire hose are needed to get sufficient water on the fire without delay. All hose and pipe openings for fire use in the mine should be of the same size as the regular air hose in use and standardized to insure prompt use. If more lines and volume of water are required this can be arranged for in a reasonable time provided a record is kept of all of the surface fire hose as to size and location.

Fire doors should be so placed that fire may be quickly isolated and materials available for the temporary sealing off of the fire area. Cement

guns are of great value in the permanent and efficient sealing off of any area.

All of the labor connected with the fighting of fire should be done as far as possible by the fresh air men who may be assisted and protected by the oxygen apparatus crews. This can be done by building up air pressure with portable blowers.

The value of special trucks with blowers and flexible piping and also large fire extinguishers with long hose cannot be placed too high. When 300 feet of flexible pipe can be installed in an hour and its cost is moderate and it occupies such a small space in storage its use is to be highly recommended. Some of the materials used in making this pipe are highly flammable and this must be considered in purchasing.

Signal systems to call all of the men out of the mine should be provided and it would be well to have such systems standardized at least in each district, and better still nationally. Flashing signals on the electric circuits is apparently the most feasible and common in vogue.

At times of fire and disaster it is of paramount importance to place one man at the scene of operations and another on surface through which all orders must go. Each should keep a complete record of every order, by whom, time, and to whom transmitted, thereby providing a valuable and reliable source of information, saving much duplication and delay. Every boss and official should be instructed and notices posted throughout the mine as to general rules to be followed in case of mine fire.

The danger of smoke and gases from surface fires entering the mine must be considered and provision made to prevent it.

Appended is a brief summary of the equipment and organization of the Globe-Miami District Mine Rescue and First Aid Association and Central Mine Rescue Station at Globe, Arizona.

The purpose of the Association is to provide training and facilities for the employees to render prompt and efficient aid at times of injury, and to aid in every possible way in fire prevention and finally to keep an organization especially trained in the use of oxygen breathing apparatus and mine rescue operations, as well as with the responsibility of keeping the equipment of the station and mines available for immediate use.

The association employs three station attendants and the director. Three shifts are maintained, day shift 8:00 A. M. to 4:00 P. M., night shift 4:00 P. M. to 12:00 midnight; the night shift man sleeps at the station. One day shift man is on the outside inspecting first aid boxes, supply bases, half-hour apparatus, pulmotors and miscellaneous duties. The attendants change shifts every two weeks.

#### STATION EQUIPMENT

Twenty sets Draeger 2-hour, positive pressure, by-pass, mouth-breathing type apparatus, 1 half-hour regular Draeger apparatus, extra oxygen cylinders for each, spare parts, 3 high-pressure refill pumps, 13 150 cu. ft. oxygen storage cylinders, minimum supply of 2-hour regenerator 1,500, 1,000 one-half hour regenerators, 4 basket stretchers, 7 army stretchers, 10 blankets, large supply of 1, 2, and 3-inch roller bandages, absorbent cotton, sterile compresses, made locally and sterilized at the hospital, tri-

angular bandages, iodine, A. S. A., picric acid, 12 canary birds, 1 carbon monoxide gas detector, 1 Globe Geophone, 1 Dodge mine rescue truck, 1 Ford roadster truck, and 1 Ford touring car.

**TIME TO GET TO EACH PLANT WITH RESCUE TRUCK**

|                                         | <b>Miles</b> | <b>Minutes</b> |
|-----------------------------------------|--------------|----------------|
| Inspiration Consolidated Copper Co..... | 7.0          | 25             |
| International Smelting Co.....          | 4.2          | 14             |
| Miami Copper Co.....                    | 5.7          | 17             |
| Old Dominion Co.....                    | 1.0          | 7              |
| Arizona Commercial Mining Co.....       | 3.5          | 14             |
| Iron Cap Copper Co.....                 | 4.0          | 17             |
| Superior & Boston Copper Co.....        | 4.9          | 20             |

**COSTS**

Operating costs of station, first aid and rescue supplies for training average about one cent per shift for each man employed, or \$1.00 per day for each 100 employed. Expenses are carried by the several companies on the basis of the average men employed each month.

**OFFICERS AND DIRECTORS OF THE ASSOCIATION**

|                          |                           |
|--------------------------|---------------------------|
| W. G. McBride, Chairman  | T. H. Donahue, Director   |
| T. H. Donahue, Secretary | T. H. O'Brien, Director   |
| A. McAlpine, Treasurer   | L. O. Howard, Director    |
| W. G. McBride, Director  | F. W. MacLennan, Director |

**COMPANIES OF THE ASSOCIATION**

|                                         | <b>Number of<br/>Men Employed<br/>March 1929</b> |
|-----------------------------------------|--------------------------------------------------|
| Inspiration Consolidated Copper Co..... | 1,425                                            |
| Miami Copper Co.....                    | 1,265                                            |
| Old Dominion Co.....                    | 896                                              |
| International Smelting Co.....          | 426                                              |
| Arizona Commercial Mining Co.....       | 317                                              |
| Iron Cap Copper Co.....                 | 222                                              |
| Superior & Boston Copper Co.....        | 91                                               |
|                                         | <b>4,535</b>                                     |

At each of the operating shafts and portals of the mines of the district is kept a special cabinet containing six one-half hour oxygen breathing machines, portable fire extinguishers, lineman's belts with emergency tools, flashlights and recharge for the apparatus. This half-hour apparatus can be worn by any one without special training, and is located in a cabinet which has glass doors. It is expected that those present will be able to do work of great value during the important and critical first half-hour, such as getting the men out, locating fires and possibly even fighting the fire in its early stages. These machines only weigh eight

pounds and are of great value in bridging the gap between the time of discovery of fire and the arrival of the rescue trucks and crews. They can be used through the entire operation for exploration work.

#### HALF-HOUR SELF RESCUER CABINETS

**Inspiration Consolidated Copper Co.**—Six self-rescuers with recharges, 6 pyrene fire extinguisher, 7 flashlights and batteries, 5 linemen's belts with emergency tools, 2 hand axes, 1 claw hammer, 1 wood chisel, 2 cold chisels, nails, spikes, 1 hack saw, 1 keyhole saw, 2 three-cornered files, 2 14-inch Stillson wrenches, 3 6-inch Stillsons, 1 12-inch monkey wrench, 1 6-inch monkey wrench, 1 pair side-cutting insulated pliers, 25 feet of 1-inch rope. This equipment is kept in a specially-designed cabinet near the shaft. Two Pulmotors at mine office.

**Old Dominion Co.**—Same equipment kept in the Safety Inspector's office near the shaft. One pulmotor at mine time office, one pulmotor at Grey Shaft.

**Miami Copper Co.**—In addition to the equipment listed above, has special pipe connections, 75 feet of  $\frac{3}{4}$ -inch hose, first-aid box and pulmotor. This equipment is kept on a specially constructed truck that can be taken to any section of the mine; the truck is kept near the main shaft.

**Arizona Commercial Mining Co.**—Has two self-rescuers kept at the supply house near the shaft.

**Iron Cap Copper Co.**—Has four self-rescuers in a cabinet near the shaft.

**Superior and Boston Copper Co.**—Has two self-rescuers in the foreman's change room near the shaft.

#### NUMBER OF FIRST-AID BOXES IN THE DISTRICT

|                              | Surface    |           |           | Underground |          |          |
|------------------------------|------------|-----------|-----------|-------------|----------|----------|
|                              | Boxes      | B'kts     | St'chers  | Boxes       | B'k'ts   | St'ch's  |
| Inspiration C. C. Co.....    | 41         | 10        | 5         | 19          | 4        | 4        |
| Internat'l. Smelting Co..... | 15         | 7         | 1         | —           | —        | —        |
| Miami Copper Co.....         | 15         | 12        | 12        | 45          | 4        | 3        |
| Old Dominion Co.....         | 25         | 9         | 10        | 31          | 0        | 0        |
| Ariz. Com'l. M. Co.....      | 4          | 5         | 3         | 3           | 0        | 0        |
| Iron Cap Cop. Co.....        | 5          | 3         | 3         | 6           | 0        | 0        |
| Sup. & Boston Cop. Co.....   | 1          | 2         | 4         | 0           | 0        | 0        |
| <b>Total</b> .....           | <b>106</b> | <b>48</b> | <b>38</b> | <b>104</b>  | <b>8</b> | <b>7</b> |

Total Boxes, 210; Total Stretchers, 45; Total Blankets, 56.

#### NUMBER OF FIRST-AID SUPPLY BASES AT PLANTS

|                                |   |                                                 |
|--------------------------------|---|-------------------------------------------------|
| Inspiration Con. Cop. Co.....  | 2 | (a) Mine Time Office (b) Mill Time Office       |
| International Smelting Co..... | 2 | (a) Gen'l Office (b) First-Aid Room             |
| Miami Copper Co.....           | 2 | (a) Mine Time Office (b) Warehouse              |
| Old Dominion Co.....           | 3 | (a) Helmet Room (b) Warehouse<br>(c) Grey Shaft |

Ariz. Com'l M. Co.....1 Warehouse  
 Iron Cap Cop. Co.....1 Hospital  
 Sup. & Boston Cop. Co.....1 General Office

#### SPECIAL EQUIPMENT AT INTERNATIONAL SMELTER

Twenty-two army style gas masks with sulphur dioxide canister, 1 by cranemen.

#### RESCUE TRUCK

Dodge, 1-ton, 137-inch wheel base, length over all 17 ft. 6 in, weigh body and load 2,600 pounds, total weight loaded 5,230 pounds.

#### EQUIPMENT OF TRUCK

- 10 2-hour Draeger apparatus
  - 1 ½-hour regular Draeger apparatus
  - 1 Pulmotor
  - 1 High-pressure oxygen refill pump
  - 3 150 cu. ft. oxygen storage tanks
  - 3 Flexible brass tubes
- 10 Extra 2-hour oxygen cylinders
- 12 2-hour regenerators
- 12 ½-hour regenerators
- 24 Eveready flashlights and 40 extra batteries
- 12 Candles
  - 1 Trouble lamp
  - 3 Hand bird cages with seed and water cups
  - 1 Package bird seed
  - Special adapters for pipe lines
  - Life line and reel
  - 3 1-gallon cans pyrene
- 17 Canvas (brattice 6 ft. x 9 ft.)
  - 1 Extra self-rescuer oxygen cylinder
  - 1 Extra regular ½-hour cylinder
- 100 Feet 1-inch rope
  - 2 Basket stretchers, 2 army stretchers
  - 4 Blankets
  - 1 First aid box
  - 1 Set leg splints (padded)
  - 2 Rolls adhesive tape
  - 1 Bottle iodine, 1 bottle A. S. A., 1 bottle picric acid
  - Auto jack, wheel chains, side curtains, 2 extra tires
  - 2 Pyrene extinguishers
  - 6 Flexible tubes (regenerator holder to cooler)
  - 4 2-hour breathing bags
  - 4 Self-rescuer breathing bags
  - 6 Long circulation tubes
  - 6 Short circulation tubes
  - 2 Reducing valves
  - 2 Bypass tubes

- 8 Standard tube couplings
- 4 Bypass tube couplings
- 6 Rubber side straps
- 4 Respiration valve chambers
- 6 Rubber plugs
- 12 Pairs goggles
- 6 Moisture trap tubes
- 4 Moisture traps
- Bag of tools and gaskets

## DISTRICT MINE RESCUE BONUS CREWS

Inspiration Con. Copper Co., 15 men; Miami Copper Co., 15 men; Old Dominion Co., 15 men; Arizona Commercial Mining Co., 5 men; Iron Cap Copper Co., 5 men; Superior & Boston Copper Co., 5 men. These men are paid a bonus of twenty-five cents per day for being on the crew; they are subject to call to any mine in the district in case of disaster, at which time they are paid double time. They receive a minimum of four hours' training every six weeks. Reserve men for crews are on hand, as each company must have the specified number of bonus men at all times. This Association was organized in January, 1918. The station was completed and a full crew put on January 1, 1920.

## SUMMARY OF MINE RESCUE TRAINING FOR THE SIX MONTHS ENDING JULY 1

| <i>Company</i>                 | <i>No. Men</i> | <i>Total Hours</i> | <i>U. S. B. M. Certificates</i> |
|--------------------------------|----------------|--------------------|---------------------------------|
| Inspiration C. C. Co.....      | 15             | 301                | 15                              |
| Miami Copper Co.....           | 36             | 308                | 18                              |
| Old Dominion Co.....           | 19             | 332                | 13                              |
| Arizona Commercial M. Co.....  | 6              | 113                | 8                               |
| Iron Cap Cop. Co.....          | 6              | 103                | 6                               |
| Superior & Boston Cop. Co..... | 5              | 96                 | 5                               |
| <b>Total</b> .....             | <b>87</b>      | <b>1,253</b>       |                                 |

Average No. Hours per man, 14.4.

Total number practices held, 75. Total number practice hours, 199.

Total attendance, 379. Average attendance each practice, 5.05.

## SUMMARY OF FIRST-AID TRAINING FOR THE SIX MONTHS ENDING JULY 1

## Inspiration C. C. Co.

| No. Men    | Mine | Mill | Surface | Buttons                 |      |         |
|------------|------|------|---------|-------------------------|------|---------|
|            |      |      |         | Mine                    | Mill | Surface |
| 81         | 57   | 8    | 16      | 12                      | 5    | 7       |
| Attendance |      |      |         | U. S. B. M Certificates |      |         |
| 280        | 156  | 46   | 78      | 9                       | 5    | 3       |

## Miami Copper Co.

| No. Men    | Mine | Mill | Surface | Buttons                 |      |         |
|------------|------|------|---------|-------------------------|------|---------|
|            |      |      |         | Mine                    | Mill | Surface |
| 106        | 103  | 1    | 2       | 25                      | 0    | 1       |
| Attendance |      |      |         | U. S. B. M Certificates |      |         |
| 347        | 337  | 2    | 8       | 23                      | 0    | 1       |



## Old Dominion Co.

| No. Men    | Mine | Mill | Surface | Smelter | Mine | Buttons                 | Mill | Surface | Sm. |
|------------|------|------|---------|---------|------|-------------------------|------|---------|-----|
| 285        | 261  | 5    | 15      | 4       | 77   | 0                       | 5    | 2       |     |
| Attendance |      |      |         |         |      | U. S. B. M Certificates |      |         |     |
| 890        | 822  | 12   | 44      | 12      | 59   | 0                       | 5    | 2       |     |

## International Smelting Co.

|            |  |  |  |  |  |                         |  |  |  |
|------------|--|--|--|--|--|-------------------------|--|--|--|
| 178        |  |  |  |  |  | Buttons                 |  |  |  |
|            |  |  |  |  |  | 78                      |  |  |  |
| Attendance |  |  |  |  |  | U. S. B. M Certificates |  |  |  |
| 658        |  |  |  |  |  | 78                      |  |  |  |

## Iron Cap Copper Co.

|            |    |   |    |  |  |                         |  |  |  |
|------------|----|---|----|--|--|-------------------------|--|--|--|
| 12         | 8  | 1 | 3  |  |  | Buttons                 |  |  |  |
|            |    |   |    |  |  | 4 0 2                   |  |  |  |
| Attendance |    |   |    |  |  | U. S. B. M Certificates |  |  |  |
| 47         | 33 | 4 | 10 |  |  | 4 0 2                   |  |  |  |

## Arizona Com'l M. Co.

|            |    |  |    |  |  |                         |  |  |  |
|------------|----|--|----|--|--|-------------------------|--|--|--|
| 29         | 22 |  | 7  |  |  | Buttons                 |  |  |  |
|            |    |  |    |  |  | 18 3                    |  |  |  |
| Attendance |    |  |    |  |  | U. S. B. M Certificates |  |  |  |
| 109        | 96 |  | 13 |  |  | 18 3                    |  |  |  |

## Superior &amp; Boston

|            |    |  |    |  |  |                         |  |  |  |
|------------|----|--|----|--|--|-------------------------|--|--|--|
| 12         | 6  |  | 6  |  |  | Buttons                 |  |  |  |
|            |    |  |    |  |  | 2 1                     |  |  |  |
| Attendance |    |  |    |  |  | U. S. B. M Certificates |  |  |  |
| 31         | 10 |  | 21 |  |  | 2 1                     |  |  |  |

## Miscellaneous

|            |  |  |  |  |  |                         |  |  |  |
|------------|--|--|--|--|--|-------------------------|--|--|--|
| 28         |  |  |  |  |  | Buttons                 |  |  |  |
|            |  |  |  |  |  | 7                       |  |  |  |
| Attendance |  |  |  |  |  | U. S. B. M Certificates |  |  |  |
| 55         |  |  |  |  |  | 7                       |  |  |  |

Total number men, 724. Total attendance, 2,417.

Average attendance each man, 3.34.

No. classes held, 159. Total hours training, 233.

Average attendance each class, 16.1.

Total buttons, 249. Total U. S. B. M. certificates, 222.

## OLD DOMINION COMPANY

## GENERAL RULES TO BE OBSERVED FOR MINE FIRES

1. The first consideration must be the safety of all of the men.
2. All air currents are to be maintained as nearly normal condition possible until the men are located.
3. Any one locating a fire and who cannot put it out at once must to the "A" Shaft notifying every one he meets and ring the accident call bell and level for the cage. When the cage arrives he him must go to the engine room and notify the engineer to give the signal.
4. All engineers must be thoroughly familiar in giving the fire signal (which is 3-3-3 on all electric currents).

5. All shift bosses must have a sufficient number of men chosen, instructed, and assigned to certain portions of his run to enable him to get the men assembled as quickly as possible.
6. The powdermen and carmen must be thoroughly instructed regarding fire signals, and should be kept informed at all times as to who the men are that are chosen to make the assemblage and where they are working.
7. When all the men are assembled they will proceed to the "A" shaft if possible. If it is not possible to reach the "A" shaft without danger, take the best available exit.
8. The exit signs along the drifts indicate the way on all levels from "A" shaft to best exits.
9. All abandoned places must be marked by crossed lagging with "closed" sign.
10. Working places such as raises and stopes not connected from one level to the other, also dead end drifts are to be marked "No Emergency Thoroughfare."
11. Regardless of the exit used by you to reach the surface, you must go at once to the mine time office and call for your check, the same as when coming off shift.
12. It shall be the duty of all shift bosses to see that these rules are complied with at all times.

#### INSTRUCTIONS IN CASE OF FIRE IN MINE, MIAMI COPPER CO.

##### DON'T GET EXCITED

##### TIMEKEEPER ON SHIFT

1. On being notified of fire, will learn its location. Also instruct person telephoning to notify assistant foreman on shift.
2. Notify Mr. Woodburn at District Safety Station. Telephone *Globe Main 406*.
3. Send down by cager to assistant foreman on shift the list of trained helmet men on shift and instruct cager to take half-hour helmets and equipment belts from hoist house to the station nearest fire.

##### NOTE

No. 4 shaft fan should be closed off at once. Fans at No. 3 and No. 1 shafts should not be stopped except on special order of person in charge of fire fighting.

4. Telephone—D. G. Scott, Phone No. 41  
C. S. Peyton, Phone No. 53  
F. Kieren, Phone No. 3

Asking them to come to the mine with automobiles. On day shift telephone for cars to:

Garage  
Bucan's Office  
Warehouse  
D. G. Scott  
Mr. Williams

5. Notify Mr. MacLennan, Mr. Hensley, Capt. Wakefield, and Mr. Allen.
6. Notify the helmet men on the following list who can be reached by telephone.
7. On arrival of cars send out for helmet men according to the following list, first checking off the men on shift.
8. Timekeeper will remain in the office to answer calls from the mine, note names and time of arrival of helmet men, and instruct them to report to Mr. Woodburn at the "dry".

**AVOID ALL NEEDLESS PUBLICITY**

**REQUIREMENTS OF RESCUE TRAINING FOR  
METAL MINERS**

R. H. SEIP, SAFETY ENGINEER, THE NEW JERSEY ZINC COMPANY,  
FRANKLIN, N. J.

**INTRODUCTION**

There is no longer any question as to the necessity or desirability of maintaining breathing apparatus at metal mines for use in rescue work, fire fighting, or recovery operations. Neither does any doubt exist in the minds of most mining men as to the equal necessity of properly training men in the use of such apparatus, and the maintenance of the condition of both men and apparatus.

Evidence supporting the first statement is offered in the fact that at present there are comparatively few metal mining companies of appreciable size that have not installed at least two sets of breathing apparatus. In the past few years the tendency has been to give more attention to the proper training of men in the use of the apparatus, and today this phase of the work has reached a fairly high stage of development. This result is due chiefly to the years of effort on the part of the United States Bureau of Mines, and to the employment by the mining companies of men qualified to give sound instructions along these lines. Relative to the maintenance of the apparatus, and the necessary supplementary training of the men who are required to use it, there remains much to be done.

It is not the purpose of this paper to deal with the make, type, or number of breathing machines which should constitute the proper equipment for any mining operation, or of the auxiliary equipment and supplies, as this subject was very thoroughly covered in the paper by Mr. A. J. Moorshead at the Sixth Annual Congress at New York in 1917. The principal aim of the paper is to provoke discussion by the members of the mining section that will tend to increase the efficiency of the rescue crews upon which our mines depend for the saving of life and property in times of emergency or disaster.

Assuming, then, that the proper equipment has been procured, it would seem logical that the subject should be considered as follows:

1. The selection of rescue men
2. The training quarters
3. The schedule of training
4. Supplementary training

#### SELECTION OF RESCUE MEN

Obviously, it is of vast importance that the men to be selected for places on the rescue crews should be given careful consideration. It is just as essential to have physical fitness in rescue or recovery work as it is to have mechanical fitness in the type of apparatus which is used. Each of these factors is dependent on the other, and each without the other is dangerous, not only to the one man but to the entire crew. Therefore, each candidate should be subjected to a thorough physical examination prior to any instruction. An examination given at this time saves not only money for the company, but often embarrassment on the part of a man forced, by physical unfitness, to discontinue the course of training. This examination should, of course, be made by a physician or surgeon. If the surgeon is in the employ of the company he will doubtless be familiar with the nature of the training and will conduct his examination accordingly. In addition to the general physical condition of the candidate, special attention should be paid to the condition of the nose, throat, and lungs. Also, in consideration of the strenuous nature of the work, and the prevalence of hernia among workmen, this important point should not be overlooked in the examination. Systolic blood pressure should also receive careful consideration, as high blood pressure induces vertigo and dizziness.

There are other features also to be considered in the selection of men for training. It would be natural to suppose that men of large stature and corresponding strength would be the best fitted to wear apparatus, yet most of us know that this is not strictly the case. Experience has shown that men of average height and weight are able to handle themselves to a better advantage while wearing apparatus than taller and heavier men.

Inasmuch as a considerable part of actual emergency work with apparatus is dependent upon the absolute understanding and execution of instructions, men who are to be selected for the training should be mentally as well as physically efficient. This statement does not imply that the candidate should be highly educated, but, as Mr. Luke Keating, Mine Rescue Foreman for the Lehigh Valley Coal Company, in his article on "Picking Men for Mine Rescue Training" has stated, "Training in mine rescue work should not be required to include a course of instruction in English."

All candidates should be thoroughly familiar with the mine workings, and should know the conditions existing in each level and ladder-way. It is also important that they should be able to do any of the various kinds of work underground as might be necessary, such as timbering, constructing brattices, drilling, mucking, etc.

There are certain phases of the mental fitness of the men that cannot be determined, sometimes, until later in the training period. These

phases involve the coolness with which they are able to act in dangerous atmospheres, steady nerves, good judgment, and the maintenance of clear faculties. Men who become easily excited or panic stricken should be eliminated from the crews as rapidly as these symptoms become apparent.

Furthermore, rescue work is not the most pleasant occupation that men engage in, and comparatively few men desire to engage in it. At best it is a hazardous occupation, so that men should not be coerced into taking the training. Every man to be trained should be a volunteer in the sense that he does not do the work against his will. The man who is forced into the work may at some time bring disaster to his crew due to mental deficiency which may result from fear or other causes.

#### TAKE TRAINING QUARTERS

With apparatus and men selected, the next thing to be considered is the place of training. Upon this subject there is a diversity of opinion. The preliminary instructions must, of necessity, be given on the surface, so that any room large enough to accommodate the number of men in training will serve this purpose. Also, the first couple of days can be spent in the open air until the men become familiar with the apparatus and "get the feel" of it while wearing it in the preliminary work.

Following this period many instructors then take the crew into the mine for further practice. Whether or not this is advisable is an open question. It is not believed by the writer to be essential. The course of training is for the purpose of teaching the men something entirely new, a phase of mining work that requires courage, and one that is not without hazards. Therefore, the work must be done in a manner and under conditions that will instill in the men absolute confidence in their machines and in their ability to use them. It is of course important that they should be able to carry on their work under the same conditions as exist underground. To this end the training chamber, or smoke room, should be constructed so as to meet these conditions, and most metal mine conditions can, with little work, be represented in the smoke room.

To illustrate this point blue-prints of the training quarters of The New Jersey Zinc Company at Franklin, N. J., have been prepared for reference. Sketch No. 1 indicates the general scheme of layout of the building proper. The ground floor is divided into two rooms: an apparatus and instruction room 13x22 feet in plan and 8 feet in height, from which a door gives access to the smoke room immediately adjacent to it. The smoke room 22x43 feet in plan varies in height from 20 to 28 feet to permit the erection of the necessary timber. Double doors on one side open to the outside of the building. These doors are equipped with electric door openers which may be operated from the apparatus room or the observation chamber. The doors are counter-weighted so that their operation in opening is entirely automatic. This feature, in

addition to a window in the upper part of the building operated by a rope, provides for rapid removal of fumes in emergency. The floor of the smoke room is cinder covered.

Above the apparatus room is a small storage room 8x13 feet in dimensions, and from this room an observation chamber 4x7 feet in cross

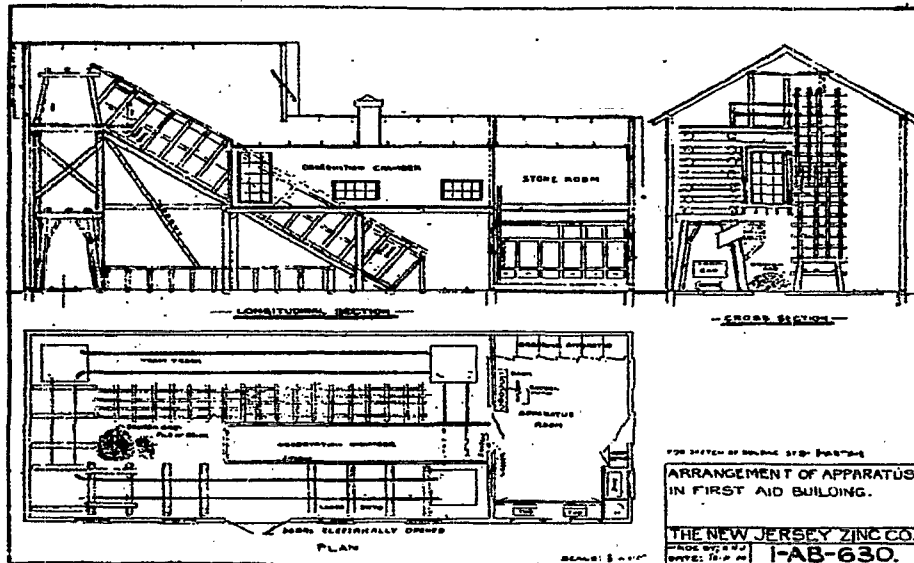


FIG. 1. ARRANGEMENT OF APPARATUS IN FIRST AID BUILDING

section projects into the smoke room for a distance of 24 feet and is ventilated by a separate ventilator in the roof. Access to both the storage room and observation chamber is had by a vertical iron ladder from the apparatus room.

One end of the apparatus room is equipped with six vertical closets for the storage of the apparatus, each closet accommodating two sets of apparatus. Above these closets are two horizontal compartments for new first-aid supplies, while below are six drawers for first-aid practice materials, etc. The opposite end of the room is equipped with two copper-lined wash tubs, an antiseptic solution container and a white enamelled sink. The drain boards of all of these receptacles are covered with sheet lead. At each tub and sink hot and cold water faucets are located. A small work bench with additional cupboards above and below the sinks complete the equipment with the exception of the charging pump and six oxygen tanks in a rack.

The smoke room has been constructed to represent as completely as possible actual mine conditions as indicated by sketch No. 2. A standard mine car has been installed on standard mine tracks extending

around the four sides of the room with turnplates at each corner. On one side and end of the room are standard mine timber sets, four sets of which are loose for erection or removal in training. Over the track a vertical cribbed raise has been constructed with a standard chute at the bottom for loading the car. Slightly to one side of the center of the room an inclined timbered raise or manway connects with a platform at

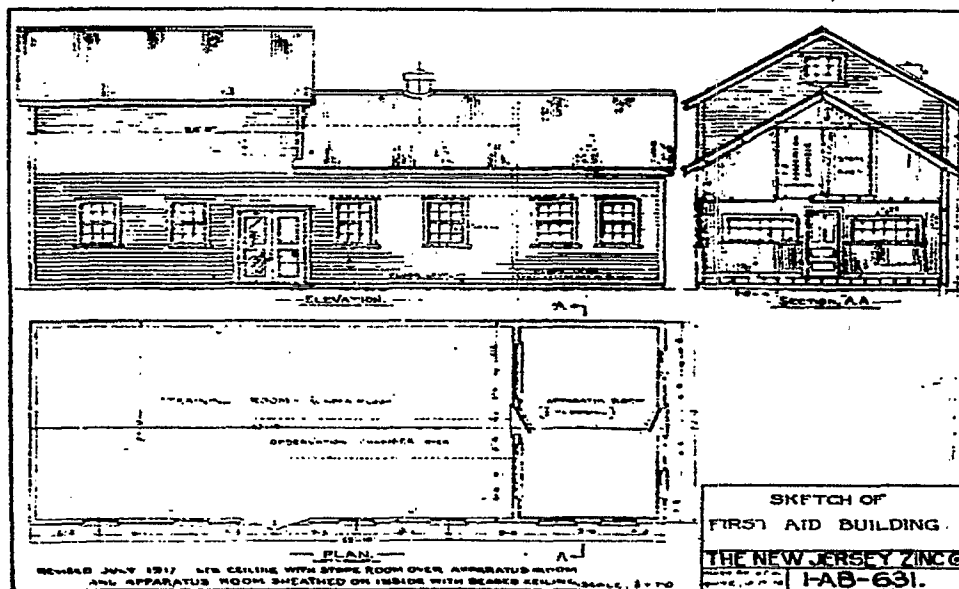


FIG. 2. SKETCH OF FIRST AID BUILDING

Note—Section A.A.—Training room, side walls, and gables to be covered with  $\frac{3}{8}$ -in. sheathing, tar paper, and novelty siding. Roof to be covered with double  $\frac{3}{8}$ -in. sheathing, tar paper and No. 20 corr. galv. iron. Partition double  $\frac{3}{8}$ -in. sheathing and tar paper, make air-tight around all doors and windows. Apparatus room, side walls to be covered with novelty siding. Roof to be covered with  $\frac{3}{8}$ -in. sheathing and No. 20 corr. galv. iron.

the top of the vertical raise. Another means of access to this platform is by a ladder beneath the inclined raise to a trap door at the top. A low timbered passageway directly beneath the inclined raise is reached through a trap door at the bottom of this raise. The opposite end of this passageway is left open. Pipe lines have been installed for practice work, as well as the necessary tools, such as axes, hammers, bars, wrenches, ropes, etc. Smoke or fumes are generated by means of a smudge pot.

It may readily be seen that such an arrangement offers practically all of the mine conditions, eliminates the generation of smoke and fumes in the mine, and, further, establishes confidence in the men during the training period.

## SCHEDULE OF TRAINING

In the study of any subject it is necessary that the fundamental principles of the subject be thoroughly understood. This is no less true of rescue training. Therefore, the instructor can well afford to spend considerable time on this phase of the work, especially on the first and last days of the preliminary course, the last day naturally being by way of review.

It has been generally conceded that five half days, at least, should be allotted for the preliminary training. Six half days are not too many. The following schedule is that used for the preliminary training at Franklin, N. J. (The words "preliminary training" are used to indicate the course of instruction and to differentiate between it and "supplementary training" or additional practice.)

## FIRST DAY

Physical examination

Record Card, filled in for card files

Brief résumé of course of training

Explanation of causes of fires, explosions, etc., which might render use of apparatus necessary

Instruction in gases as to kinds which might be encountered, their effects on man, and the means of detection

Simple explanation of the chemistry of breathing and its relation to the rescue apparatus

Careful and detailed explanation of the apparatus; first by sketch, then by assembly of apparatus

Instruction on various tests to prove mechanical fitness of apparatus

Crew assemble apparatus and test same

Wear apparatus without oxygen one-half hour in fresh air in smoke room

Work schedule—Walk, climb, and crawl around smoke room. Average rate of walking, 3 miles per hour.

Crew disassemble and clean apparatus

Instruction in charging of bottles

Assemble apparatus (as completely as possible) and put into proper place

At this point it might be well to state that, further to insure the confidence of the crew in the apparatus, the instructor should not be merely an instructor, but should participate in all of the work as a member of the crew.

## SECOND DAY

Short review on assembly of apparatus and tests of apparatus

Wear apparatus with oxygen one-half hour in smoke room in fresh air and one-half hour out of doors

Work schedule—Walk, climb, and crawl around smoke room. Average rate of walking, three miles per hour. Walk at same rate to sand pile 1,000 feet away, resting every 250 feet. Fill bag with 50



pounds of sand and carry back to smoke room; same rest intervals. Finish period by walking, climbing, and crawling around smoke room

Dissemble, clean apparatus, and charge bottles

#### THIRD DAY

Assemble, charge and test apparatus

Wear apparatus one and one-half hours in smoke room in fumes of sulphur or formaldehyde and smoke

Work schedule—Walk, crawl, and climb around smoke room at moderate pace for ten minutes. Load car at chute. Tram car around smoke room and dump in front of chute. Replace ore in chute. Carry sand bags and plank to top of inclined raise. Tear up track. Saw six pieces of timber. Finish period by walking, crawling, and climbing around smoke room

Dissemble, clean apparatus, and charge bottles

#### FOURTH DAY

Assemble, charge and test apparatus

Wear apparatus two hours in smoke room in fumes and smoke

Work schedule—Walk, crawl, and climb around smoke room at moderate pace for ten minutes. Take down four sets of timber. Disconnect pipe line along floor and up vertical raise. Relay track taken up on previous day. Carry sand bags and plank down inclined raise and build plank brattice backed with sand bags. Reconnect pipe line. Finish period by walking, climbing, and crawling around smoke room

Dissemble, clean apparatus, and charge bottles

#### FIFTH DAY

Assemble, charge and test apparatus

Instruction in rescue crew organization to include reserve crews and use of life line

Wear apparatus two hours in smoke room in fumes and smoke

Work schedule—Tear down wall built on previous day. Put up four sets of timber. Carry four sand bags to top of inclined raise. Make exploration trip around smoke room, using life line, bird cage, etc. Carry stretcher to top of inclined raise and load with four fifty pound bags of sand. Carry loaded stretcher down incline and around smoke room. Clean up smoke room, and finish period by walking, climbing, and crawling around smoke room

Dissemble, clean apparatus, and charge bottles

#### SIXTH DAY

All apparatus has been completely dissembled and piled in center of floor. Crew required to assemble apparatus completely and test it. Review of construction and circulation system of apparatus and tests

Review of instruction on gases; crew organization, methods of exploration, etc.

Make necessary repairs or replacements on apparatus

Replace apparatus in cupboards

The preliminary course as outlined in the foregoing paragraphs endeavors to carry the candidate gradually from an understanding of the fundamental principles of rescue work to as thorough a knowledge of the details as is possible in the time allotted. It is natural that, in the training period, many unforeseen things will occur that the men will not understand. Reducing valves will require adjustment, by-pass valves will accidentally become opened, men will over-exert themselves, etc. It is the duty of the instructor to explain carefully the reasons for all such occurrences and instruct the men how they may be corrected or prevented. Too much importance cannot be attached to the method of instruction, for the value of the candidate as an efficient rescue man is almost entirely dependent upon the confidence of the man in his instructor and in his apparatus, gained at the beginning of the course.

#### SUPPLEMENTARY TRAINING

The cost of the preliminary training of but five men is not a small item and is increased directly as the number of men trained is increased. Yet, if this preliminary training is to constitute the entire effort on the part of the company, the money spent has been a poor investment.

Most of us know how easy it is to forget simple first-aid training provided we do not continually practice along those lines. For this reason first-aid contests have been inaugurated to stimulate practice in first-aid work.

This paper does not present any argument in favor of contests in rescue work, but it does purpose to lay stress on the necessity of practice or supplementary training in rescue work. The lives of the members of the rescue crew, or of others, depend upon the efficiency and ability of the crew, and such efficiency can be attained only by continual and regular practice.

It would therefore seem advisable that a half-day each month be allotted to each crew for practice. In these periods the apparatus should be worn for at least one and one-half hours and the work should be varied so as not to become monotonous. In case of the loss of members of the crew by resignation new men should be added, but should receive individual instruction, provided there are but one or two vacancies. This method should not be employed if there is any opportunity to train new men as a crew, as better results obtain than from individual training.

It is realized that this subject is not a new one by any means, and that most of the foregoing matter has been discussed at previous meetings of this section. Yet the subject is of much vital importance to the mining industry, to the safety of the men employed, and to the protection of the properties in which millions of dollars have been invested, that this paper has been presented with a view toward stimulating such discussion as will broaden our views of this phase of safety work.

CHAIRMAN TILLSON: These papers are open for discussion.

## DISCUSSION

MR. CONIBEAR: I notice there are some five or six companies. Are the men at one company expected to respond in case of fire at another mine?

MR. WOODBURN: We maintain a crew of sixty men that we call a district crew that are paid extra for that service. They get a small bonus daily and that compensates them for their time. They can be taken to any part of the district. They are all trained men. In addition to that there are reserves or men waiting to get on that crew. In addition to that the engineers and foremen and special men—electricians and so on—in each mine are added to the crew.

MR. BRADLEY: Do you have any trouble relative to getting men to fill these positions on the mine rescue crew?

MR. WOODBURN: No, sir. Each mine has to keep a corps of fifteen men and if they have any vacancies coming up they put a notice on the bulletin board that they will accept applications and we always have enough to recruit probably twice or three times more than we want. We are pretty fussy; we pick out whom we had rather have out of the applications.

MR. CONIBEAR: If it is not too inquisitive or personal, I would like to ask what the extra compensation is to induce men to volunteer and endanger their lives in cases of fire in mines where they do not work.

## COMPENSATION FOR RESCUE WORK

MR. WOODBURN: I might say that we do not have fires and hazards in connection with mine rescue work. In our district we haven't had but one or two mine fires in the last seven or eight years. We pay twenty-five cents a day additional bonus. That is Sunday and every day. That is \$7.50 a month in addition to their regular pay and the time they receive for the practice.

MR. J. T. RYAN (Mine Safety Appliances Company): One of the coal mining companies that maintains a very efficient rescue organization gives an extra compensation to their men for their training work. They train one day a month and do that very religiously, and they pay those men their regular salary or whatever they would make per day and \$5.00 extra and their expenses, which includes their lunch and dinner. They maintain central rescue stations and the crews are made up of men from different mines. Some of the men have to travel possibly two to five miles. They usually provide machines for them. The compensation is regular pay and \$5.00 extra per day. They don't have any trouble in keeping their crews and they have waiting lists.

CHAIRMAN TILLSON: Five dollars for the one day in the month?

MR. RYAN: Yes.

MR. HARRINGTON: In one of the large mines in the West they do a considerable amount of this kind of work. Each mine contains a crew of ten men trained at all times and those men are given a daily rate of twenty-five cents. They have mine fires frequently and they have no difficulty in keeping up their crews. The only difficulty is that the men change around and it requires the training of new men occasionally.

MR. G. J. JOHNSON (Homestake Mining Company): I would like to ask Mr. Woodburn if he had any actual experience with fire extinguishers.

MR. WOODBURN: I am afraid this gentleman misunderstood my reference to that half-hour set in connection with the paper. Each of our main operating shafts has a unit outfit as listed in this paper, and in that there are six pyrenes that we use in small fires. It is surprising how much you can handle in a small place by means of fire extinguishers.

#### FIRE EXTINGUISHERS

Last year I mentioned that we used carbon tetrachlorid in a small slope fire. It was too hot to remain there long and we didn't know whether we could do any good or not, but we put in ten gallons of pyrene. It was about eight months later that we were able to get in, but we could look down the raises and we could see that it burned about half way and then stopped, so we feel that it did some good. Anyway, it was not a costly experiment.

MR. C. E. JULIEN (U. S. Bureau of Mines): I have had some experience with extinguishers, and in one particular case they were valuable in stopping fires. That experience had a bearing on Mr. Conibear's question about what inducement men have to risk their lives for other people's property. I was much impressed by the slight inducement. I have always been astonished at the courage of men when their courage is required. They will rush in and cheerfully try to die on every occasion that presents itself, and then they meet somebody standing at the cross-roads with a club to drive them back. I think that one of the biggest things to remember in mine rescue work is getting the men to the point where they will go into it willingly. It is awfully hard to get the proper attitude behind the lines. If the men are well selected and well supplied they will do everything possible in an emergency. I have been in several difficult situations in every one of which I have been able to analyze defects in performance.

I tried to get a number of companies to combine and have a mine rescue crew. There was one manager who was very narrow in his conceptions and we couldn't do much with him, and consequently our plants had fallen down for lack of joint action. One night I was called up over the telephone and told to get down to my shaft, the men were going down another shaft and we would meet. We didn't know where the fire was. The smoke was coming up from one point. I never did get down to see the fire. I was up on the shaft taking a bath when the fellows all came piling out with dirty faces and said, "Well, you didn't show up at the fire. Where have you been hiding out?" I said, "That is all right, fellows, I've been hiding out in a place where it made it possible for you to be down there." I was up at the top where I was in telephone communication with the service men, I was flying around gathering up these extinguishers and getting the material to fill them and rigging up hoisting equipment that was out of commission and getting the men down to work. That was all I was doing.

MR. FLYZIK: We had rather an unfortunate experience in Washington

some few months ago. We lost three men as the result of a little experimental work being done in an old mine. The rescue team had a double motive in view in undertaking this task. They unsealed this abandoned slope. They had two types of machines in the same crew. They went down to examine some water and, secondly, they thought they would get a little practice in doing that for the Denver meet. They descended to the bottom and spent perhaps more time than they anticipated or realized, because they began to return on their way out a little later and the captain of the team collapsed, and he was considered one of the best first-aid men in the state of Washington. When he collapsed, the rest of the rescue team attempted to pack him out in a pitch of about pretty close to thirty degrees. They packed him out about 200 feet up the slope and then the second man collapsed, so that other three men came to the conclusion that they couldn't carry out the two men and they fixed their machines and proceeded to go out. Just as they got to the fresh air a third man collapsed, but by that time the other two men were successful in dragging him out to the surface. They took their breathing apparatus off and were eventually revived. In the attempt to get out the first two men that collapsed they lost another man. A man that had received the training at one of the other mines and was not in very good shape heard about the incident and went to the mine office and insisted on getting a machine. He was furnished with a machine and the crew reorganized and proceeded to go down the slope to bring out the overcome men. No sooner had they gotten down until this man collapsed. By that time there were several people summoned and sent down and they got out the men. In the investigation it developed that the first men that went into the mine went in with apparatus but half charged and, in fact, placed too much confidence in the machines. The third man wasn't in very good physical shape and should not have been permitted to use the machine. For some six months he had not had a machine on. This goes to prove that we cannot exercise too much precaution in the using of mine rescue apparatus. Our experience has led us to believe that from now on we ought to insist that when men go and use these machines they must take full charges with them and that no man ought to be permitted to use one of those machines unless he is constantly practicing and in excellent shape for the work.

MR. WOODBURN: Mr. Flyzik's recommendations are along the lines we have always been trying to work on. It would seem that it is very easy to have some little oversight occur. Personally I am very much afraid of practice periods in reference to casualties—really more than in actual mine rescue work. In practice work it is very easy to be careless and run into many peculiar things.

I had nineteen men with apparatus in a small prospect tunnel that was pretty well smoked up with burning fuse. It makes a good smudge; it is not particularly deadly but would overcome men in time. These men were in their preliminary training. The farthest man in got in trouble. He had difficulty in breathing. To get back through that small drift through these other eighteen men was a pretty difficult matter. I sensed

the difference in their voices, won my way in, found this man staggering and two men trying to hold him up. Before we got to the portal he collapsed. All that was wrong was that he had filled his bag too full with the by-pass. He was so afraid that he wouldn't get air enough that he would keep sweeping it up; as soon as he got a little fresh air he was all right and insisted upon going back. I made him wait a little while. While he was working around on the outside he did the same thing. We might have got him down inside and had trouble with him again.

I had another man that overlooked giving his machine enough air and he collapsed. We had given him physical examination the day before, had taken him to the chief surgeon after this happened and couldn't find a thing in the world wrong with him, so we figured that was all that could have happened. I would urge everybody to use great care in practice because it is so easy to overlook these precautionary measures. One would feel almost like a murderer getting them into trouble in practice work.

About your fire extinguisher underground, there is a point there in the way of prevention of fires that is worth consideration. I suppose that an average of once a month in our district some incipient fire is put out by a fire extinguisher close at hand and it never gets any attention. We just happen to hear of it in conversation. I highly recommend having these fire extinguishers every place. It would be fine if we would have one within the reach of everybody throughout the mine.

MR. FLYZIK: Mr. Woodburn, would you say that you had some definite rules in your mind about just how far these men should advance? In this particular case they went down 1,200 feet.

MR. WOODBURN: You would have to be governed by the condition entirely. I would say that is far in excess of where they should have traveled. In practice work I wouldn't think of putting men into a highly poisonous atmosphere. In training you can use a dense smudge that isn't so dangerous. I wouldn't put the men into a deadly poisonous gas. I think we discussed that last year at the meeting. The Bureau of Mines puts a distance of traveling on the level of some 2,000 feet.

MR. HARRINGTON: It is according to conditions.

MR. WOODBURN: They set that as a conservative estimate.

MR. HARRINGTON: With respect to that inquiry, Mr. Flyzik, I had some experience about three years ago in a mine fire in Wyoming. There were two Bureau men and another fellow with me there for three weeks, and we found that if we traveled 500 feet at times we had considerable amount of difficulty in getting back. The difficulty is generally this: That when you get into a pitch above twenty degrees, unless there is slack on the floor, if the floor is clean and has had water over it, you have a very difficult time maintaining your foothold even if you have no load on your back, but with a load of forty pounds it is almost impossible to stand. Not only that, but a man can climb a pitch of twenty-five to thirty degrees comparatively easily if he travels light, but the weight of a twenty or twenty-five or forty pound machine on his back has a tendency to cause trouble. I personally made up my mind that in the future if I am present at a fire in a slope mine—a mine of a pitch of

say fifteen degrees or over, the men shall not go down that slope farther than 500 feet. The same is true in a raise. A man climbing a raise of 100 or 200 feet vertically is in grave danger. In most mines you have a situation confronting you that compels you, under the state laws, to have platforms every twenty-five or thirty feet in vertical ladder mines. If those platforms are within twelve or fourteen inches of the ladder, it is almost impossible to take the larger type of apparatus through them. It is an extremely grave and dangerous thing, to my mind, to try to climb any distance on a vertical ladder.

MR. FLYZIK: Would you consider it dangerous for a team to use two types of machines in rescue work?

MR. HARRINGTON: I don't know; I think some of the other men would be better qualified to answer that than I. I think it is a point that is well worth consideration. Personally I am rather inclined to believe that Mr. Bagley is right. He recommended that two types of machines should not be used on the same team. The men who wear the automatic type generally try to speed up. I am inclined to believe that Mr. Bagley's recommendation that the two-trip feed as against the automatic should not be used in the same operation.

MR. JOHNSON: I am not clear on Mr. Woodburn's use of fire extinguishers underground. Is it carbon tetrachlorid?

MR. WOODBURN: The soda acid type is used underground. There are six sets of the tetrachlorid because of their portability.

CHAIRMAN TILLSON: Mr. Seip has attempted to provoke criticism by recommending a definite type of training in a building constructed with appliances to simulate the difficult conditions of a metal mine. He advances an argument in favor of that method of training as opposed to the other methods mentioned of taking teams down in a mine or in a drift and training them there. It seems that some casualties have occurred where you have trained men by taking them down underground, possibly largely because in the darkness underground the supervisor cannot be in perfect control and touch with his men, and what is more, if they have penetrated a distance in an unrespirable atmosphere they have to come back that same distance to get into a respirable atmosphere, whereas with a training building it is possible immediately to get a man into an atmosphere which is respirable although he has been doing his work in an absolutely poisonous atmosphere—poisonous so he will have no tendency to try to slip his mouth-piece and breathe around the corner of it and get into bad habits that he will regret some day. Mr. Seip's recommendations are a little unusual; it strikes me, so far as the practice is concerned. They are either good or bad, and I think we ought to have more discussion in regard to that. If they are good why haven't others adopted them on a larger scale? That is one of the questions. There is another question raised, if you care to discuss it, that I will raise later.

MR. WOODBURN: I would say that I am in hearty accord with Mr. Seip on his work. It is absolutely along the lines of standard practice; it is carried out throughout the metal mines of the country. However, it is not feasible for us to use the training house type or training gallery at

the station because our plants are separated and we can better take our apparatus over on our specially designed truck and conduct the practice at their own plant under their own conditions. We can get any section of the mine that we want that is not in active use, and rig up almost any condition that we care to. Putting the work on a more practical basis is quite essential.

#### DANGER FROM STARTING SMOKE IN A MINE

CHAIRMAN TILLSON: Another feature that I don't think Mr. Seip mentioned in his paper which might be borne in mind by some is the fact that the presence of smoke in a mine is dangerous providing it doesn't indicate a true condition of fire or a dangerous condition. That is, it is dangerous for a man to smell smoke in the mine, be anxious about the presence of a fire there and discover it is only some stunt or practice or something else, because it leads him to be careless in the future.

MR. HARRINGTON: It seems to me that that could be taken care of in almost any mine by building your smudge or having your smoke so that it would not get into the works. In the Butte region, for instance, they use both systems of training. There they give them preliminary training in the outside rescue stations and then take the men underground in a very hot and comparatively dangerous drift which is straight down, but it is really accessible so that if the men should go down and become unconscious they are readily and easily reached by half a minute's walk by any observer. They have to do that in Butte because in fighting their mine fires, of which they have a considerable number, the men have to become accustomed to using the apparatus in extremely hot atmosphere, temperatures of from ninety degrees up to as high as 125 or 130 or 140 degrees. If they are not accustomed to those atmospheres they are absolutely useless in the Butte mines.

CHAIRMAN TILLSON: You can simulate those atmospheres in a rescue building as well as not. Steam temperature can be raised as high as you get in any mine.

I might also add to that, in regard to the criticism of smoke, a little experience I had in the matter. Some years ago at our plant we took some motion picture films in the cause of safety lessons underground, and among the various subjects we photographed were little stories of different causes of mine fires and the development and the work of rescue crews in mine recovery in these fires. In doing that, and to make them realistic, we started actual fires in territories of the mine. That same day I happened to be down late after all the shifts had gone off, and upon coming out to the shaft to go up I discovered a fire in the shaft station. The shaft was the upcast shaft which you say is the return course for the air. Nobody had come down to investigate the possibility of the mine being on fire. The cage tender had smelled the smoke going up the shaft, but they had been building fires in the mine all day and he thought it was some more of the movie stuff going on and he ignored it. It was only by accident that I happened to be present and find the fire that probably would have extended and ruined a shaft and cost hun-



dreds of thousands of dollars. That is the reason that some people object to letting smoke exist in the mine for any reason at all if it isn't a real fire that should be extinguished.

MR. JOHNSON: We carry on our preliminary training outside the building, but the final training is underground. At the same time, the underground working is above the tramway level and has no connection with the mine. We evade the danger of which you speak.

MR. WOODBURN: We have that condition, too. We go off on the hill and have a complete mine all to ourselves. We have our underground galleries, smoke galleries and so forth for our work, but it is very seldom that we use them. More often we take these crews on Sunday and put in an eight-hour shift using about fifteen to twenty apparatus men, working them in four squads. We go in and show them the whole country that they are to work in and give them the lay of the ground to save time and then start smudges at various places throughout that district and ask them to do certain work at certain places. After all, our work in the metal mines is limited to putting up stoppings and isolating fires.

Relative to the smoke: Timber smoke has a very distinctive odor. You will never mistake it. We use no timber smoke in connection with any of our smudges. Concentrated smoke from burning fuses is not to be confused at all with that of timber.

#### SHOULD INSTRUCTOR WEAR APPARATUS WITH CREW

Mr. Seip says that he would like to have the instructor put on an apparatus and wear it right along with the crews. I object to that seriously. I don't know as I would care to do the work that I subject the men to do sometimes. There is another thing: Your foreman is not mucking to set the pace for the muckers. He is not going to run a machine and demonstrate to them how he can run a machine. I am always very closely in touch with them, particularly if they are under actual conditions, by use of the half-hour apparatus. I visit them at least every fifteen minutes. I don't think it is necessary for me to get out there and wear an apparatus right through the training with the crews. I am training sixty men every other week. That would mean I would be putting in six afternoons every other week wearing apparatus.

MR. SEIP: I did not mean in supplementary or additional practice periods. I mean in the preliminary period when you are taking absolutely green men and putting them through the course of training. I know that the men will feel just that way about it and do feel that way about it. You say, "Here is the apparatus. Here is the way to use it. Go in and do all this work." If you go up in the observation chamber on the outside and look in through the window at them, it does not instill the confidence in them that they will have if you say, "Here is the apparatus; you pick out your five and I will take the one that is left." You put that apparatus on and go right in with them and do the work with them for the first week. After that you can run your practice periods with the men as a unit alternating them as captains and they will

then have the confidence in the apparatus that you set out to instill in them.

CHAIRMAN TILLSON: Mention was made of flashing electric signals in a mine as a warning of fire. You remember that last year we had quite a delegation from Butte with us. They had a considerable amount of experience with mine fires out there and had had special investigations which had been made up in regard to signal alarms, warning of catastrophe to get the men out of the mine. They were quite interested in the subject of the use of stenchers as an alarm to get men out of the mines. I think it would be perfectly fitting for us to consider the subject if those here now are interested in regard to the injection of stenchers in the air line of a mine, giving a more widespread warning and a warning closer to the actual working face than can be obtained by the use of the signal flashing system because of the fact that electric illumination cannot be made close to blasting operations.

MR. HARRINGTON: I happened to be living in Butte for about three years and I ran across a number of their mine fires. I was there at the time of the North Butte fire when there were 163 men killed. The question of warning the miners was an extremely difficult one to handle, particularly in that region where they are working levels from the surface at 100 to 3,600 verticals. Some mines had men working at practically every horizon, from, say, 100 feet below the surface down to the very deepest. At the time of the North Butte fire there was ample evidence at the coroner's inquest proceedings to show that men traveled there as far as the 2,400 level down to the 3,000 foot level and then traveled back to the 2,000 foot level warning miners to get out. One man in particular, the assistant foreman at the North Butte mine, had gotten wind of the fire on a 2,400 level, went down to the 3,000 level, climbed back to the 2,000 and was killed. He died just outside the company foundry line after he had warned about fifty or 100 men to get out.

#### USE OF STENCHES FOR WARNING MEN

A question came up as to what would be the best method of handling those warnings. The Butte Superior Mining Company tried out a system of introducing butyric acid into the compressor and found that it was transmitted through the drills and the air hose to the remote parts of the mine in less than five minutes. That was brought to my attention. I put it up to the Bureau of Mines and afterward we took some other stenching materials to the North Butte mine, the same mine that had the fire. We were able to get a very definite signal to remote raises in the lowest parts of the mine in less than five minutes and the North Butte Mining Company has installed and has in readiness for actual use the system of notifying their men by the use of these stenchers. There isn't any doubt on earth about the men getting them, because the stenchers are so bad they would drive the men out of a working place in due time.

## METHYL MERCAPTAN

MR. MARTINSON: We feel that stench is very satisfactory, but I don't feel they are the last thing in warning men of a catastrophe. The plan, of course, in addition to using the stench, is also to have signals with our electric lights in order to get the men who might be working on tramming levels and the places where the air line does not open so that they would get the stench. In that way we take care of the situation a little better than with the stench alone. We found that the methyl mercaptan, of course, was really the best stench, but I don't believe I could recommend that to any one else because we have not been able to buy the chemical, or whatever the stuff is. We have about ten installations on the Mesabi Range and we only have enough chemical to take care of about three of them.

CHAIRMAN TILLSON: Have you ever tried oil of peppermint?

MR. MARTINSON: No.

CHAIRMAN TILLSON: Would it be convenient for you to try that? In the study as presented by the Bureau of Mines that is one of the materials tabulated in one of the tables, and the indication of that tabulation is that it is an effective odor, that a small quantity of it will make itself very noticeable to a large volume of air as compared with some of the other stench which are recommended; and yet in that bulletin it gives no indication of a field test with oil of peppermint; although the analysis of one of the other schedules might seem to the casual observer that it was a favorable stench. Another question raised in contention is as to whether the odor must be a disagreeable one as versus an agreeable one. It might be well to analyze it psychologically. I am convinced that it must not necessarily be offensive in order to be a suitable warning signal when men are trained and instructed that a certain unusual odor is a warning signal. The other viewpoint is brought out that the odor must be so offensive that it naturally drives the man away from the source of the odor to where the air is more agreeable. The other thing I wanted to ask is whether, that is if it would be convenient, you could make a trial of oil of peppermint and permit this section to have the benefit of your experience.

MR. MARTINSON: I should be very glad to do that. We haven't dared to use the methyl mercaptan that we have because we feared that we might need it some time and then not have it. We have tried this artificial banana oil and have got unsatisfactory results, and one of the reasons we discarded it was because we use a great deal of birch timber and the odor from the birch timber, green, is rather sweetish and pleasant and similar, in some respects, to the odor of banana oil.

CHAIRMAN TILLSON: That is anil-acetate?

MR. MARTINSON: Yes.

MR. HARRINGTON: We tried, at one time, anil-acetate also, but it was a failure. I don't think there is any necessity for having any offensive odor. Anything that is distinctive will act as well as anything offensive.

MR. MARTINSON: My point in mentioning the methyl mercaptan was because it is so offensive and on the other hand is not at all dangerous.

## BUTYRIC ACID

CHAIRMAN TILLSON: I believe butyl mercaptan was another strongly favored one. I have never smelled it, but if it is anything like butyric acid or its derivatives, I think I recently smelled it at the chemical exposition in New York. I was wandering around there about a week ago and I struck a corner of the room and I thought, "My gracious! Who left that Limburger cheese out?" I couldn't imagine where this odor came from. I found a large exhibit of some company manufacturing butyric acid products and I imagine that is what it was. Some of these other odors that have been recommended have a garlic odor, and surely the odor of garlic is not at all uncommon to those of us who have been in close contact with our foreign labor. It seems, therefore, that those are not suitable as warning signals, but unusual odors, whether they are pleasant or offensive, might be more valuable.

Another thing that was strongly recommended was something having a skunk-like odor, as it was described. One of our mining men last night said they had too many skunks that hid around the mines to make that effective. I think those things ought to be discussed freely and considered.

## OIL OF PEPPERMINT

I might suggest that I would like very much to know the effect of the oil of peppermint. In 1907, I was the laughing stock of most of the shift bosses and executives in my own company because I suggested and used oil of peppermint not for the purpose of fire alarm but discovering and noting the presence of all the points at which there were air leaks underground in the mine. I found it was very easy to discover leaks which the senses wouldn't otherwise have noticed.

MR. LUNT: I would like to ask how methods have been developed or what methods have been developed for getting these various substances into the air line and how much it takes. If you have a compressor that is developing, say, 1,000 cubic feet of air a minute, how much oil of peppermint or other material is it necessary to put in to get it all over the mine?

MR. HARRINGTON: I cannot give the figures. The Bureau has published figures in connection with this and they give definite data. I don't think that the present stage of the game is practicable in coal mines in the ventilating current, they are too slow. In metal mines, even at times when there is comparatively little compressed air being used, we get very good results. Even at that time we are able to convey the signal within less than five minutes to the furthestmost parts of the mine.

MR. LUNT: How do you get them in?

MR. HARRINGTON: The Bureau also shows how to make connections on your main air current, preferably between your main receiver and the mine. Fill a little cylinder with the material, have air pressure above it, in other words, by-pass the air.

MR. LUNT: Sort of a lubricator?

MR. HARRINGTON: Exactly.

CHAIRMAN TILLSON: Pressure lubricator.

MR. HARRINGTON: It is very inexpensive and you can put it all on for \$25.00 or \$50.00.

MR. MARTINSON: The first one that we tried was one the Bureau of Mines furnished us. We found that we had some difficulty in getting that round cylindrical glass in, so we bought some pint lubricators and installed them and we did the job just as well and didn't have the danger of the glass breaking.

I don't quite see why it is necessary to get this injector between the air receiver and the mine. We have ours in the engine house, in the compressing house. We have considerable cold weather and a lot of snow and we don't want to ask our men to go out there to do the work on the air line. We feel that it is easier to do it in the engine house. Therefore, it saves some time.

CHAIRMAN TILLSON: Your stenchés will volatilize more readily in the engine house than they would outside in the winter time. The only advantage outside is that when you stop feeding your stenchés there is less of the stench left in the system and it cleans away more quickly than if you have a large volume to be cleared out of the receiver. I think that would be Mr. Harrington's contention. That is really a minor point because it is only a matter of a few minutes anyway before it would be cleared out.

#### FLASHING WARNING SIGNALS

PROF. STOEK: What success has been obtained in the flashing signals or telephone for the same purpose, and how have you gotten the messages from the last station to the men who were at the face?

MR. WOODBURN: We have posted all through the mines that they will get a flash of three times three on the light circuit, and every bit of electricity that goes underground is on this one oil switch in the engine room and that is to be used to call the men out at any time necessary. The only time we used it, it worked beautifully. They were all suspicious, they didn't know what was coming, but they came out in good order. We require that those on the level spread the news to the working places. Then our shift bosses have the fire arrangement with the men to get it to certain portions of the mine. Once a month the safety inspector requires the shift boss to notify his men and proceed out of the usual exit from that section of the mine and meet him at some point above.

CHAIRMAN TILLSON: Other suggestions which I have heard made for systems of alarm might be indicated as follows: One is that the compressed air supply is shut off, the reason being that when a man operating a drill finds that the drill stops, he goes back to find where it has been shut off in the line, whether it is a valve near his working face or, if not, his tendency is to go back and investigate. Something is wrong so he goes out and follows his line along to see what is wrong and that is a means of assembling men together.

Another suggestion applicable in shallow mines, but which would probably be less favorably accepted and less practical in deep mines, is

the disconnection of the compressed air mains and the connection of water in the air mains so that automatically when a signal is given it is merely the change from air to water and the man finds water leaking out of his machine. It furnishes a double purpose of being an unusual occurrence to warn the men, especially if they had been told that such a condition was a warning signal, and at the same time it has the advantage of having water present in the air lines for the extinction of any fire and is right at the working faces.

I have also heard the question raised in the coal mines as to whether the shutting off of electric power for coal cutting machinery and so forth would not similarly be a warning to the men working at the face.

MR. WOODBURN: An idea was advanced at Butte to put a test in your air lines at frequent intervals with a whistle. Your compressed air would be shut off at the surface and a vacuum put on the lines which, working against the pressure or sucking on these whistles, would cause them to whistle through the mine. It was found too slow. It takes a little while to develop enough vacuum to blow all the whistles, but there is a possibility there.

#### GONGS NOT SATISFACTORY

PROF. STOEK: There was a law passed in Illinois some time ago requiring gongs to be placed in all inside places. They were taken out within one year. The law was written off of the statute books by the next legislature. You would be surprised how short a distance away you cannot hear a sound. Some tests were made at that time in the northern part of Illinois by simply going around the corner and back a little, and one of those large twelve-inch gongs couldn't be heard at all.

MR. WOODBURN: Two mines adjacent to this one property using the flash signal system, only recently had occasion to call their men out, because they didn't know the seriousness of an alarm and it was surprising to see how they got them out in such good order and in such a remarkably short time. They checked them out and did the job up right without any preliminary instructions or system. They did it the best they could by a messenger passing the word around. They worked just as well as our very elaborate system at the mine next door, and their mines are in the same condition and approximately the same depth.

CHAIRMAN TILLSON: There are other points in the paper that you haven't raised. One of them deals with the danger of relying upon electrically driven ventilating fans in mines. I believe the practice is widespread. The electrically driven fan, I imagine, is generally used, but I think there may be a strong reason in the contentions made to the unreliability of service, power service, transmission line service, and relying upon the electrically driven fans in ventilation of a mine where gases exist. I hope there are people of different opinions here, but if we are all of one opinion we ought to go on record to that effect.

MR. HERBERT: I think it is generally conceded that the steam fan is the more reliable, and I think it is the general custom in all of the mines, in the central field particularly where they are now installing electrically

driven fans, also to make arrangements so that they can be converted to steam driven fans in a few moments.

CHAIRMAN TILLSON: How can they do that if they have not a boiler plant operating?

MR. HERBERT: They put in a separate boiler plant to heat the water for the change houses, and have that of sufficient capacity and keep a small pressure of steam on all the time, large enough, though, to drive the fan engine, possibly not as fast as the motor would drive it but at least fast enough to keep air going through the mine.

CHAIRMAN TILLSON: How about internal combustion engines for such emergencies—gasoline or oil engines?

MR. HERBERT: I have never seen them used.

CHAIRMAN TILLSON: Why wouldn't they be more economical and more subject to instantaneous application than any steam plant, because the amount of water heated in most mine change houses does not require much of a boiler, and the tendency would be to skip the steam engine again.

MR. HERBERT: Those who have used it have used a large enough boiler to attain the purpose for which it was put in.

CHAIRMAN TILLSON: I think it would be more economical, then, to drive the fans entirely by steam than to carry a boiler year after year for that purpose.

MR. HERBERT: In the winter time that heat is used to heat all the buildings around the plant as well as heat the water, so that particularly in the winter time they are not losing a great deal.

CHAIRMAN TILLSON: Does any one know of any internal combustion engine installations for operating fans?

MR. HERBERT: I have seen them used, yes, but not in a joint combination. They were fairly successful, aside from the danger of fire. The fire hazard around a coal mine would be objectionable.

#### STATE LAW REQUIRES TWO SOURCES OF POWER

MR. HARRINGTON: In some states, at mines that are gaseous, the state law requires that there be two sources of power, either steam or electricity or, if electricity is used, two sources of electricity or possibly two kinds of electricity—alternating current and direct current. In one state I know that is the case, and not very long ago, within the last three years, an explosion occurred in a mine that had an electric fan equipped with only one source of power, and it put the mining company up against it very badly because the explosion occurred about an hour after the men went into the mine and it was then discovered that the fan was down and there was no way of starting it before the men could be gotten out.

CHAIRMAN TILLSON: Suppose that in a metal mine what we call a raise for handling rock or ore has become blocked up some distance above a level. It is impossible to get at it from above because it is filled above the block-up with the materials passing down through there. What methods do you know that are safe for starting that raise to running again? Very frequently men having been required, and I personally have

been required, to climb up a distance of forty feet, not knowing what has blocked it above, and place a charge of explosives there with the danger of the whole thing immediately coming down.

MR. GIDLEY: There is one method that can be sometimes used with success. That is turning a hose in at the top and starting it down with a stream of water. That will often start a raise unless the particular point where the raise is hung should be blocked with large boulders. Then, of course, the water will not have the same effect.

CHAIRMAN TILLSON: Sometimes a piece of timber or a couple of pieces of timber will get in there and get crosswise. Have you ever tried to use searchlights of any description to inspect over long distances through a raise of that sort and see what the condition is?

MR. GIDLEY: Some years ago, about twenty, the Anaconda people used to have those raises in the Anaconda mine. They were driven exclusively for ore with no manway along the side, and when the raise was completed they installed a chain, sometimes a wire cable. This was hung at the top of the raise and extended clear down through it. In those days an ore chute was not complete without the chain, and in the case of a chute hanging in any particular place, the loader, by taking hold of the chain and shaking it, could usually start the chute.

CHAIRMAN TILLSON: How long would the chains be, fifty or 100 feet?

MR. GIDLEY: One hundred feet, extending from the level above clear through the chute. Usually around the mine there is always some old cable that can be used for such purposes. They are not very long-lived, of course, but at the same time it is extremely dangerous, even if the chute is only hung up just a short distance above, for a person to get in there to attempt to blast it out. Of course, climbing up thirty or forty feet is out of the question. A chain or cable through the chute is very valuable.

MR. JOHNSON: For lifts which are not too extreme we have a standard 2x2 wooden stock that we have all through the mine, and we first investigate with searchlights and if it is in reach we nail together two or three of these twenty-foot blasting poles, as they are commonly called, around our works, put on a charge and explode it with electric caps, so there is no danger. We use a little storage battery automobile spotlight for a searchlight.

CHAIRMAN TILLSON: Have you tried the Presto-Lite tank for automobile acetylene searchlights?

MR. JOHNSON: No, we haven't used that.

MR. CONIBEAR: This problem is a very serious one with us. We have a large mine in which the ore runs sixteen to eighteen per cent moisture. Whenever any ore is left in the raises—and nearly all our raises are double compartment—we have to keep traveling service crews to take out that ore. Otherwise, it remains over night and it costs more to take it out than it does to mine it. In our hard ore mines we have chunks in the raises. The miners keep poles about eight inches and a half in diameter and fifteen feet long, and they use two of these tied together; a charge is put at the end and one or two shots will usually bring it down.



CHAIRMAN TILLSON: Do you have any difficulty in casting a beam any distance because of the dust or the moisture or the smoke that exists in mining operations reflecting light so as to make a fog that is hard to penetrate the light through?

MR. JOHNSON: We haven't had any particular difficulty, but a yellow beam will throw farther through dust and haze than a silver beam.

ADJOURNMENT.

### FRIDAY MORNING SESSION

THE meeting convened at 9:45, Mr. Tillson presiding.

CHAIRMAN TILLSON: I will read the first paper by Mr. Boardman and Mr. Bates on "Accidents from Falls of Roof and Ground (Metal Mines)".

### ACCIDENTS FROM FALLS OF ROCK OR ORE

JOHN L. BOARDMAN, CHIEF SAFETY ENGINEER, ANACONDA COPPER MINING COMPANY, BUTTE, MONT.

AND

W. S. BATES, SAFETY ENGINEER, MT. VIEW MINE, A. C. M. CO., BUTTE, MONT.

In writing on the subject of Accidents from Falls of Rock or Ore, we must first refer the reader to previous and more complete papers, namely, the yearly "Metal Mine Accidents in the United States," compiled by Albert H. Fay and published by the Bureau of Mines, and "Accident Prevention in the Mines of Butte, Montana," by Daniel Harrington, Mining Engineer of the Bureau.

These writers have had access to accident reports from widely separated mines and mining districts and their papers are more complete than the present one attempts to be. However, we have endeavored to obtain a more detailed study of our subject by confining our attention to the accident reports of the Anaconda Copper Mining Company with which we are familiar.

The importance of this subject will be at once apparent when it is realized that during the five and one-half year period, January 1915 to June 1920, inclusive, of the total underground accidents in the mines of the Anaconda Copper Mining Company at Butte, 37 per cent was due to falls of rock or ore. All accidents from this cause have been tabulated, and the accident rate computed on a basis of 10,000 *underground* shifts. See Table No. 1.

In connection with the accident tabulations used in this paper it must be firmly fixed in the mind of the reader that the Anaconda Copper Mining Company has made a very sincere effort to prevent accidents, and for this purpose has insisted that all accidents from any cause, and regardless of their serious or slight nature, must be fully reported. Therefore the accident rates given show the actual conditions. No comparison of accident rates is made with the Bureau of Mines statistics for the reason

TABLE NO. 1  
Falling Ground Accidents Per 10,000 Shifts Worked, Five and One-Half Year Period, January, 1915 to June, 1920

|                         | Drilling    | Barring<br>Down | Rocks<br>Falling<br>Down Pile<br>or Slides | Slabs or<br>Rocks from<br>Back or<br>Sides | Rocks<br>Falling<br>Thru Upper<br>Floors | Rocks<br>Falling<br>in<br>Manways | Rocks<br>Falling<br>in<br>Shaft | Total<br>Falling<br>Ground<br>and Rocks |
|-------------------------|-------------|-----------------|--------------------------------------------|--------------------------------------------|------------------------------------------|-----------------------------------|---------------------------------|-----------------------------------------|
| <b>1915</b>             |             |                 |                                            |                                            |                                          |                                   |                                 |                                         |
| Fatal .....             | 0           | 0.005           | 0                                          | 0.07                                       | 0                                        | 0.005                             | 0.01                            | 0.09                                    |
| Serious .....           | 0.16        | 0.11            | 0.05                                       | 0.43                                       | 0                                        | 0.03                              | 0.03                            | 0.81                                    |
| Slight .....            | 0.89        | 1.19            | 0.75                                       | 2.24                                       | 0.41                                     | 0.59                              | 0.29                            | 6.86                                    |
| <b>Total.....</b>       | <b>1.05</b> | <b>1.305</b>    | <b>0.80</b>                                | <b>2.74</b>                                | <b>0.41</b>                              | <b>0.695</b>                      | <b>0.33</b>                     | <b>7.26</b>                             |
| <b>1916</b>             |             |                 |                                            |                                            |                                          |                                   |                                 |                                         |
| Fatal .....             | 0           | 0               | 0                                          | 0.03                                       | 0                                        | 0                                 | 0.004                           | 0.084                                   |
| Serious .....           | 0.02        | 0.08            | 0.06                                       | 0.31                                       | 0                                        | 0.01                              | 0                               | 0.48                                    |
| Slight .....            | 1.12        | 2.33            | 0.86                                       | 2.26                                       | 0.49                                     | 0.47                              | 0.34                            | 7.87                                    |
| <b>Total.....</b>       | <b>1.14</b> | <b>2.41</b>     | <b>0.92</b>                                | <b>2.60</b>                                | <b>0.49</b>                              | <b>0.48</b>                       | <b>0.344</b>                    | <b>8.384</b>                            |
| <b>1917</b>             |             |                 |                                            |                                            |                                          |                                   |                                 |                                         |
| Fatal .....             | 0           | 0               | 0                                          | 0.07                                       | 0                                        | 0.01                              | 0.01                            | 0.09                                    |
| Serious .....           | 0.03        | 0.02            | 0.05                                       | 0.36                                       | 0                                        | 0.01                              | 0.01                            | 0.48                                    |
| Slight .....            | 0.74        | 1.36            | 0.78                                       | 3.16                                       | 0.45                                     | 0.44                              | 0.28                            | 7.20                                    |
| <b>Total.....</b>       | <b>0.77</b> | <b>1.38</b>     | <b>0.83</b>                                | <b>3.58</b>                                | <b>0.45</b>                              | <b>0.46</b>                       | <b>0.30</b>                     | <b>7.77</b>                             |
| <b>1918</b>             |             |                 |                                            |                                            |                                          |                                   |                                 |                                         |
| Fatal .....             | 0           | 0               | 0.005                                      | 0.08                                       | 0.005                                    | 0.005                             | 0                               | 0.095                                   |
| Serious .....           | 0.03        | 0.01            | 0.04                                       | 0.44                                       | 0.03                                     | 0.01                              | 0.01                            | 0.57                                    |
| Slight .....            | 0.50        | 0.29            | 0.36                                       | 5.16                                       | 0.52                                     | 0.58                              | 0.34                            | 7.75                                    |
| <b>Total.....</b>       | <b>0.53</b> | <b>0.30</b>     | <b>0.405</b>                               | <b>5.68</b>                                | <b>0.555</b>                             | <b>0.595</b>                      | <b>0.35</b>                     | <b>8.415</b>                            |
| <b>1919</b>             |             |                 |                                            |                                            |                                          |                                   |                                 |                                         |
| Fatal .....             | 0           | 0               | 0                                          | 0.08                                       | 0                                        | 0                                 | 0                               | 0.08                                    |
| Serious .....           | 0.04        | 0.01            | 0.04                                       | 0.78                                       | 0.01                                     | 0.02                              | 0.03                            | 0.93                                    |
| Slight .....            | 0.39        | 0.12            | 0.29                                       | 3.67                                       | 0.16                                     | 0.35                              | 0.28                            | 5.26                                    |
| <b>Total.....</b>       | <b>0.43</b> | <b>0.13</b>     | <b>0.33</b>                                | <b>4.53</b>                                | <b>0.17</b>                              | <b>0.37</b>                       | <b>0.31</b>                     | <b>6.27</b>                             |
| <b>1920 (1st half)</b>  |             |                 |                                            |                                            |                                          |                                   |                                 |                                         |
| Fatal .....             | 0.01        | 0.0             | 0.0                                        | 0.06                                       | 0.0                                      | 0.0                               | 0.0                             | 0.07                                    |
| Serious .....           | 0.14        | 0.07            | 0.04                                       | 0.62                                       | 0.01                                     | 0.04                              | 0.0                             | 0.92                                    |
| Slight .....            | 0.65        | 0.35            | 0.70                                       | 2.83                                       | 0.45                                     | 0.29                              | 0.29                            | 6.06                                    |
| <b>Total.....</b>       | <b>0.80</b> | <b>0.32</b>     | <b>0.74</b>                                | <b>3.51</b>                                | <b>0.46</b>                              | <b>0.33</b>                       | <b>0.29</b>                     | <b>7.05</b>                             |
| <b>Grand Total.....</b> | <b>0.83</b> | <b>1.17</b>     | <b>0.70</b>                                | <b>3.80</b>                                | <b>0.44</b>                              | <b>0.50</b>                       | <b>0.32</b>                     | <b>7.76</b>                             |

TABLE NO. 2  
Showing Underground Accidents Caused by Falling Ground, 18 Months, January, 1919, to June, 1920, Inclusive

|                                         | Drilling | Barring<br>down | Rock falling<br>down pile or<br>slides | Slabs or rock<br>slides<br>from back or<br>sides | Rocks falling<br>thru upper<br>floors | Rocks falling<br>in manways | Rocks falling<br>in shaft | Total<br>Falling<br>Ground | % falling<br>ground<br>accidents | Total acci-<br>dent rate per<br>10,000 shifts | % min'g<br>work |
|-----------------------------------------|----------|-----------------|----------------------------------------|--------------------------------------------------|---------------------------------------|-----------------------------|---------------------------|----------------------------|----------------------------------|-----------------------------------------------|-----------------|
| Drifts and Crosscuts.....               | 24       | 36              | 16                                     | 216                                              | 4                                     | 9                           | ...                       | 804                        | 24.46                            | 9.864                                         | 16.12           |
| Square Set Mining.....                  | 65       | 113             | 53                                     | 398                                              | 20                                    | 51                          | 83                        | 783                        | 62.99                            | 6.927                                         | 69.78           |
| Rill Stopes.....                        | 22       | 18              | 37                                     | 50                                               | ...                                   | 2                           | ...                       | 129                        | 10.38                            | 7.140                                         | 9.54            |
| Timbered Rills and<br>Stull Stopes..... | 1        | 5               | 3                                      | 7                                                | ...                                   | 1                           | ...                       | 16                         | 1.29                             | 2.420                                         | 3.49            |
| Back Filling Stopes.....                | 1        | 4               | ...                                    | 5                                                | ...                                   | ...                         | ...                       | 11                         | 0.88                             | 6.449                                         | 1.07            |
| Totals.....                             | 113      | 176             | 108                                    | 676                                              | 24                                    | 68                          | 83                        | 1243                       | 100.00                           | 6.566                                         | 100.00          |

that the Bureau's rates are based on total shifts, surface and underground, while the figures given here are based on underground shifts only, for the reason that surface employees are not exposed to the hazard of falling rock and ore.

Such accidents may be said to be due to three general causes:

1. Natural hazard
2. Faulty methods and materials
3. Carelessness and lack of experience on the part of the miner

and our purpose will be to show how the problem of preventing this class of accidents may best be attacked.

1. *Natural Hazard.* Table No. 2 is a tabulation of accident rates per 10,000 underground shifts based on the method used of mining the ore during a period of 18 months. This table shows conclusively that while a natural hazard is present, it varies in favor of the generally accepted

TABLE No. 3

Showing Total Underground Accident Rate Per 10,000 Underground Shifts Worked. 18 Months, January, 1919, to June, 1920, Inclusive

|                  | Fatal | Serious | Slight | Total  |
|------------------|-------|---------|--------|--------|
| Falls of Ground  | 0.079 | 0.930   | 5.557  | 6.566  |
| All Other Causes | 0.095 | 1.098   | 11.137 | 12.330 |
| Total            | 0.174 | 2.028   | 16.694 | 18.896 |

more hazardous methods of mining. In explanation of this statement we may say that the driving of drifts and crosscuts includes a mining operation which should, on the face of things, be the least hazardous with reference to falling ground. Drifting and Crosscutting is usually done in virgin ground, the back or roof is always within a reasonable distance of the miner and easily reached for barring down. Timbering is simple and easy and all other conditions should tend to make this the safest mining operation. We find however that the very safety of this class of work actually tends to a larger accident rate as shown by the table, drifts and cross-cuts comprising approximately 16 per cent of the underground work having caused 24 per cent of the accidents from falling ground.

Square set stoping which from the nature of the work should be considered more hazardous and which is estimated at 70 per cent of the total mining work, has caused only 63 per cent of the falling ground accidents. Rill stopes where no timber is used, and where the working floor is on a slope corresponding very nearly to the angle of repose of broken ore, which is estimated at 9.5 per cent of mining work, caused only 10.3 per cent of falling ground accidents. Timbered rills and stull stopes which, on account of the timber used should be considered safer are responsible for 3.3 per cent of the underground mining and caused only 1.29 per cent of the accidents. Back filling stopes which are not timbered and where the working floor is on broken ore, are responsible for 1.37 per cent of the mining work and only 0.88 per cent of the falling ground accidents.

From this information we may deduce the fact that in the more dangerous mine workings the miner by increased vigilance renders himself less liable to injury than does the man working in the "safe place," who puts too much trust in the ground holding up. However there is nothing to be wondered at in this. We all know the experienced repairman who is employed in mining through caved ground. He is always to be found around the most dangerous places underground and is rarely if ever caught by a fall. It is a pleasure to watch him work. When he first comes on shift he proceeds to make himself safe, and when he starts mining he is ever on the alert, and as quick as a cat; and if a fall of ground does come he beats the fall to a place of safety by many feet.

2. *Faulty Methods and Material.* In but few cases can a falling ground accident in a mine of the Anaconda Copper Mining Company be laid to this cause, and then only through disobedience to orders on the part of the miner using too light timber, etc. The character of the ground decides the method of mining. No skimping is attempted in the use of timber, and the miners are constantly urged to make themselves safe before proceeding with the shifts work. It is the duty of the shift boss to see that this is done, and in addition there is a safety engineer employed at each mine hoisting ore, whose duty it is to visit every working place as often as possible and to report daily to the mine foreman any unsafe conditions he may encounter. Further, each safety engineer makes a written report every two weeks to Mr. C. W. Goodale, Chairman of the Bureau of Safety, detailing all unsafe conditions and practices he may have encountered in the two weeks' period and stating whether or not they have been remedied. It is the policy of the company to furnish the miners with the best materials for their work. We quote from p. 35 of Mr. Harrington's paper, already referred to, where he speaks of the safety organization of the Anaconda Copper Mining Company. "The writer had occasion during the years 1916 and 1917, also to some extent in 1918, to go underground in more than 20 Butte mines, in many of which he visited every working place (the underground inspection lasting several weeks). It was evident that a sincere, determined effort was being made to keep the mines of the company in a safe condition and to have all employees use safe and sane methods."

3. *Carelessness and Lack of Experience on the Part of the Miner.* Accidents due to lack of experience are of course almost impossible to segregate and no attempt has been made to do so. A man who hires out as a miner always claims to be proficient. No shift boss would knowingly put an inexperienced man in a place for which he was unfitted, and we are satisfied that accidents under this head are a very small percentage of the total.

As to carelessness, a close inspection of underground accident reports, coupled with observations underground, revealed the fact that a very large number of accidents were due to thoughtless or careless actions on the part of the injured. With this idea in view, the company's safety officials thought that a system of competition among the mines might be inaugurated which would interest every man from the foreman down in the prevention of underground accidents.

Realizing that an intense interest might be difficult to maintain for a long period, it was decided to hold a Safety Drive for 4 weeks, and the period July 19 to August 14, inclusive, 27 days, was chosen in order that the results might be tabulated and a prize awarded in connection with the Safety First Field Day exercises, August 16, an annual affair for the miners of the Butte District.

A Safety First pennant 12 ft. by 24 ft. was procured and advertised as the award to the mine having the lowest underground accident rate per 10,000 underground shifts for the period of the Drive. Eighteen mines took part. Twelve of these mines are operated by The Anaconda Copper Mining Company and one each by six other companies in the district.

The Rules of the Drive were:

1. Entries would be limited to mines hoisting ore.
2. All underground accidents resulting in personal injuries regardless of their serious or slight nature should be reported and counted.
3. Any mine found not reporting accidents properly would be disqualified.
4. The winning mine had the exclusive right to display the pennant for one year.

The Drive was a great success and the pennant was won by the Emma Mine of the Anaconda Copper Mining Company with an underground rate of 0.0. With 5,357 shifts worked during the Drive this mine did not have a single accident. Similarly the Alice Mine of the A. C. M. Co. did not have an accident but on account of a greater number of shifts worked, the Emma was declared the winner. The West Colusa Mine of the A. C. M. Co., with 11,428 shifts was third with a total underground accident rate of 2.625. The Black Rock Mine of the Butte and Superior Mining Company was fourth with 20,994 shifts and a total underground accident rate of 4.763.

The results of the Drive in so far as the 12 mines of the Anaconda Copper Mining Company are concerned are shown in Tables No. 4 and No. 5. Table No. 4 is a comparison of underground accident rates, on a basis of 10,000 underground shifts worked, of accidents from falling ground, for the five and one-half year period, January 1915 to June 1920, for July 19 to August 14, 1919, and for July 19 to August 14, 1920—the period of the Safety Drive. Table No. 5 is a tabulation and comparison of the total underground accidents per *ten thousand* underground shifts during the Drive with those at the same mines for the same period last year (July 19 to August 14, 1919, inclusive), and with total underground accidents at all mines of the A. C. M. Co. for the months of July and August, 1919, for the year 1919, and for the first half year of 1920.

It will be noted that the total accident rate was reduced from 23.499 for the same days and mines during 1919 to 9.114 for the Drive, a reduction of 61.3 per cent.

A reduction from 19.210 for July and August 1919 to 9.114, or 52.6 per cent.

When compared with rate for 1919, the Drive shows a reduction of 47.5 per cent.

TABLE NO. 4  
Falling Ground Accidents Per 10,000 Underground Shifts Worked

|                                                                          | Drilling | Barring<br>Down | Rocks<br>Falling<br>Down Pile<br>or Slides | Slabs or<br>Rocks from<br>Back or<br>Sides | Rocks<br>Falling<br>Thru Upper<br>Floors | Rocks<br>Falling<br>in<br>Manways | Rocks<br>Falling in<br>Shaft | Total<br>Falling<br>Ground<br>and Rocks |
|--------------------------------------------------------------------------|----------|-----------------|--------------------------------------------|--------------------------------------------|------------------------------------------|-----------------------------------|------------------------------|-----------------------------------------|
| Five and one-half years,<br>Jan., 1915 to June, 1920,<br>inclusive ..... | 0.83     | 1.17            | 0.70                                       | 3.80                                       | 0.44                                     | 0.50                              | 0.32                         | 7.76                                    |
| July 19 to Aug. 14, 1919 .....                                           | 0.89     | 0.22            | 0.0                                        | 6.94                                       | 0.67                                     | 1.12                              | 0.45                         | 10.29                                   |
| Safety Drive,<br>July 19 to Aug. 14, 1920 .....                          | 0.29     | 0.59            | 0.29                                       | 1.32                                       | 0.15                                     | 0.15                              | 0.0                          | 2.70                                    |

TABLE NO. 5  
Underground Accident Rates Per 10,000 Underground Shifts

|                                                         | Fatal | Serious | Slight | Total  |
|---------------------------------------------------------|-------|---------|--------|--------|
| During Safety Drive, July 19 to August 14, 1920 .....   | 0.234 | 0.735   | 8.085  | 9.114  |
| Same Mines, July 19 to August 14, 1919, inclusive ..... | 0.671 | 2.014   | 20.814 | 23.499 |
| All Mines during July and August, 1919 .....            | 0.341 | 1.993   | 10.976 | 13.210 |
| All Mines, Year 1919 .....                              | 0.199 | 1.908   | 15.234 | 17.341 |
| All Mines, first half, Year 1920 .....                  | 0.129 | 2.237   | 18.224 | 21.590 |

When compared with rate for first half of 1920 the Drive shows a reduction of 57.8 per cent.

It is especially interesting however to note that the accident rate from falls of rock or ore was reduced 72.3 per cent when compared with the same period of last year, which shows that accidents from this cause are amenable to treatment; and that the prime factor is the human element, even to a greater extent than in accidents from other causes.

Education is the remedy in accident prevention, and when we have taught the miner to concentrate on his daily work for every minute he is underground, all accident rates will show large reductions.

CHAIRMAN TILLSON: Mr. Boardman writes in explanation the following:

"Referring to tables one, two, and four, the accidents shown are all accidents regardless of their serious or slight nature. Any accidental injury in our mines is reportable and many injuries included in these tables are of so slight nature that the injured man lost only a few minutes in having a first-aid bandage applied and did not even leave the plant.

"In classifying injuries we use the ruling of our State Industrial Accident Commission which is that 'serious accidents' are those which cause a loss of more than fourteen days. 'Slight accidents' are those in which the injured was required to leave the plant for one or more days, and 'lost no time' accidents are those when the injured returned to work the following shift."

Table No. 4 shows a remarkable reduction during the safety drive as compared to a similar period compared with their average records. That reduction is without exception in all the sub-divisions of the classification for the total falling ground and rocks.

In table No. 5, the chief reduction is, of course, in the total accidents and in the slight accidents. The question of whether an accident becomes slight or serious is largely a matter of luck. The same piece of ground that falls and hits a fellow on the end of his toe might hit him on the top of his head. In one case it might be a little injury and in another a fatality.

It may be of interest to inject into the minutes of the meeting some comparative statistics of other metal mining operations, as for instance a tabulation of accidents from the New Jersey Zinc Company's mines, tabulated as to the same seriousness of injury based on 10,000 shifts of work—a similar basis to the Anaconda—from 1913 to date. It may be interesting to notice that including the trivial accidents in all cases, that is accidents requiring absolutely no loss of time, the rate has varied anywhere from six down to about three and one-quarter per 10,000 shifts in that period of time. We have here, however, a segregation of the trivial accidents which is not given in Mr. Boardman's report and which is exceedingly interesting because if they are included, as I believe they are in his statistics, that is the point where, as time goes on, you will get a more complete record in following up your accident statistics, that is, as you get your safety organization more fully developed you will have a more complete report of trivial accidents (where a man has just



## FALLING GROUND ACCIDENTS PER 10,000 SHIFTS WORKED

NEW JERSEY ZINC COMPANY  
FRANKLIN, N. J.

PERIOD JANUARY, 1913, TO JULY, 1920

| RESULT                      | 1913   |      | 1914    |      | 1915    |      | 1916    |      | 1917    |       | 1918    |       | 1919    |       | 1920<br>to 6/30 |      | Total     |      |
|-----------------------------|--------|------|---------|------|---------|------|---------|------|---------|-------|---------|-------|---------|-------|-----------------|------|-----------|------|
|                             | No.    | Rate | No.     | Rate | No.     | Rate | No.     | Rate | No.     | Rate  | No.     | Rate  | No.     | Rate  | No.             | Rate | No.       | Rate |
| FATAL                       | 3      | 0.30 |         |      | 3       | 0.15 |         |      |         |       | 1       | 0.049 | 1       | 0.058 |                 |      | 8         | 0.00 |
| PERMANENT DISABILITY        |        |      |         |      |         |      |         |      |         |       |         |       |         |       |                 |      |           |      |
| TEMP. DISAB. (Over 20 days) | 4      | 0.40 | 4       | 0.37 | 2       | 0.10 |         |      | 4       | 0.10  |         |       | 3       | 0.174 |                 |      | *17       | 0.13 |
| SERIOUS (15 to 20 days)     |        |      |         |      | 1       | 0.05 | 4       | 0.18 | 2       | 0.086 |         |       |         |       |                 |      | 7         | 0.05 |
| SLIGHT (1 to 14 days)       | 30     | 3.03 | 12      | 1.10 | 15      | 0.75 | 22      | 0.98 | 12      | 0.58  | 14      | 0.68  | 11      | 0.61  | 5               | 0.63 | 91        | 0.70 |
| TRIVIAL                     |        |      | 49      | 4.48 | 71      | 3.56 | 76      | 3.39 | 64      | 3.09  | 52      | 2.53  | 77      | 4.49  | 33              | 4.17 | 452       | 3.49 |
| TOTAL                       | 37     | 3.73 | 65      | 5.95 | 92      | 4.62 | 102     | 4.55 | 82      | 3.96  | 67      | 3.26  | 92      | 5.30  | 38              | 4.81 | 675       | 4.44 |
| No. of Underground Shifts   | 99,161 |      | 109,252 |      | 199,099 |      | 224,205 |      | 206,818 |       | 205,556 |       | 171,070 |       | 79,067          |      | 1,294,824 |      |

\*Includes 8 in 1913 and 1914 combined under "Perm. Disab.," "Temp. Disab.," and "Serious."

†Includes 30 in 1913 combined under "Slight" and "Trivial."

scratched his finger and had a bandage wound around it). It would be very well worth while, I think, if we could get Mr. Boardman to give us some notes segregating that, because people start in accident prevention work watching statistics and they are likely to get discouraged, because they find the more accident work they do for a few years the poorer they see their statistics appear because they have a more accurate system of reporting and they are catching accidents they didn't catch before.

Mr. Kudlich is not here, so I will read his paper on "Accidents from Falls of Roof and Ground (Coal Mines)".

### ACCIDENTS FROM FALLS OF ROOF AND GROUND (COAL MINES)

H. H. KUDLICH, SAFETY ENGINEER, DELAWARE-HUDSON COAL COMPANY,  
SCRANTON, PA.

Accidents occurring from this cause are responsible for more deaths than any other class of accidents due to mining of coal. While other accident causes may be responsible for a greater number of accidents, approximately 50 per cent of all fatalities are due to falling roof and therefore our greatest efforts are naturally bent toward the reduction of such accidents and more particularly so when the vast majority of all such accidents are potentially a fatality.

In seeking to prevent these accidents our first aim is to seek a true classification in order to ascertain those which can be prevented.

The first natural division is into avoidable and unavoidable accidents. These two classifications naturally overlap depending upon conditions to which they are due.

Accidents avoidable in one field become unavoidable in another due to different working conditions or methods. Where it is customary and permissible to shoot from the solid as is the general practice in the anthracite field, many accidents become unavoidable, which could not be so classed where the coal is sheared or undercut.

Under avoidable accidents must be combined all those which are due to (1) failure by the man in the face to safeguard himself properly, due to ignorance, (2) failure to supervise the man properly in the danger zone, (3) flagrant carelessness or disobedience of rules, (4) willingness to take a chance, (5) improper methods of working.

Under unavoidable accidents must be placed those which it is impossible to safeguard against, whether it be through timbering, removal of dangerous conditions, close official supervision, training of the miner to a realization of the true dangers which threaten him, or due to hidden dangers impossible of detection in advance of the fall.

Of these unavoidable accidents, the great majority are found to occur within ten feet of the face, in the unprotected area which must of necessity be left unpropped where it is the permitted practice to shoot from the solid, and are due to the familiar "horseback," "saddle" or "kettle bottom" which are of such mass as not to be detected by the ordinary

methods employed in detecting dangerous roof conditions, namely, by sound touch or sight.

Again there are occasionally those falls in which an immense mass drops without apparent reason, and with no warning which would be noticeable by the average workman. It has been my misfortune to experience two such within the past few months. In each case a sandstone roof overlaid the seam and a mass 10 feet wide, 8 feet thick, and about 30 feet long, fell without previous indications of danger. Each of these pieces was separated from the main roof on all four edges by a water seam which was not visible before the occurrence of the fall and in each instance, the fall occurred in a 12-foot entry. Such accidents can hardly be classed otherwise than unavoidable.

#### AVOIDABLE ACCIDENTS

Our principal interest is, however, naturally devoted to those accidents which are avoidable and the means which can be employed to prevent their occurrence. We must of necessity include in avoidable accidents all such as can be prevented by any means within our power.

What preventive means then have we available?

#### TRAINING OF MINERS

First and foremost is the training of our miners to a true realization of the dangers which confront them while in the face for it is there that over 90 per cent of our roof fall accidents occur and in the final analysis it is upon the miner that we must depend.

This is well demonstrated in robbing or pillar mining conditions. It is the usual practice to place only experienced and highly-qualified miners at such work as it is realized the greatest dangers exist along the robbing face. As a result for an equal tonnage mined the fatalities occurring under robbing conditions are less than one-half of those occurring in solid mining notwithstanding the greater hazards encountered.

How is the miner to be trained so that he will guard his own safety in so far as possible?

The first step naturally would be the education of the miner to a true realization of the danger to which he is exposed by falling roof.

Since, however, in the anthracite field of Pennsylvania it is compulsory that every miner be granted a certificate of qualification before being allowed to mine coal, it would seem justifiable to assume that he is at least aware of the dangers to which he is under ordinary circumstances exposed.

It then remains to educate the miner so that he may be able to detect possible sources of danger and guard against them.

#### TESTING OF ROOF

The first and most important means of protection is detection of dangerous roof by sound, touch, or visual test. And yet how many miners actually are capable of making such test properly? How often do we

see a miner on entering his working place in the morning do so with his eyes on the roof?

How often do we see a miner sound his roof and at the same time use the sense of touch to assist him in determining dangerous conditions?

As a rule the miner uses but one of his senses, namely, hearing in making his roof tests.

Is it not then part of the employer's duty to see that the miner is properly trained so that he may make use of every faculty in protecting himself?

With this purpose in view, we have found it advisable to make it one of the duties of the supervisory mine force to instruct each and every miner how to test his roof properly, and to continue such instruction until satisfied that the miner thoroughly understands this work.

Each miner is supposed to examine the roof carefully in his working place, at least upon entering his place in the morning and after each shot which he fires during the day, and remove or remedy any dangerous roof conditions which he finds. In addition to this, it is necessary to have examination of roof conditions made by the foreman or his assistant on the daily inspection made by them.

It has been found that on the average each miner fires five holes per day to produce his quota of coal. In other words in a mine having 500 producing faces, 3,000 careful roof examinations would be made each day.

If we can succeed in having every miner test his roof properly as often as mine law requires such test, there will be but very few of the avoidable accidents due to falling roof which will not be eliminated.

Another point of great importance, but which is extremely hard to impress upon the miner is the hazard due to failure to remove dangerous roof, even though it cannot be barred down after continued effort to do so. It seems almost impossible to make the average miner understand that the very attempt which he has made to bar down a dangerous piece of roof has so weakened it that a fall can be expected at any moment.

#### TIMBERING

Another most important means for the prevention of accidents from roof fall, is by proper use of timber.

The most common cause of accidents due to improper timbering is failure by the miner to place sufficient amount of timber. This is particularly true in locations where the roof is, as a rule, considered good. It has been the custom for many years, to place timber only where a dangerous condition is known to exist and as a result, unless the miner is competent and careful, he will not place sufficient timber to protect himself.

As a result, it has been found expedient to place timber along the working face as close as possible, whether there is evidence of its need or not. This brings us back to the question of systematic timbering and develops the weak point in this system—not actually the weak point in it, but rather the failure of the miner to grasp the true meaning of sys-

tematic timbering. In other words, the miner supposes that with timber placed according to set specification, no further support is necessary, not realizing that it is simply the minimum of timber which is to be considered. Here again we have emphasized the necessity for close supervision of the actions of the miners in the face.

Again we have failure to place timber properly, due to the inability of the miner to make proper test and in this way detect the dangerous roof. This failure is, of course, entirely dependent upon the proper training of the miner in the face as I have indicated under that subject and it is quite evident that if we can so train the miner that he will properly test and detect the dangerous roof conditions, he will then naturally take every means to protect his own safety.

Again we have improper setting of timber. The most common fault being the failure on the part of the miners to use cap pieces, to place their cap pieces in the wrong direction, or to make them too small. Occasionally we encounter conditions where the miner will place a prop upon the built-up foundation instead of on the bottom proper.

All of these faults again are naturally dependent upon the training of the miner so that he will realize the dangers which follow improper practices.

Another difficulty met with is the unwillingness of the miner to keep his timber as close to the face as possible. The most usual claim is that the timber will be shot out and if a miner discharges one prop a week, or even one a month, he will advance the claim that it is impossible to keep the timber close to the face due to the shooting out of the props. I have encountered such conditions where no props have been placed within 20 or 30 feet of the face and upon criticising the condition, have been given this as an excuse whereas even though the miner may occasionally discharge a prop when set more closely, we have found it practicable, even under the worst conditions, and shooting from the solid, to maintain timber within 10 feet of the face.

This is another point which can only be enforced by close supervision until such a time as the miner has been educated to the realization of the hazards under which he works, so that he will of his own volition, cut down the unprotected area in the face to a minimum.

#### REMOVAL OF DANGEROUS CONDITIONS

While we must depend upon timbering under many conditions to protect the miner, it should still be borne in mind that it is advisable whenever it is practicable to do so, to remove threatening roof rather than to attempt to support it by timber. It is not at all unusual to find accidents occurring even though props have been placed, for they have proven to be insufficient to sustain the weight, have been displaced by side pressure, or have been shot out causing added hazard. We have, therefore, found it advisable to issue instructions that in all cases where practicable, dangerous roof shall be removed rather than supported by any artificial means.

## CARELESSNESS AND DISREGARD OF RULES

Most accidents arising from this cause are met with in miners of long experience in whom familiarity has bred contempt, or younger miners who have been trained by a careless one.

There is only one means by which we may hope to lessen the accidents arising in this way. If after warning, a miner has been found careless or disobedient and continues in his actions, further warning weakens the effect of rules and the authority of the foreman or sub-foreman issuing them, and it is only possible to eliminate carelessness and enforce obedience by administration of discipline in such a manner as will clearly demonstrate to the miner that he must heed the instructions of the person in authority under whose supervision he is working.

## RULES

In all our actions we are generally assisted by the mine law in effect. In the Anthracite Fields the mine law specifies that the miner shall be held responsible for the safety of his place and shall carefully examine the roof, face, and ribs in order to detect and remove the dangers arising from them. In addition to this requirement of the mine law, we find it advisable to issue and enforce the following rules guiding the miner in protecting both himself and any who may be working with him.

1. Carefully examine your working place before starting in the morning, after each blast, and frequently during the day.
2. You are responsible for your working place. It is up to you to make it safe for yourself and any one who may enter.
3. Never undercut overhanging coal or rock farther than one cut before taking down the overhanging coal or rock.
4. When you have tried to pull down dangerous roof and find you cannot do so, either shoot it down or prop it before going under.
5. Never cut any props or timber while they are in position to support the roof or sides. When it is necessary to remove them, it must be done by blasting.
6. When standing props always wedge securely in place by means of a cap piece driven toward the face and extending over the full width of the prop.
7. If your working place is in a dangerous condition and you have no props, stop working immediately and notify the foreman and do no more work until you have obtained props or timber to safeguard yourself.
8. Notify the foreman immediately in case any unusual or dangerous condition arises.
9. If you notice any movement of the ground indicating a creep or squeeze, immediately put in position danger board across the foot of your place and notify the foreman in charge and do not re-enter the place except by his direction.

These rules cover in a general way all conditions which will be met with by a miner in the course of a day's work.

## SUPERVISION

Until that time arises when every miner or person entering the mine has been educated to the point where he will be able to detect and protect himself against all dangers arising from falls of roof or ribs, we must, to a great extent, depend upon the supervision by the foreman or his assistants and inspectors, to eliminate in so far as possible our accidents from roof fall. Until that time arrives, his duties and responsibility are manifold. We must depend upon him for the proper education and training of the men in the face, so that they will be able to appreciate the hazards of their employment and utilize all means in their power for their own protection. Until the man in the face is able and willing to do this, all of his own volition, we must depend upon the foreman and sub-foreman, etc. to observe all their unsafe conditions which have escaped the attention of the miner and immediately demand that they shall be removed. This cannot be done by the superficial inspection, but requires careful observance of all conditions, careful testing of the roof and instructions to the miners in every case where such are found as to how they may be remedied. This in itself is, however, not sufficient, if the same condition is met with time after time and nothing is done further than the remedying of the same, the miner gradually comes to depend upon the foreman, rather than upon his own observations of test and detection of dangers. This is a condition which must be avoided if we hope to train the miner properly and if he will learn in no other way, we must force him to appreciate the necessity of obeying instructions by disciplining such as fail to do so of their own free will.

Failure to observe rules is either the fault of the foreman who has failed to impress upon the miner the necessity, or is due to unwillingness on the part of the miner to observe them. If due to the first, the fault lies entirely with the foreman and it is another one of his duties to see that every miner under his supervision shall be thoroughly acquainted with the rules formulated for his protection. If he in turn has done his part and there is lack of inclination to obey them, his one recourse is by the administration of discipline.

We must at all times remember that no blame can be attached to a man who makes a mis-step through ignorance, or who has not in his estimation done something which may endanger him—under these conditions the fault lies rather with us in that the man is not properly trained. It is, therefore, our duty in such cases carefully to impress upon our men at all times, the dangers to which they are subjected. On the other hand the workman who shows reluctance to learn, must be given such rules which he will be required to obey without rime or reason and failure on his part to obey them, must be followed by discipline. In short then, our two methods for prevention of accidents can be summed up briefly as follows:

*First:* Education of the minor so that he will use every effort to detect in advance dangerous conditions due to roof falls and use every means in his power to prevent them.

*Second:* The enforcement of certain fundamental rules which through the investigation of many accidents have been found advisable of enforcement upon the miner by supervising forces.

#### METHODS USED IN FOLLOWING OUT THIS PLAN

##### INSTRUCTION

The education of the miners is attempted in a number of different ways—*First*, by direct instruction. This is accomplished by means of the supervising force of the various collieries and the inspectors who make periodical trips covering each colliery in its entirety.

Each of these officials whenever any extraordinary condition or improper practice is encountered, takes the time to instruct the miner carefully as to the proper methods and practices to be used in overcoming the conditions encountered—not only by direct orders but also by a clear explanation as to the reason for each order issued and in case of improper practice, in what point the practice being followed out is improper.

*Second*—By the holding of monthly meetings at each colliery.

At each colliery a Safety Institute has been organized which is attended by all employees. Meetings are held monthly and efforts are made in every case so to interest the employees that it is not necessary for the official force to take any active part in these meetings, rather letting the men understand that the success or failure of this phase of the safety work is up to them, and by placing this responsibility upon them, endeavoring to stimulate additional interest.

At these meetings every accident having special points of interest are taken up when such accidents occur at the colliery in question or at any colliery along the system. Papers are read by various employees upon subjects which will be of interest to the institute.

In addition to this, excellent use is made of the moving picture films on safe practices which are made available by the United States Bureau of Mines and by the National Safety Council.

*Third*—By the issuance of bulletins covering accidents, calling attention of the employees to the method of occurrence and the lesson which is to be derived from such; also by the posting of the bulletins issued by the National Safety Council.

*Fourth*—By the awarding of prizes annually to the employee at each colliery who advanced the suggestion having most value in promotion of safety work.

##### SUPERVISION

The supervision of the working place is dependent upon the foreman and his assistants and is checked up by the periodical inspections made by the safety inspectors.

Regulations are in effect that every working place shall be carefully examined at least once each day and wherever dangerous or unusual conditions are encountered, such places must be re-inspected without



fail during that day in order to see that the instructions issued the foreman or his assistant have been followed out.

The periodical inspection by the safety inspectors serve to check up the practices followed in general at the collieries so that the efficiency of the supervising officials may be kept at a high point.

Any conditions criticized by the inspectors are immediately taken up with the colliery officials so that they may be remedied at once and in addition, the findings of the inspections are referred to the general officials of the company for their attention, so that the efficiency of the colliery force along these lines may be followed up.

The supervising force is also made responsible for the enforcement of their instructions by judicious administration of discipline wherever such is found to be advisable.

#### RESULTS OBTAINED

While the working method as outlined above has not yet reached the highest state of perfection and is not functioning on a 100 per cent basis, it became evident in a short space of time that results were being obtained.

The employees as a whole, were taking considerable interest in the safety movement from the face right back to the breaker, and improvement was noticeable particularly in the departments where hazards were greatest. In the class of accidents with which we are dealing a decrease for the first half of the current year as compared with the same period for the years 1919 and 1918, showed a most satisfactory decrease in roof fall accidents of approximately 20 per cent, in spite of working hazards remaining approximately the same.

#### DISCUSSION

MR. CONIBEAR: The supply of timber in our country is gradually being diminished. I would like to ask if the poor timber that we are forced to use in our mines, has any effect upon our accident rate by falls of ground.

MR. FLYZIK: I come from a country where we have all kinds of timber and the accidents from this one cause are just as numerous as any other place in the United States. Admitting that perhaps defective timber might cause a certain percentage of unavoidable accidents, in my estimation that percentage is so small that it is hardly worth while answering. I really believe that accidents from the fall of timber are worthy of consideration. I should say that actually fifty per cent of our accidents in the United States are caused from that one thing. We kill annually more people in the United States in the mines than Germany and Great Britain combined. One thousand people were killed from the fall of roof; measured in dollars there is an economic loss of \$5,000,000.

In addition to the suggestions offered in these papers, I think it would be advisable for the Bureau of Mines to take a general survey inquiry into the various causes of the fall of roof. Those of us who have worked in the various mines of the United States know that conditions vary.

have worked in mines where we have had to pack our own timber. In those cases, the managers used to unload the timber at the most convenient place to the haulage way and you can readily understand that when we went up to our working place 300 or 400 feet from the main haulage way and encountered a dangerous roof, we didn't feel like coming down; we waited until noon or shooting time or perhaps quitting time in the evening. I am of the firm opinion that it is cheaper to deliver the timber as close to the working place as it is practical to do. In that way I think accidents will be reduced considerably. We must carry on a persistent campaign in educating the miner to the need of properly securing his working place, but in doing that we must also try to remove the human equation that enters into this problem, and that is that if the timber is left at any great distance from his working place he is going to run chances. It is like permitting a machine to be unguarded and expecting all the responsibility to rest with the workman.

Mr. Bagley, the State Mine Inspector of Washington, is about to undertake that sort of a campaign. He is going to take the different parts of the state and go over the various conditions they have there and inquire whether or not accidents are lessened from this one cause in mines where the management delivers the timber to the working place as against those mines where they get paid so much per prop or per set and are expected to pack the timber from 200 to 500 feet up the pitch.

MR. HENRY ROARK (Clinchfield Coal Corporation): Do I understand that in the anthracite region the miners are held responsible for the condition of their working places?

CHAIRMAN TILLSON: I think that is what it said.

MR. ROARK: In the particular mine that I represent, the company is responsible for that. I would like to know if there is any way of finding out the difference where the company is responsible for the setting of the timbers.

CHAIRMAN TILLSON: You mean the difference of timbering on company account or timbering on contract account. That is what it amounts to because the miners in this case are all practically on a contract in their work.

MR. GIDLEY: There is no question but what the scarcity of timber is having a tremendous effect upon the safety of mining operations. We find that down through the South where timber is scarce, we are receiving an inferior grade of timber and, of course, where we have a great deal of heavy ground it has to be supported by various methods of timbering. The quality of timber used is bound to have a decided effect upon accidents. There is no question about that.

This paper is splendid. It gives the reasons and the prevention. Mr. Boardman says that twenty-four per cent of the accidents from falling ground occur in drifts and cross-cuts. In my opinion, accidents due from falling ground in drifts and cross-cuts can be almost eliminated. It depends on the miner absolutely. He doesn't give the percentage of accidents occurring in timber drifts and untimbered drifts, he doesn't make the distinction, but in drifts where no timber is required if the back is

properly dressed down before actual work of shoveling or drilling is begun, it seems to me the hazard could be reduced to the minimum. We have, during the last year, introduced a method of supporting the back in timbered drifts that may be interesting. We have hooks made of inch and a half square iron and the hooks are hung on the cap of the last set of timber that has been put in the drift and those hooks are used for booming purposes. The booms are placed up there. They can be shoved right ahead and the working places can be kept entirely covered. They are very convenient. With this method nothing is in the way and the car can be shoved right up to the working place. Those booms are never taken down. As to rounds of blasting, they are shoved ahead from



*Courtesy Phelps-Dodge Corp.*

**BOOMS SUSPENDED BY IRON HOOKS**

cap to cap and the hooks changed on the cap ahead. It works fine. (See illustration.)

**CHAIRMAN TILLSON:** That is to save the expense of putting false caps on?

**MR. GIDLEY:** Yes. In an ordinary timbered drift after your round is plastered, your first operation is just simply to shove your booms ahead. After that you can place your new cap on top of the boom.

**MR. CONIBEAR:** Suppose you are in cushioning ground?

**MR. GIDLEY:** If you are in cushioning ground where you need more weight, your booms can be supported by a T-piece in a stull in the front if your ground is real heavy.

**MR. CONIBEAR:** Would that hold in real heavy ground?

MR. GIDLEY: Yes.

CHAIRMAN TILLSON: You have been having some little time to glance over these figures. I merely wish to call your attention to the facts that where Mr. Boardman has spoken of percentages of division of accidents that must also be qualified by considering the percentage of work which has been done in those classes whether in drifts or stopes. Where he said that twenty-four per cent of the drifts and cross-cuts have occurred that way, you must realize that only sixteen per cent of the mining work was done that way. This indicates the disproportion of accidents in a place where the causes ought to be very readily correctible.

I think Mr. Kudlik has brought out the same point that in the dangerous and hazardous occupations the accident rate is kept down below the rate in other occupations which are not so hazardous because the men do pay attention in hazardous places to their work. I think both of these papers, written independently, bring that out as the vital point which should be remembered.

MR. CONIBEAR: It has been said that it takes ten to twenty years to get a start in the work of accident prevention. We have had to work ten years and we find that holds true. Our greatest causes of accidents are those falls of ground. The only fatalities that we have suffered the last year are falls of ground, and I think the best prevention is personal contact between the higher officials and the commonest men employed in the mines. We are doing this by periodical and regular examinations by the superintendents of the company and by the safety inspector. These men in positions of authority talk personally to the individual miner in regard to his responsibility, and we find that this is doing more than any other means to educate the men in their own safety and in their own responsibility.

MR. SEIP: I would like to ask those that are here if accidents from falls of roof and ground constitute the largest percentage of their accidents. How many are there who have that condition? There seem to be only about two. That isn't my difficulty. I have two other causes from which I have more accidents. One of those is under the Bureau of Mines classification No. 3, timber and hand tools—accidents resulting from the handling and setting of timber and the use of hand tools. Those are all slight accidents, but the largest number occur there. Another is loading cars at chutes.

MR. GIDLEY: There is no question but what the number of fatal accidents probably are due to fall of ground, that is the largest number, but our experience has been that the majority of minor accidents come from loading from chutes and handling of tools and timbering in square set stopes.

PROF. STOEK: One accident that hasn't been spoken of at all and which in coal mines amounts to about 33½ per cent, is the haulage accident.

MR. MARTINSON: Whenever we have an accident through fall of ground, the first thing that enters our mind in investigating is, has the company provided proper means of preventing this accident in the way of timber made easily accessible to the miner?

The next thing we consider is, has the man been properly instructed by the foreman. We usually find that he has, that is according to the story that we hear after the accident occurs, but I have investigated a large number of these accidents and I have really found, in my experience, that you can easily hang it on the foreman. He comes into the working place and has seen a condition which was dangerous and has no doubt told the men to correct this either by putting in a set of timber or barring down a piece of loose ground; he has walked away; he has not made the impression that he should have made on the man. He doesn't come back to see whether his instructions were carried out. Of course, if the man is killed or severely injured we hear of it; otherwise we don't.

We are starting now to hang it on the foreman. He has to instruct the miner and it is his duty to see that the fellow does it and not go away and say, "I told him to do it."

#### UNRELIABILITY OF STATISTICS

MR. HALL: I think there seems to have been a disposition to explain away statistics. I don't know what good statistics are unless to a certain extent we are guided by them. The statement was made once that rock pillars was the most dangerous work; that is possibly open to question. Perhaps the statistics are right when they suggest that the dangerous thing is to go into new ground. After the roof is subjected to a certain degree of strain, it may, to a certain extent, be relied upon; but when you are going into entirely new ground you come across kettles and slivers of rocks which occasionally cannot be discovered and it may possibly be that the dangers are really as great there as elsewhere. It may be that the statistics may not show the actual hazards, but perhaps we should not be too prone to consider that the statistics do not show the actual facts but to give them the proper weight and question in our own mind whether after all the rawest kind of man should not be allowed to go into breaking new ground and face the dangers which may accompany that work. I really am of the opinion that the most unexpected accidents occur under those circumstances. You can't foresee just exactly what you are going into, whereas when you are drawing back your pillar you are going into the rock which has already underground a certain degree of strain and, therefore, on which certain things can be predicted.

Another thing is the effect of heavy shots usually used in drifting work and the comparatively light shots used in rock pillars.

MR. HARRINGTON: I spent three years in the Butte mining district, and I don't understand Mr. Boardman's figures as to the considerable number of accidents in the face of the drift. The ore there is generally in pretty hard quartz with pyrite, and it requires twelve or fourteen or sixteen holes. The drifts themselves are not very large. The cross-sections are only about five or six feet wide by six or seven feet high and I don't understand why there are such a considerable number of accidents.

Mr. Martinson brought out an idea that I think is one of the vital points in safety, not only in the fall of rock but in all other safety work, underground work, in coal and metal mines. That is placing responsi-

bility on the foreman. I spent a couple of years looking into accident prevention in regions where the companies were devoting a considerable amount of attention to it. I talked to the men and to the safety engineers, to the bosses and to the shift bosses. No doubt, the company was trying to do the best toward reducing accidents. On the other hand, "Well, that sounds fine and dandy, but when the safety engineer is around the shift boss will get after us to make things safe and as soon as the safety engineer gets away he says, 'What we want is the rock in the box.' " I think the fault lies largely in the fact that the mining companies do not get the proper co-operation of the shift bosses. The shift bosses are told to carry out the safety ideas by the management at the top and by the safety engineer, and on the other hand, if the rock doesn't come out, the shift bosses lose their jobs. I think more attention should be paid to the shift bosses.

#### SAFETY ENGINEERS AND BOSSES BREAK SAFETY RULES

Safety engineers and safety men and bosses are only too prone to break their own safety rules. For instance, you see rules against riding on trips, loaded trips particularly; yet you rarely see a safety man who won't get on a trip and ride it out of the mine. A boss will do the same thing.

I investigated a coal mine accident a couple of years ago in which 121 men were killed. They were killed because the safety engineer went into the mine wearing a safety lamp and had the flame extinguished. Gas came out about 100 feet from the face where the flame of the lamp was extinguished, and he deliberately unscrewed the lower portion and the upper portion of the lamp and lighted the gas and killed himself and 120 others.

MR. CONIBEAR: Our accidents prove that the largest percentage occurs in places where we don't expect them, in drifts because of the nature of the ground, etc.

In regard to holding the bosses responsible, when our work started I called attention to the fact that our bosses could not stop at the place to see whether the men did as he instructed them. Immediately in all of our mines the number of shift bosses was doubled and even yet the accidents occur. Our shift bosses have been through a vocational school of two years. They were selected because of their ability, and yet these accidents continue to occur. A boss can't stay in one place all the time. Our bosses are supposed to cover their territory four times a shift, and there isn't a group of men that are better safety inspectors in our mines than our shift bosses. Every six months we select three of them and have them inspect all of our mines.

MR. ROARK: I think there is too much put on the foreman. In our mines, for the last sixty days, we have had two accidents from fall of coal. In the first place, I personally visited the working places and told them not to leave the top coal to the last, but to work the top coal first. The first thing in the morning I would give them that instruction before they had ever shot in many cases, but before I made another trip around they

had shot the bottom coal. On two occasions they had been hurt by the coal falling. The instructions were to shoot the whole cut down but they loaded any coal at all. What are you going to do in a case like that?

CHAIRMAN TILLSON: It seems to me that either by threat or by additional precautions have to be taken, and it depends upon the labor market to a certain degree. If there is plenty of labor and men are working for jobs, discipline works; getting rid of the unsafe man is the obvious thing to do. Where your labor market is not in condition for you to go along without that labor, you have to coax them the best you can and everlastingly keep after them.

There is one other thing that hasn't been mentioned. You speak of barring down ground. Probably that term is used generically, but I want to call attention to the fact that a man will only too frequently take a bar and try to pry down a piece of ground. He can get his bar into the edge of the slip but he can't move forth the piece of ground. Probably he will spall off the edges of the slip in which he has inserted his bar and then give it up. Perhaps seventy per cent of those cases could be handled if he would go and get a wedge and drive that or several of them underneath the piece. In lots of cases where bars won't bring down the ground, wedges will.

#### PAID SECRETARY FOR SECTION

A year ago, your Chairman presented to this Mining Section a report on the need of a paid Secretary or engineer for the Mining Section who would devote his time to furthering the interests of the Mining Section and its members by getting around to the various member companies, collecting data for bulletins, spreading ideas by word of mouth, and in general, running your Mining Section as a business organization similar to the operations of the National Safety Council as a whole and to the engineering societies. For years, now, we have been existing as a volunteer organization relying upon the efforts of a few to spare such as they could from their regular business duties in attempting to further your interests as well as their own mutual interests in the betterment of the mining industry. Your delegates last year voted unanimously to adopt such a procedure, if funds could be raised, as I suggested at the beginning of my remarks, and to send out letter ballots to all members requesting a vote as to whether they were willing to pay double the amount of the dues they had been paying with the understanding that the excess dues should be applied to the direct operations of the Mining Section and should not go to other activities in the National Safety Council. Such ballots were sent out, not only once but four different times in an endeavor to get a complete or authoritative return vote from members. The results have been unsatisfactory in that the members have not responded to these requests for vote. One-third of the members who replied and two-thirds of the third that did reply were in favor of having their dues increased for this service. That leaves us only approximately a quarter of the membership who are in favor of it, and only a small percentage were opposed to it of those who replied. The number in favor

was too few to warrant taking so radical a step with the investment involved and the obligations assumed financially and the possibility of those members who had not replied not favoring the object and dropping their membership from the Council.

Your Chairman, before this Congress, conceived the idea that it would be an advantage to the Mining Section and the National Safety Council through its Mining Section and that there would be a unique field of opportunity involved for the U. S. Bureau of Mines if that Government Bureau should feel that it fell properly within its function to offer the services of one of its employees to act in this technical manner for the Mining Section of the Council. We had a conference with Dr. Cottrell, the Director of the Bureau of Mines, and the general tone was developed that there was a big opportunity for such a co-operative step and that the job of carrying on such work was a job that required a man of very high grade caliber and great ability. Dr. Cottrell also saw some difficulty. He saw the possibility of political interference, congressional committees attempting to cast aspersions upon the good faith of the Bureau of Mines in spending its money in what might be made to appear some outside organization; he, however, felt that possibly that condition could be overcome if the object was truly in accord with the Bureau's policies. On the other hand, he saw the difficulties of finding and applying the right man to the job. Dr. Cottrell, I believe, is willing to give this matter serious consideration and was kind enough to see that a number of delegates from the U. S. Bureau of Mines attended our meetings. In all cases, I think without exception, these delegates have never been to a session of the Mining Section of the National Safety Council before. The objects were new to them.

At the same time, the American Institute of Mining Engineers officially denoted by action of its Executive Committee, a representative to come here to our meetings so as to show the official co-operative spirit of the A. I. M. E. with the activity of this Mining Section, and by very good fortune the man whom they delegated was also more or less the personal delegate of Dr. Cottrell of the U. S. Bureau of Mines. I refer to Mr. C. E. Julihn who is in charge of one of the Bureau of Mines districts and is stationed at the University of Minnesota.

Your Chairman had several conferences with these various representatives of the Bureau of Mines—Mr. Julihn, Mr. Harrington from out West, Mr. Adams who is now Statistician of the Bureau of Mines located at Washington, Dr. Sayers, who is the Bureau of Mines Surgeon, and Mr. Herbert also of the Bureau of Mines, and I hope he is not wrong in saying that these gentlemen view with favor the proposed co-ordination of the Bureau of Mines with the Mining Section of the National Safety Council along these lines.

It is a difficult matter, probably, to express the thought in the short space of time that ought to be devoted to it, but it appears to your Chairman that a field of great vision may be opened up by such activities. To the casual observer it might appear that somebody was trying to put something over, to use a slang expression, on the Bureau of Mines and



get something out of them. To another prejudiced observer, it might appear, "Here is somebody to swing this organization under the control of the Bureau of Mines," so you see the difficulties. Those might be assumed to be extreme and prejudiced views. I think in answer to a question which would arise as to what percentage of time this man would spend working for the Bureau and how much for the National Safety Council, if he did not spend it all with us, and the question might arise, is it satisfactory for a man to serve two masters. That sounds foolish. He should spend 100 per cent of his time working for the interests of the Mining Section of the National Safety Council and he should spend 100 per cent working for the U. S. Bureau of Mines. I see no difference in the interests. They are both out to improve the safety and the efficiency of the mining industry. On the other hand, it seems to me that it is not asking a favor of the Bureau of Mines but it is offering to that organization an opportunity which has great possibilities, an opportunity for them to approach the Mining industry and its operators both from the executives and the workmen with less formality than would be occasioned by its approach from its formal organization which is the Bureau of Mines itself. It further gives them another port of entry to approach them as officers of the Bureau of Mines or to come in as one of the co-operative organizations to which they themselves belong—the National Safety Council.

The other psychological feature that appears is that of course we are all paying individually for the Bureau of Mines; it is ours and it belongs to us and we are a part of its functions and we should be partners in its operations, but do we realize it? We pay our taxes and that is the way we support it. As to how much money we are investing in that Bureau of Mines we don't know. It is so remote that we are not in direct contact with it and our interests are not so drawn toward it as one of our own activities. We do know that we are paying so much in dues to the National Safety Council and it is our organization and if we don't get something out of it it is our fault, and we want to know why. It belongs to us. Therefore, it seems that a more co-operative spirit between the preaching of safety methods would be found in this organization and the Bureau of Mines operating through this organization in this manner than it would be from the more formal organizations.

The general proposal is of this nature: Last year your Chairman suggested that we attempt to have our dues doubled. He would still suggest that that procedure is worth while regardless of this other step. The field is so big that we will need the money before we get through with it. More money will enable us to have more service that we can give no matter how much we can get from the outside. If we can persuade the Director of the Bureau of Mines to delegate a man to us to work in our service as well as their own (it is mutual), and have the Government supply his normal traveling expenses, for which I believe there is a per diem standard rate of \$4.00 per day for expenses on the road, we would be in the position where from our funds we could readily make up the difference to meet the sum which really is required for a man to get

around. As it stands, the government men are restricted by the statutory amounts allowed for expenses for doing the active work in the field that they would like to do. It means that somebody has to supply that extra money. It means we are going to co-operate then, if we adopt this, with the Bureau of Mines, and we are going to invest our money in it and it is going to be ours as much as it is theirs, or more, because there are more of us than there are in the Bureau of Mines.

To get the thing started is the problem. We have to get this balloting. We submitted this list of members around with the request that you note upon the lists those members you would solicit personally and would make a note of their names. We asked that the lists be returned. Some of them have not been returned. The result is that we have to take steps to complete this membership subscription vote. If we can temporarily get from the Bureau of Mines the services of such a man (and the delegates from the Bureau of Mines estimate that in addition to what the government could give it might require a thousand to twelve hundred dollars to canvass the country thoroughly) and if we could obtain a loan from the treasury of the National Safety Council of that sum of \$1,200, then the big "if" would be this: If this idea appeals to these delegates you must all get behind it and work for it, boost it and get all you can out of it. If all that can be done, it is the belief of your Chairman that there are strong possibilities that both the U. S. Bureau of Mines and the Executive Committee of the National Safety Council will look with favor upon this proposition. It is further the belief of your Chairman that if you do adopt this and make a go of it as you must make a go of it if you start it, you are opening up a field of activity for the National Safety Council at large that far surpasses in usefulness anything it has achieved so far. You are opening up possibilities of the general principles of technical paid executive service on a very greatly increased scale being given to all the industries of the country, and you are furthermore aiding the Government Bureau of Mines in a development which I believe will far surpass in possibilities that which it has achieved in the past, and we know that has been considerable.

I am going to ask Mr. Juliñ, who is here from the Bureau of Mines, to just give us his idea regarding this subject.

MR. C. E. JULIÑ: After considering the matter carefully, I can see a very decided room for co-operation suggested. In the first place, under the organic law of the Bureau, we have a right to spend our money in a rather broad way for safety. There should be no difficulty in that connection. The most important feature of the matter, though, in my mind, is the opportunity it may develop for bringing the Bureau's work right home into the mining industry, and that is the thing that appeals to me most strongly. I have not been long in the service, but I have gained an impression that there are a great many governmental agencies that are limited in their usefulness because of a tendency to centralize in Washington to solve questions at distances from the fields they are serving, and so gaps develop between the agency in Washington and the people in the field.

I very much hope to see the Bureau of Mines, which has started in a

way very close to the people, keep going in that direction and build always right into personal contact with the industries. That is the view I take of this, and I am going to recommend its acceptance by the Director.

CHAIRMAN TILLSON: We want to hear from the rest of you.

MR. HALL: I think it would be an excellent idea. I don't think we could arrange anything which will do more to put us on a stable basis and relieve us of many of the difficulties in which we find ourselves. I think the result will make the Mining Section something a great deal more vital than it has ever been in the past.

MR. MARTINSON: I agree that it would certainly prove advantageous to us. Our relations to the Bureau of Mines have always been of the best and we are glad to have those men around. They have done a lot of work for us. I think they can do more for us if they co-operate with the National Safety Council.

MR. GIDLEY: I think that it is vitally essential that we should have the full co-operation of the Bureau of Mines. Personally, I don't think we will experience any difficulty in securing that co-operation provided we all get behind the movement and go at it in the right direction.

MR. REED: I am very favorable to it.

MR. HARRINGTON: I am in favor of it, but I think that there is no reason on earth why the Bureau of Mines should not co-operate with the National Safety Council. Safety work is a large portion of the Bureau's work and is really the work in which the Bureau was first founded and there is every reason that appeals to me why we should get behind it and no reason why we should not.

MR. SULLIVAN (Oliver Iron Mining Co., Duluth, Minn.): I am very much in favor of a technical Secretary. Our company would be in favor of it.

MR. ARTHUR (American Zinc Company of Tennessee, Mascot, Tenn.): I am in favor of it.

PROF. STOEK: First, should this Section have a paid Secretary? Undoubtedly, yes. How is the best way to pay him? If the Section has enough money it ought to pay him. I don't mean by that that there shouldn't be co-operation financially if it cannot raise the money itself. If it has any help it ought to come from an agency already interested in similar work. As most of you know, there is co-operative work being carried on in a number of states in which the Bureau pays for part of the work and the state pays the other part through the universities so that it can be done successfully. Engineering experimentation and such work is being done in perfect harmony. I can testify to that because in Illinois we are carrying on work between the Bureau of Mines and the Geological Survey of the state.

MR. WOODBURN: We are all in accord; I don't see that there is any argument at all.

MR. JOHNSON: I see no possible objection.

MR. BRADLEY: I think it is a good thing and should be pushed to the limit.

MR. L. A. DEBLOIS: (E. I. du Pont de Nemours & Co.): As a hard-headed member of the Executive Committee, I want to get straight on this proposition. Do I understand that the idea now is for the Executive Committee to reach down into its pocket if this thing goes through and come across with \$1,200 to help out the Mining Section in the co-operating and financing of a technical Secretary?

CHAIRMAN TILLSON: A loan of \$1,200.

MR. DEBLOIS: You call it a loan. That is entirely separate from the double-due idea that was undertaken last year or canvassed last year? That is, if you did double the dues of the Mining Section members, the money accruing that way would be used for other purposes, that is purposes other than this?

CHAIRMAN TILLSON: The idea is that if we get a loan of \$1,200 and also get the services of the Bureau of Mines man, we figure that the \$1,200 would be sufficient, with traveling expenses supplied by the Government, to permit him to canvass the situation throughout the country so thoroughly as to succeed in getting member companies to double their dues and repay the loan and continue then with the double dues in all the service that could be given as well as with the services of the man the Bureau of Mines gave us.

MR. DEBLOIS: He is really not selling the National Safety Council idea but he is giving technical service, and you feel that when the members get to realize the value of that service they will be willing to pay more in order to get it?

CHAIRMAN TILLSON: Yes.

MR. DEBLOIS: I have been tremendously interested in the technical development of the sectional work, especially during the past year as Chairman of the Committee on Standardization and Technical Development. We watched the developments in the Mining Section and the Metal Section both very carefully; as you know the Metal Section project fell through. I am personally convinced that although we have a very efficient and I hope more and more useful, Engineering Section created that can serve the sections of the Council in a technical capacity in what might really be termed research work on their problems, still really successful, intimate, technical work of the sections must be done by the sections themselves. Nowhere will you get the interest in the specific problems that each industry or industrial activity has to meet as you will from that industry or its representatives themselves. You may have your problems which you can properly refer to the Engineering Section and in the Engineering Section we will have engineers, mining engineers and others, and technical access to other bodies which will be at your service. But we shall never be able to take keen personal interest nor shall we have the intimate personal touch with your problems that you have. Therefore, I really feel that for the Sections' success their own technical work must be largely done by them, and it will only be a question of time before they will employ technical secretaries or at least paid secretaries who can prosecute technical work—that is the larger sections.

I feel that this thing is certainly a step in advance and I am sure

that if the Executive Committee would approve of such an expenditure they would watch the experiment with a great deal of interest.

CHAIRMAN TILLSON: We have with us our Secretary and Chief Engineer of the National Safety Council, Mr. S. J. Williams, and we would like to know his reaction on this problem.

MR. S. J. WILLIAMS: I have been very much interested in this proposition from the beginning. I was very regretful that the proposition didn't go through immediately. We think we did all we could by correspondence to get replies from the members of the Mining Section voting for or against 100 per cent increase in dues. You have already had the report on the results of that.

As an engineer and officer of the Council, I am very much interested in seeing this thing go through. I hope with all my heart that it will go through. It pleases me more than I can tell you to see that the men in the Section, and especially Mr. Tillson, are sufficiently interested to keep plugging away until they get it through. Anything that I can do personally to help that may be possible will certainly be done, and I think that now with an engineer, Mr. Tolman, as President of the Council, Mr. DeBlois as Second Vice-President, and throwing his influence into the Council's government, there is certainly a chance to get the thing through if ever, and I look for it to go through. I honestly believe that in ten years from now the Safety Council will look on the Mining Section as having pioneered in this field. It seems to me that the development of sections is just as important and inevitable as the development of the local councils which is going on in a very satisfactory degree.

CHAIRMAN TILLSON: Gentlemen, are you ready for the question?

(The members of the Section present were unanimously in favor of the proposition.)

CHAIRMAN TILLSON: The next paper on our program is that by Mr. D. E. A. Charlton, Managing Editor of the "Engineering and Mining Journal," New York.

#### HAZARDS MET IN OPEN-CUT MINING

D. E. A. CHARLTON, MANAGING EDITOR, "ENGINEERING AND MINING JOURNAL,"  
NEW YORK CITY

Some years ago, when I was actively engaged in safety work, I made the statement—I do not admit that it was entirely original—that the best beginning that could be made in the development of an accident prevention program was a careful and systematic study of the accidents which had occurred over a certain period of time at the particular operation or operations where the installation of preventive methods is contemplated. It is to be assumed, of course, that every advantage is to be taken of methods already in practice at similar operations, and for that reason the safety engineer can follow a well defined plan which will apply to his general problems; but his specific problems, those which are peculiar to his individual operation, will be best determined by the study of

the accidents that have occurred about his plant, shop, mine, or whatever the operation engaged in. Having determined the cause, it is then up to the safety engineer to suggest the manner of prevention. Oftentimes it is within his province to put this directly into effect, but at any rate his judgment should be such that possibility of recurrence of a similar accident is reduced to a minimum.

The thoroughness of accident prevention work in all lines of industry needs no comment here, and it is not the intent of this paper to emphasize what has already been done in the different fields. Those engaged in safety work are all working for a common purpose—the elimination of injury. However, there is the great opportunity for co-operation that we should not lose sight of. If we do so, we become provincial and place ourselves in the class of the man who believes himself sufficient to himself, refuses to accept suggestions, and thereby places limitations upon his accomplishments which are bounded by his own often narrow capabilities. There has been, still is, and will continue to be an immense amount of study given to safety work in every branch of industry, so that it behooves the safety engineer not only to give heed to his own type of accidents and the method of prevention but to those conditions in other fields as well. The idea is simply one which is carried out in any line of work, and its application has been largely responsible for the success that has attended America's industrial progress. By way of illustration: During the recent trip of the American Institute of Mining and Metallurgical Engineers to the Lake Superior region it was most noticeable that the visiting engineers were interested in methods which differed from their own, and the comparison of practices was frequently discussed. This example of course applies to the various branches of mining, but it may well be extended to other industries, any one of which includes features common to all of them.

#### OPEN-PIT ACCIDENT PERCENTAGE LOWER THAN OTHER MINING

Open-pit or open-cut mining is free from many of the accidents peculiar to other methods of mining. Although the sources of many open-pit accidents are not present in underground mines, they are, in comparison, in the minority, and it may be said in general that a lower accident rate prevails in open-pit than in underground mines. This is not only true of the average which is based on the number of men employed but also of that obtained on a tonnage basis, for open-pit operations as a rule permit of a greater removal of material than that obtainable through underground methods. The outstanding advantage is, of course, the daylight feature and the relation of this connection with accident prevention is too well known to the safety engineer to require further comment. It is true that night operations are conducted so that perhaps an additional hazard is introduced. The lighting problem, however, does not present such a serious obstacle as is found in other systems of mining, and present practices have reached a high stage of development, so that there is little difference between the number and seriousness of accidents occurring in the night time and the day time.

In order to obtain an idea of the comparison of the accident rate at open-pit mines and that which holds for all other methods I have reproduced a table which appeared in Technical Paper 252 of the Bureau of Mines, "Metal Mine Accidents in the United States During the Calendar Year 1918," compiled by Albert H. Fay. This shows the number killed and injured in open-pit mines where the ore was mined by steam shovel during the years 1914 to 1918 and includes the returns from typical companies employing about 10 000 men and operating open pits in Minnesota, Alabama, Nevada, New Mexico, and Utah. I have also added the number killed and injured in all methods of mining, (including open pits) per 1,000 300-day workers, for the respective years, these figures being obtained from the same source.

The comparison used is entirely an arbitrary one but sufficiently accurate to show that open-pit mining is not so hazardous as other methods.

It should be understood that the term open-pit mining includes not only those operations where steam shovels are used but those in which other methods of excavation are employed. For our purposes, I shall deal with the former, as I believe all of the hazards met with in the latter will be included in such a consideration. It might be well also, in connection with the above explanation, to add that the development of the electrically operated shovel will preclude the designation "steam shovel open pits" in any treatment that may be made of open-pit accidents, for the success which has attended the installation of these excavators has demonstrated that they will play a considerable part in the future of the open pits and earth removal.

#### GENERAL CAUSES OF OPEN-PIT ACCIDENTS

In order to consider the various hazards met in open pits, the following classification of causes may be used and each subject can be treated with its relation to the operation as a whole. The scheme of classification follows the subdivision of accident causes which is used by the Bureau of Mines, and it is to the best of my knowledge adaptable to most open pits. All of the accidents can be traced directly or indirectly to all of these causes and a further elaboration will only complicate the study which will be made from the operative standpoint: Falls or slides of rock or ore; explosives; haulage accidents (locomotives, etc.); steam shovels; falls of persons; falls of derricks, booms, etc.; machinery (other than locomotives or steam shovels); electricity; hand tools; other causes.

Accidents resulting from falls or slides of rock or ore in open pits do not constitute as large a percentage of the total open-pit accidents as do those attributed to a similar cause in a study of those accidents relating to underground mining. The reason for this is quite obvious, inasmuch as the nature of the operation permits better accessibility to the dangerous condition. Not infrequently is ample warning given, the men may be removed to a place of safety, and the necessary steps taken to make the bank safe.

## BANK TRIMMING PREVENTS ACCIDENTS FROM FALLS OF GROUND

I believe the average slope for stripping banks is  $1\frac{1}{2} : 1$  and it is approximately the same for ore, that is where the overburden is composed of glacial till and the ore is soft such as may be found at the open pits on the Mesabi Range. Rock banks or ore which are of denser structure of course permit of steeper slopes unless the pitch of the strata is such that exceptions must be made. In any event the principal preventive measures which must be taken to avoid this type of accident consist of careful inspection of the banks and proper trimming when necessary. Several factors, such as frosts, blasting, removal of rock or ore from other sections of the pit, etc., may influence falls of banks, but all of these must be carefully guarded against. Several companies employ special men on regular bank inspection work and the results have proved that such precautions have entirely justified the expenditures made. Among the rules which are prescribed by many of the companies who are engaged in open-pit operation is to be found a clause relating to workmen at the front and the bank side of a steam shovel. Although perhaps the rule may apply more particularly to steamshovel operation, it is most applicable in connection with falls of rock or ore. By remaining on the free sides of the shovel during its operation, the men are assured of safety, and should their work require them to occupy positions between the shovel and the bank a rigid watch should be kept and the men advised of any movements of ground. Such precautions are easily obtainable during the daytime. During the night shift, unless sufficient illumination is procurable, the difficulty is necessarily increased.

## THE USE OF SHELTER HOUSES IN OPEN PITS

Accidents attributable to explosives are many and varied. Before taking up the subject of the handling and treatment of powder, it may be well to consider the dangers resulting from blasting and some of the precautions necessary. It is most essential at all times that men working in the pit are given adequate protection from flying pieces of rock and ore which often travel considerable distances. There should be ample provision made properly to warn the men, and this is usually done by means of warning whistles which are blown—a series of short blasts from either the steam shovel or locomotive whistles—for some time previous to the blasting. Following this it should be the duty of the foreman and the underbosses to see that all of the men seek proper shelter. There are a number of types of shelter houses which are in use in open pits. These consist of steel frames lined with ties or houses built of steel plate and reinforced. The latter are undoubtedly more serviceable and can be transported from one place to another without much difficulty. In addition to affording protection to the men the shelter also serves as a point from which the blaster may, if he is using an electric battery, explode the charge, and so perform that operation in perfect safety.



## PRIMITIVE THAWING METHODS TABOOED

The lists of "don'ts" which have been given publicity by the manufacturers of blasting powders and which appear in every safety rule book should have adequate perusal and digestion, for they have all been written with a purpose, and apply in open-pit mining as well as in any operation where blasting powder is used.

It is quite essential that proper storage be provided for explosives. Powder magazines must be kept dry and well ventilated, separate houses being maintained for the storage of black powder and dynamite and also for blasting caps, electric fuses and exploders. It is generally specified that these should be located not less than 300 feet from the thawing house or any occupied building. Standard types of thawing houses are provided by powder manufacturers and these are in general use where climatic conditions require that the dynamite be properly prepared before using. Their specifications provide a separate housing for the heating, which is done by hot water, steam, or exhaust steam, and the thawing house proper where the explosives are stored. Certain precautions regarding the proper care of the thawing house, such as the removal of drawers, etc., are stipulated. The many accidents which have resulted from attempts to thaw dynamite by primitive and foolhardy methods have caused rigid rules to be made concerning this particular proceeding, and there are, fortunately, few instances today where attempts are made to thaw powder by methods other than those stipulated by powder manufacturers or operators.

The transportation of powder from the magazine or thawer house to the working place must be accomplished safely and in a convenient manner. At several mines a special slide or lowering device is provided and from the lower end of this the men in special charge of that part of the work convey the powder to the various points where it is to be used. Properly marked boxes should be used and separate boxes provided for dynamite and for caps and exploders.

## GOPHER HOLE PRACTICE ON THE MESABI RANGE

The general practice as relating to the charging of dynamite does not differ appreciably in open-pit work and is too well known to warrant discussion in this paper. The use of black powder is perhaps not as familiar. In this connection, I am sure the following description<sup>1</sup> of "gopher holing" as used in the open pits will be of interest:

"Stripping banks fifteen feet or more in height are shaken up ahead of the shovel by blasting 'gopher' holes. These holes are started at the toe of the bank and are pointed downward at angles of five to ten degrees from the horizontal. 'Gopher' holing, when first used, consisted in making the holes large enough to permit a man to enter and work, but frequent accident caused this method to be abandoned, and 'gopher' holes at the present time have an average diameter of about fifteen

<sup>1</sup>"Steam Shovel Mining on the Mesabi Range," by L. D. Davenport, Engineering and Mining Journal, March 2, 1918.

inches. Loose ground is removed with a No. 2 round-pointed shovel blade, the edges of which are slightly turned up, fitted with a twenty-five foot handle of two or three-inch diameter. When a hard seam is encountered, it is drilled with a long auger or with a moll and one or two sticks of dynamite are pushed in with a pointed loading stick and fired with a blasting machine. The loose ground is then removed with the shovel. If a boulder is struck while the 'gopher' is being driven, repeated blasting with sixty per cent dynamite will often shatter it sufficiently to allow the hole to be continued. Where it is impossible to blast through a boulder, the hole is bottomed against it, or new hole is begun a few feet away, depending on the length attained. The limit of length of a 'gopher' hole is about twenty-five feet."

After the "gopher" has been prepared dynamite is used to chamber the hole, and when sufficient time has been allowed for the interior to cool so that no premature explosion may take place, the hole is loaded with black powder, from five to ten kegs of twenty-five pounds being used. In order to avoid danger from sparks and other sources the powder is poured into the hole by means of a launder device which is provided with a covered hopper. Usually the blasting is done by battery. This and the foregoing description represents Mesabi Range practice and has from a safety standpoint, proved most satisfactory.

#### ROLLING STOCK SHOULD BE CAREFULLY SAFEGUARDED

In considering the hazard which may be involved in the use of locomotives and other rolling stock and the prevention of accidents from those causes, open-pit operators have been guided to a great degree by practices which have been standardized by railroads and other industrial enterprises of a similar nature. The Interstate Commerce Commission in 1910 adopted a number of regulations governing safety appliance standards on locomotives and these are in effect at practically all open pits. They relate to sill steps, hand holds, uncoupling levers, hand rails, hand brakes, running boards and other appurtenances. It is, of course, essential that a well-arranged system of inspection be maintained in order that the proper persons be advised of any breach of regulations in this particular, and constant work is necessary to keep all rolling stock in a safe condition, as the usage to which it is subjected is by no means one that defies wear and tear. There is considerable variety to the equipment used, and the manner of safeguarding locomotives, stripping cars, ore cars, etc., will be governed by the adaptability of safety devices to the certain types. Having specified the mechanical means for the prevention of haulage accidents, it is further necessary to adopt certain regulations and provisions which will make for the avoidance of accident from other than mechanical sources. In Bulletin 751, issued by the Bureau of Mines, the following rules have been suggested as governing safe practices for the operation of locomotives and ore and stripping trains:

"Rules and Regulations for Metal Mines," by W. R. Ingalls, James Douglas, J. R. Finlay, J. Parke Channing and John Hays Hammond. Govt. Ptg. Office, Washington, D. C., 1915.

"Precautions are necessary against collisions, against runaway trains on the steep grades and sharp curves that usually exist, and against the danger of running down men who may be walking on the track. To avoid this last danger trails and walks should be provided apart from the railroad tracks and their use insisted upon. Dangerous methods of coupling and dangerous methods of boarding cars or engines should be forbidden. Nobody should be allowed to ride the ore trains except the train crews. Proper clearances over cars and on the sides should be provided and material should not be allowed to be piled so close to the track as to be dangerous. The men selected to work on the track should be intelligent and alert and should be taught extraordinary caution in looking out for trains. Frogs should be blocked and signs provided at crossings. There should be a strict adherence to safe practice in regard to the use of headlights and rear lights on locomotives and trains, to the sounding of whistles, and the ringing of bells." . . . "There is a certain amount of danger attached to dumping the stripping cars, and somewhat less to discharging the ore cars when the contents are frozen or sticky. Dangerous practices in performing these operations should be specifically prohibited."

These provisions are generally carried out in open-pit practice and modifications to fit specific conditions have been made by the various companies.

It was stated earlier in this paper that the recent advances made in earth excavation practice admitted of a broader term than that of "steam shovel." The steam shovel still holds its own and steam as a motive force remains a dominant feature. With the increasing use of electricity and other forms of power, and the adoption of the drag-line excavator and other mechanical means for earth removal the more general term of "power shovels" or "power excavators" might be more acceptable. However, with a few exceptions, the safeguarding of power excavators is very much the same and follows the lines carried out in any shop scheme wherein all moving parts are covered; that is, where it is possible to do so. It is hardly necessary to state that the construction of guards must be particularly rugged to withstand the hard usage which the machinery must undergo. A regular plan of inspection, such as is carried out in machine shops and other plants where mechanical devices are safeguarded, should be instituted and rigidly followed.

It is quite necessary that the area which is occupied by the shovel be kept clear of material. This is not always possible and particularly so where the shovel is "moving up." but it will be found an excellent rule and one which will be the means of preventing a number of slight accidents. Orderliness in open-pit operation is as necessary for accident prevention as in any other work and should not be neglected.

#### ACCIDENTS FROM FALLS OF PERSONS

The responsibility of mining companies for injuries which occur on their property not only includes the safeguarding of their employees but also extends to those who may have no connection whatever with the com-

pany. For this reason it is not only necessary to maintain a careful watch around the entrances and banks of open pits but also to see that sufficient fencing and guard-railing is done. Stairways should be substantially built and provided with hand rails. Test pits or other openings should be properly covered. The practice of bank trimming, which was referred to in an earlier paragraph, is often carried out under hazardous conditions, as it is sometimes necessary that the men, in order properly to trim a bank or slope, must place themselves in a position where a movement of the ground might cause them to fall or perhaps be buried in a run of rock or ore. To safeguard against this the men are provided with ropes which are placed around their bodies and substantially fastened to some safe point above. This practice is also extensively used in the milling method of mining, which may be regarded as a modification of open-pit operation. In the winter it is especially necessary to keep stairways and other such places free of accumulations of ice which may cause falls of persons.

Under the subject, "Falls of derricks, booms, etc." will be included hazards that are somewhat limited in number. The construction of stripping dumps requires that considerable trestle work be done, and it will be found that accidents result from carelessness in the handling of the timbers used in the trestles. At coal loading stations, water tanks, and other such appurtenances to open-pit mines, arrangements must be made properly to safeguard all devices used, and instructions must be issued as to the proper methods of operation.

There is little machinery used in open-pit mines other than that included under the head of steam shovels and rolling stock. There is, of course, the machine shop, the blacksmith shop, and the other departments at which the necessary repair work must be done, but the hazards to be found at any of these are well known and do not differ from those met with in general shop practice. The same efforts which are applied in the latter should be the rule in the shops of the open pit. Small hoists, compressors, machine drills, or other auxiliary machinery used in open pits should receive the same attention, both as to operation and safeguarding, as in underground or general surface operation.

#### HIGH-VOLTAGE ELECTRICITY NOT GENERAL IN OPEN PITS

Electricity as a motive power, either in driving a shovel or hauling ore or stripping trains, is not as yet in general use, so that the dangers resulting from the transmission of high voltage have not become to any great extent a problem of the safety engineer. In open pits which have reached the stage where steamshovel removal of ore has been replaced by scrambling operations and the ore is removed through a shaft, motor haulage is frequent and here it is necessary that the same precautions used in underground mining be observed. In some instances electricity is used as the motive power for pumps and considerable lighting is done by means of electricity, but in both of these instances methods of safeguarding are well defined and follow the trend of general practice.

**HAND TOOLS: CAUSE MANY SLIGHT ACCIDENTS**

There are few serious accidents which may be attributed to the improper use or condition of hand tools, but as a source of the slight accident they are prolific. The prevention of this type of accident can be brought about mainly by inspection and instruction in the proper use of the tools. There is always the mushroom-head drill to be found, the loose or broken hammer handle, the stillson wrench that is not working properly and any number of small defects which should not be permitted if the men are to do their work safely and properly.

Under "Other Causes" may be included a miscellaneous lot of accidents which result from improper handling of material, explosions (other than those due to blasting powder) and others which do not properly fall into those causes already mentioned. It may be well at this point to mention one factor which has a considerable bearing on the frequency of open-pit accidents. That has to do with labor and, as each operator and engineer knows, with the dependence that can be placed on each workman to look out for his own safety. Open-pit labor, with the exception of the foremen, shovel operators, locomotive engineers, train crews, and such men as are required for certain classes of skilled work, is not required to be of the standard usually employed underground, and it has been drawn largely from foreign fields. In some cases there is, or has been, an unfamiliarity with the English language, a certain sluggishness that has been due to either indifference or timidity, and a rather detrimental effect in so far as the best conditions for obtaining prevention of accidents were concerned. In many instances, this condition has been counteracted by the further employment of such men who would serve as instructors, as bosses, and a lower percentage of accidents to the class of unskilled labor has resulted.

The safety engineer will find much to interest him in the study of accident prevention and the hazards as met with in open-pit mines. The mechanical safeguarding which can be done is limited, but, the opportunity for "safety psychology" presents ever an absorbing problem. Such details as "breaking in" a man on the day shift before he is permitted to work at night, transferring one workman to another place for which he is better fitted and following out other plans which can be determined co-operatively with the foreman, are some of the interesting studies that are open to the safety engineer.

**PRESENT SYSTEM OF LIGHTING IN OPEN PITS IS IMPROVEMENT OVER EARLIER METHODS**

The matter of illumination in open pits is receiving considerable attention. Formerly the practice consisted of obtaining only such light as was possible from the locomotives, lanterns, and gasoline burners on the steam shovels. Later the gasoline burners were discarded as being unsafe and the steam shovels were wired and provided with a small dynamo. This practice exists today and is supplemented by the use of carbide flare lights which provide excellent light. The practice of extending wiring into pits for illumination purposes has not met general acceptance, due

to the fact that frequent blasting causes breakage of the globes and arc lights.

All open-pit mines make use of signals which are given from the shovels or locomotives. A specified code is used and by means of this the men in charge may be notified of any happening at the particular point where the shovel or locomotive is situated. The value of such a system to accident prevention methods as used at open pits is undeniable.

A treatise on the subject of safety in open-pit mining would be incomplete without pointing out the use for warning signs, safety bulletins, and safety rules. These will necessarily be a large part of any safety campaign, but are too well known to warrant further discussion.

In conclusion, the hazards met in open-pit mines are less than those that may be expected from other types of mines. In general it may be said that the three big causes of accidents in open pits are from falls of ground, explosives, and those due to haulage. Similarly these same causes make up the bulk of underground mine accidents, but the manner of prevention in each case is, by reason of the difference in the mode of operation, different.

I realize that much of the information will doubtless be an old story, particularly to those who have had the opportunity to be in touch with open-pit work. The last few years have brought about notable changes. We have today bigger shovels, bigger stripping cars, methods for handling materials on the stripping dumps, compressed air tie tampers, and other devices which are producing more effective results. All of these are given close scrutiny from the safety standpoint, and so far as their mechanical make-up is concerned, the operator may rest assured that the manufacturers have considered the necessary points to make them safe for the workman. With improved machinery and devices must come the higher type of workman, so that as a higher intelligence is demanded the possibility of accident from causes due to ignorance, indifference, and lack of understanding is decreased. And this in short should mean a marked decrease in the number of open-pit accidents.

CHAIRMAN TILLSON: I want to congratulate Mr. Charlton in your name and for myself personally for the excellent presentation he has given of this subject. I would suggest that Mr. Gallus' paper be read before discussion takes place.

(In Mr. Gallus' absence, the Chairman read his paper on "Hazards Met in Anthracite Stripping".)

### THE HAZARDS MET IN ANTHRACITE STRIPPING

F. S. GALLUS, DISTRICT SUPERINTENDENT OF STRIPPINGS, THE LEHIGH COAL AND NAVIGATION COMPANY, LANSFORD, PA.

Impressing upon the mind of every man who toils, the value of Safety and what it really means to him and his, is perhaps the greatest task which this great movement has before it.

It is probably safe to say that the bulk of the mining accidents can be

traced to one of three causes or a combination of all of these causes—RECKLESSNESS, THOUGHTLESSNESS, and LACK OF COMPREHENSION.

As almost every one realizes and statistics have proved, the system of underground mining is one of the most hazardous occupations, yet these dangers are, year by year, being lessened through the tireless efforts of the various companies in promulgating SAFETY.

A new method of mining is coming more in vogue each year in the Anthracite region. This is the open cut or strip pit method of uncovering the veins, in locations where this system is applicable, with steam shovels and loading the coal either by shovel or drawing it down through openings into the mine; and while this system does not present the same hazards and risks which are encountered in underground mining, still there is a certain element of danger ever present which must be guarded against and precaution taken to eliminate it. The bulk of the accidents encountered, independent of blasting dangers, can be placed under the following three captions: Shovel, Transportation, and Dumping of Refuse.

Owing to the somewhat congested condition of the machinery on a steam shovel, too much care cannot be exercised in entering the housing while shovel is in operation, and for this reason and in order to reduce accidents to a minimum, no one but the operator is allowed to enter the shovel while the machinery is in motion. Yet despite precautions of this sort, accidents will happen, as is shown by the following instance: While the shovel was loading, and unobserved by the operator, one of the jackmen had entered the shovel and was at the work bench when in some unaccountable manner his foot became caught between the swinging sheave and cable, tearing off the sole and heel and resulting in the man being laid up in the hospital for a period of five months and leaving him with a stiff foot for life. As will be noted, this accident was entirely unnecessary and would never have occurred had the man observed the rules.

There have been numerous instances of jackmen being struck with the bucket on the back swing to the pit, but in each of these cases it has been due to the fact that the men have entered the pit from the opposite side to the shovel runner, for the purpose of rolling up a stone from the front of the shovel and, not having previously notified the runner of their intentions and being out of his line of vision, have been caught in this manner. Accidents of this sort can be charged to nothing but pure thoughtlessness on the part of the individual. Of course, there are instances of men being hit by the bucket under other conditions. The most frequent of these being while adjusting chains in handling boulders or in using the shovel to retrack cars which have become derailed while loading. Another sort of danger, although happily an infrequent one, is that of the shovel upsetting mainly due to slippage of the blocking, breaking of an arm or brace while the shovel is in operation, or else, the shovel getting beyond control of the runner when the jacks are loosened up while moving up. Accidents of this sort are hard to guard against, and endanger the lives of the entire crew. Probably one of the greatest dangers which is encountered is found where stripping to reclaim an area of coal which has been partially worked years previous. Very often, in a case like this, the exact position of the old chamber or breasts is not

on record and their conditions as to whether they are standing open or have been filled up by a subsidence of the top rock and surface, is absolutely unknown.

In cases of this kind, it may readily be seen that there is the ever present danger of the ground giving away under the weight of the shovel, either drawing it down or upsetting it, and thus causing a very serious accident. Under the conditions mentioned, accidents of this sort have been quite numerous throughout the Anthracite region. Bursting of steam pipes and the blowing out of joints are frequent causes of accidents around the steam shovels. Coincident with an operation of this kind, there are also innumerable minor accidents, such as cut and bruised fingers, hands, and feet caused by hammer blows, pinching with bars, and handling rocks in the pit or in dressing down high banks which the shovel has been unable to reach.

#### TO PREVENT ACCIDENTS IN TRANSPORTATION

In the transportation system as a preventive against accidents, it is essential that the tracks be kept in the best possible condition, although this is very difficult to accomplish due to the fact that the roads in the pit and on the dump are being constantly shifted. Conducive to safety on a rock stripping, only high-set engines with the cab mounted on the top of the frame should be used. This lessens the chance of the cab braces being torn loose from the boiler in case of derailment or by hitting rocks which may accidentally have fallen along the side of track, and probably will prevent the serious injury of the engineer. Several accidents of this sort have occurred during the use of engines with low-slung cabs, by having the braces torn loose from the boiler through derailment, thus allowing the steam to escape, and resulting in the serious scalding of the engineers on each occasion. Runaway trips on the grades due to broken couplings or to the trip getting beyond the control of the engineer on a slippery rail, are the causes of quite a few accidents. As a preventive measure to accidents of this sort, the engineer should be ordered to inspect the couplings on his cars at least once a day and should be cautioned to use care and judgment in handling his train at all times.

Probably the most frequent cause of injury in the transportation end is in men getting their hands and fingers caught while coupling and uncoupling cars as nearly all stripping cars are of the drawhead type with the single link and pin coupling.

There have also been instances of men squeezed around the body while coupling cars, but such accidents have been rare. Retracking cars by means of a pole bumped up with a locomotive is a dangerous practice and should be discountenanced as it has resulted in the injury of quite a few men in trying to adjust the pole. It is better and safer by far to have every locomotive equipped with a pair of good retrackers for this kind of work. Accidents on the spoil dump have been less frequent than in any other section of the operation, and the most serious ones have been directly due to thoughtlessness on the part of the individuals themselves.



## LOADING AND DUMPING

In loading stripping cars, the engineer always endeavors to load the car slightly heavier on the dumping side, so that when the car reaches the dump and the dumping chains are released the car can be more readily tipped. Sometimes, however, cars reach the dump loaded too heavily on the inside and the men are unable to dump them when the chains were opened. In various instances they have been known to clamber on the car to throw off some of the material on the heavy side, but have neglected to hook the side chains before doing so, and consequently the weight of their bodies over tipped the car and precipitated them to the bottom of the dump, resulting in some very serious injuries. The best preventive for accidents of this character is to have a short pointed dumping pole which when placed on an angle between the floor of the car and the sills will permit the car to be tipped by merely moving the trip several feet.

There are also numerous cases of men losing their balance and rolling down the dump, while attempting to bar large rocks which have become lodged on being dumped from the car. Some of the latter have produced permanent injuries and disfigurements. How many needless accidents happen yearly in open cut mining is hard to say, but if every one connected with it would adopt the "Safety First" slogan as their own, it is certain that the number would be cut to a minimum.

CHAIRMAN TILLSON: I think that this is a very able paper. Mr. Gallus has specifically pointed out from his own experience instances of accidents and means whereby they may be prevented.

## DISCUSSION

MR. CHARLTON: I would like to ask either Mr. Sullivan or Mr. Martinson, who I know are familiar with open-cut operations, something with regard to this particular accident that he mentions. I would like to ask them if it isn't customary to have a guard over that swinging shift.

MR. SULLIVAN: Yes, it is.

MR. MARTINSON: There are a couple of things that are being done which might be of interest to some other people, that Mr. Charlton did not touch upon. I might state that some of the companies have been experimenting with flood lighting in smaller places, and I believe that some of them have systems quite satisfactory. The case I have in mind possibly requires a throw of 1,500 feet, and by the installation of flood lighting systems we have been able to make our night operations much more efficient and I believe safer.

I believe this system of having a dog or jack, which is simply a piece of rail about two and a half feet long and sticking it against the side of the car at an angle and trying to catch it against a bolt or something of that kind as the trip goes forward, is causing us to lose about fifty per cent or sixty per cent of our fingers. We have had a very heavy campaign against that as being a very dangerous practice.

MR. CHARLTON: I might say that one practice that I am familiar with

in connection with the dumping of cars is that of having an iron pipe capped at either end and with a small handle protruding at each end so the men will grasp the handle rather than the pole itself, and that gives a much better opportunity for them to fling the pipe in case anything goes wrong and the catch at the bottom doesn't work.

CHAIRMAN TILLSON: Have you found that there were hazards involved in handling it with a pole so equipped?

MR. CHARLTON: As far as I know we have never had any accidents.

MR. REED: A suggestion of that kind was made by some of our men but our safety committees all turned it down and I think they were right in it for the fact that the jack, when they stick it against the side of a car for this purpose, will frequently twist and turn and if there is a handle on the side it would pull the hand against the car and perhaps take the whole hand off in place of just a finger. It is a practice that we felt was unnecessary and dangerous, and it is the opinion of all of our safety committees that it wouldn't be advisable.

CHAIRMAN TILLSON: This is not retracking cars. It is quite a different problem from merely dumping the car. On the other hand, are not the car bottoms more suitable toward the sprag having a proper hold on the car bottom for riding it than would a small mine car which had no provision for it?

MR. CHARLTON: That is right. Of course, in the up-to-date practice as they have today on the Mesabi Range, all those cars are dumped by compressed air, that is to say with twenty and thirty cubic yard cars. This refers particularly to the smaller sized cars, that is twelve-yard cars where they all have wooden bottoms.

CHAIRMAN TILLSON: The best practice is to perform that operation mechanically by power.

PROF. STOKER: I think the paper on the anthracite region has covered that very thoroughly. I might say we do not have the same dangers in the thinner seams and flat seams in Illinois that they do, for instance, in the thick pitching seams of the anthracite region in stripping operations.

#### FEDERAL STATISTICS

MR. W. W. ADAMS (U. S. Bureau of Mines): I want to make a general statement. In a number of the papers read here, use has been made of statistics and I recall a statement made last Monday by the President of the Council that the only industries covered by statistics gathered by the Federal Government were the railways, those statistics being published by the Interstate Commerce Commission, and the statistics covering the mining industry compiled and published by the Bureau of Mines. He made the further statement that those statistics, while they covered the country fairly well, were published so late in the year as to be of considerable annoyance rather than of any use because they came too late to be of value.

I suppose that most of the gentlemen here know that the reports on accidents which are gotten out by the Federal Bureau of Mines are based upon reports voluntarily rendered by the mining companies

throughout the country. The number of companies that we have to send our inquiries to is about 6,000 or 7,000, of which only about half are actually producing. We send out our first request on the first day of the year and follow that up with second, third, and fourth requests at intervals of one month. The fourth request is followed by special letters to delinquent operators so that we find ourselves pretty close to the middle of the year or even later before we can close our figures. Then it is necessary to go through the process of getting that report through the Government Printing Office. I think Mr. Seip will bear me out in the statement that that sometimes is a slow process.

I would like the proceedings of this Council to contain a plea to all of the operators to reply as promptly as possible to the requests that they receive from the Bureau of Mines instead of letting them be put aside from day to day which it is very easy to do. Most of the larger companies report their accidents to us very promptly indeed, and perhaps that would cover seventy-five per cent of the industry; but there are always a sufficient number of delinquents that compel us to keep our figures open because they are so long in replying and yet their figures very materially affect the accident rate in any small locality. If we could get more prompt replies from the operators, it would be possible to get these figures up much more promptly than we do and in that way greatly increase their value.

CHAIRMAN TILLSON: We have a Committee on Standardization of Accident Statistics, and in the past, the statistician of the U. S. Bureau of Mines, Mr. A. H. Fay, while he was in such a position, was Chairman of that Committee. Your Chairman hopes that with the new Statistician of the Bureau of Mines we will be fortunate in having him serve in a similar position if it so pleases the new Chairman of your Mining Section, and that, if so, Mr. Adams will find time unofficially to develop and put before us key figures, if you might call them that, which he does not feel warranted in having brought out in an official publication of the U. S. Bureau of Mines because of their incompleteness, possibly, or because of their being out of line with the statistics which have been produced in the past. I think the membership of this Mining Section can further this object very much by themselves taking home the resolution to specialize a bit more possibly than some of them have in regard to the preparation of accurate mining statistics in regard to accidents and supplying that information to Mr. Adams in a prompt and analytical fashion and giving him the opportunity then of preparing for the Mining Section, if nowhere else, a group of figures interesting to us and indicating the mines that have taken interest in safety and have been enthusiasts in attending these Mining Section meetings and have taken an active part in them. Those figures might be a very interesting group of figures to compare with other groups of figures of the industry in general throughout the country. I should hope that they would show such a marked improvement as to indicate the value of personal interest in this safety propaganda: we ought to be able to show that the National Safety Council is performing a very useful function in the mining industry.

I trust that Mr. Adams will find time to correlate those statistics and present them in a form that would be effective.

MR. ADAMS: I think that could be done.

CHAIRMAN TILLSON: The next item of business that we have is the report of the Nominating Committee. Before this Committee makes its report I should like to say that your Chairman, during the past year, extremely appreciated the opportunity he had to be of service to you and the co-operation he received and the help he received from the Chairmen of other Committees and the officers of the Council and from Mr. Seip who came in when the Secretary you elected last year was forced to resign because of his moving into other fields of endeavor and being remotely located. Mr. Seip has picked up that work and has helped very materially in the functions of our Section in preparing this meeting. Furthermore, the fact of your having a Nominating Committee is purely a matter of form so as to bring some names before your attention, but we hope that you will not feel at all inhibited in bringing forth other nominees directly from the floor in addition to any slate that your Committee may offer.

Mr. Hall was appointed Chairman of the Nominating Committee and we shall be glad to have him make his report.

#### REPORT OF NOMINATING COMMITTEE

MR. HALL: Your Nominating Committee respectfully submits the following names for your consideration as officers of the Mining Section for the ensuing year:

Chairman—B. F. Tillson.

First Vice-Chairman—D. A. F. Knoefel, U. S. Bureau of Mines, Terre Haute, Ind.

Second Vice-Chairman—George Martinson, Pickards, Mathers & Co., Hibbing, Minn.

Third Vice-Chairman—Guy F. Johnson, Homestake Mining Co., Lead, South Dakota.

The Nominating Committee believes that the appointing of a Secretary should be left in the hands of the Chairman of the Section under the present circumstances and, therefore, makes no nomination expressing, however, their hearty appreciation of the good work in the past year by Messrs. Sherman and Seip.

(On motion the Secretary cast the unanimous ballot of the Section for the nominees.)

CHAIRMAN TILLSON: I appreciate very highly your confidence and shall be happy to accept the office, principally in view of the fact that we have in hand a project which has been a pet hobby of your Chairman and which he hopes will materialize in the coming year.

The coming year may bring forward some very ripe possibilities for us. It all depends upon the interest and enthusiasm which you as individuals devote to this Section.

This year we have had the innovation of having four meetings of the Mining Section instead of three as has previously been the case. Do

you consider that the question of having four meeting is a successful one? Has it been too long? Those who believe that we should have four half-day meetings at future meetings will please signify by saying "aye," contrary "no". It seems to be the unanimous opinion that we shall have four half day meetings. That is one practice we will adopt.

As soon as this reorganization can be effected or disposed of, it is hoped that inquiries will be sent out in regard to subject matter for future papers and inquiries for the ideas which you members have in regard to what you would like to have handled by your Mining Section Executive Committee.

The Mining Section is rather completely organized, more so than any other, but we have to get organized in the field now and make this paper organization work as it ought to work and can work if each individual gives his effort to it.

Remember that the Chairmen of any Committees are only Chairmen; they are there to co-ordinate the activities of the Committee members and the initiative must come, to a large degree, from the members.

(The Section went on record as favoring a "Stag Smoker" in place of the "Smile Party" for the next Congress.)

ADJOURNMENT.

## Packers' and Tanners' Section

September 29—October 1, 1920

---

A. B. DRUMMOND, Chairman

Wilson and Company, Union Stock Yards, Chicago, Ill.

W. W. PIERCE, Vice-Chairman

Morris and Company, St. Louis, Mo.

G. L. MALLERY, Secretary

Swift and Company, Chicago, Ill.

---

### WEDNESDAY MORNING SESSION

**T**HE meeting was called to order at 9:30 A. M. by the Chairman,  
Mr. A. B. Drummond.

#### DELEGATES ATTENDING

J. E. Ballentine, A. C. Lawrence Leather Co., Peabody, Mass.  
Henry K. Batchelder, A. C. Lawrence Leather Co., Peabody, Mass.  
G. S. Bixby, The Mechanical Mfg. Co., Chicago, Ill.  
R. S. Bonsib, Tanners' Council of U. S. A., New York City.  
G. A. Brown, Cleveland Provision Co., Cleveland, Ohio.  
Chas. G. F. Coker, National Calfskin Co., Peabody, Mass.  
A. Duncan, Inspector, Industrial Accidents Assn., Toronto.  
Kenneth R. Dunlap, A. F. Gallun and Sons Co., Milwaukee, Wis.  
A. B. Drummond, Wilson and Co., Chicago.  
J. M. Eaton, Libby, McNeill and Libby, Chicago.  
J. C. Gillen, Cudahy Bros. Co., Cudahy, Wis.  
B. Hoffman, Michigan Tanning & Extract Co., Petoskey, Mich.  
H. L. Johnson, N. S. S. Lead Ref. Co., E. Chicago, Ind.  
D. P. Kennedy, Pittsburgh Plate Glass Co., Pittsburgh, Pa.  
George R. Kline, Swift and Co., Chicago, Ill.  
H. J. Kurtz, Plankinton Packing Co., Milwaukee, Wis.  
George Long, Cudahy Brothers Co., Cudahy, Wis.  
W. F. McClellan, Armour and Co., Chicago.  
Leo Rembowski, Solvay Process Co., Detroit, Mich.  
Henry W. Schildt, Plankinton Packing Co., Milwaukee, Wis.  
J. M. Sandel, Swift & Co., Chicago, Ill.

W. W. Williams, Safety Engineer, Ocean Accident and Guarantee Co., Peoria, Ill.

CHAIRMAN DRUMMOND: Last year at the Meat Packers' Section we appointed a number of committees, and a number of officers, and during the year I believe that none of them has functioned quite in the way they should, I myself being equally guilty, of course. We have neither Mr. Pierce, our Vice-Chairman, nor Mr. Mallery, our Secretary, with us, so I believe it will be necessary to appoint some one to sit here, so I will not be so lonesome, and I am going to ask Mr. McClellan to sit up here with me.

(Mr. W. F. McClellan acted as Secretary pro tem.)

CHAIRMAN DRUMMOND: Due to the absence of Mr. Mallery, we will have to dispense with the Secretary's report, but during the year we have gotten out twelve bulletins for the Section. It has been rather hard and difficult to get sufficient material, due to the lack of interest of the people who belong to the Section, and again, I am equally guilty in this. On the reports of the Committees—I think there were six appointed last year—I don't believe anything has been done.

The first paper on the program is "Safety Committees—Value, Organization, Methods Used, and Procedure," by Mr. J. M. Eaton.

### SAFETY COMMITTEES—VALUE, ORGANIZATION, METHODS USED, AND PROCEDURE

J. M. EATON, COMPENSATION DEPARTMENT, LIBBY, MCNEIL, AND LIBBY,  
CHICAGO

The Safety Committees should be classed as the most important part of the Safety Organization in any plant regardless of its size or the number and class of its employees.

The value of a properly organized and efficient committee cannot be fully realized until it has been in operation for at least six months, when a reduction in the number and seriousness of the preventable accidents ought to become apparent.

The Committee at plants where there are only two or three hundred employees, is usually composed of the Superintendent (who acts as chairman), the master mechanic, one or two foremen, the fire marshal, captain of the watch, and the safety inspector.

Committees in larger plants, however, may be composed of three sections, the workmen's, the fire, and the foremen's section, the last in some cases being called The General Committee.

The first section is composed of workmen who are either elected by their fellow workmen by ballot, or appointed by the foreman once every three or six months. The second section or Fire Committee is composed of men selected by the fire marshal, if there is one, otherwise by the Superintendent. These committees meet weekly or semi-monthly and discuss very thoroughly all recommendations made by their members, or those made to the members by other workmen, and draw up favorable reports on all that have merit, submitting them to the general or fore-

men's committees for consideration. The meetings are usually presided over by one of the committeemen selected by the majority, and every member has an equal opportunity to express himself on any questions under discussion. They are held on company time so that no member sustains a financial loss by his attendance.

Sub-committees of these sections, appointed by the chairman each month, make weekly inspections of the plant and draw up reports calling attention to all unguarded hazards found, and submit them at the subsequent meetings.

Each member of The Workmen's Committee, whether on the Sub-committee of Inspection or not, makes a daily inspection of his or her department to locate new hazards, replace misplaced guards, look out for and warn new help of the various hazards of their work, and at all times assume under the supervision of the foreman, the responsibility for the safe operation of the department as a whole.

To do this successfully, however, they must have the enthusiastic co-operation of the foreman.

The General Committee which in the larger plants is composed mostly of foremen with the master mechanic, the fire marshal, chief of police, and the safety inspector present and acting in advisory capacity, meets once a month and considers not only the recommendations of the Workmen's and Fire Committees, but also any other matters brought up by its own members. The superintendent usually acts as chairman, and in his absence, the assistant superintendent.

It goes carefully over a tabulated record of accidents happening since the previous meeting; calling on those in charge of the department where preventable accidents have occurred, to give details. When advisable, and in the presence of the Committee, the superintendent closely questions all parties, with a view to ascertaining the exact cause and the adoption of preventive measures provided efficient ones have not already been adopted.

Weekly inspection reports made by the regular safety inspector are also scrutinized very thoroughly, and his recommendations fully considered with a view to their adoption, if found practical.

A complete record is kept of the proceedings, and later a typewritten copy is submitted to the superintendent for approval or disapproval of those recommendations for the installation of safety devices which have been found practical.

#### MINUTES OF SAFETY COMMITTEE MEETINGS

A copy of the minutes is sent to the safety engineer in charge of all safety work, who, compares or checks them against previous minutes and thus follows up each item in order not only to see that approved recommendations have been carried out, but also that those recommendations which did not meet with the approval of the superintendent, are looked into further as to their merits with a view to using them at other points under different conditions if found practical. If the rejected ones are really practical, he should use every means at his disposal to change the attitude of the superintendent who has disapproved their use



in his particular plant, by suggesting such alterations as appear necessary, provided they do not in any way reduce the efficiency of the device.

The general safety man always, the general superintendent occasionally, and on special occasions at the request of the general safety man, the president, or vice-president, look over the copies of the minutes of the safety committee meetings, and this fact being well advertised among the plants helps to impress the members of the committees with the importance of the work they are doing.

It has been found that increased interest and regular attendance can also be induced by passing out cigars at the monthly meetings of the foremen, and at one or more meetings a month at the other committees.

The question of awards to those making excellent records as safety committeemen has been discussed, and we find the method most popular among workers is a system of promotion for those showing the greatest efficiency in this line.

We can state most emphatically, that through the efforts of the various committees, in co-operation with the superintendents, and the General Safety Department, we have been able to show during the last twelve months a very large decrease in industrial accidents, with corresponding reduction in lost-time cases as well as cost experience; in fact, the results of this work have justified us in asking for and receiving a material reduction in our casualty coverage. This last, with its consequent reduction in operation cost as well as very evident reduction in labor turnover resulting from fewer accidents to efficient operators has helped to make the safety movement popular with the various superintendents heretofore giving it only half-hearted support; thus rendering many difficult problems easier to solve by the safety man.

The whole proposition thus simmers down to the fact that when given an opportunity for self expression through a membership on a safety committee which carries with it the knowledge that the boss recognizes his ability, not only to see and provide against danger to himself but also to his fellow workmen as well, the ordinary laborer or mechanic begins to expand; to realize his capacity, to think and do for himself, and ambition is awakened with the result that where before you had only a human machine, you now have an enthusiastic worker, imbued with the knowledge that he is an integral and necessary part of a great producing industry.

**CHAIRMAN DRUMMOND:** Very valuable points were brought out in Mr. Eaton's paper. Several have been more or less a subject of discussion. There must be some idea, slightly different than Mr. Eaton's way of running a safety organization, whether it would be necessary to have any other than the Foremen's Committee, or a combination of foremen and workmen, or whether the Supervisory Staff Committee would perhaps be the best form of carrying on safety organization work.

#### DISCUSSION

**MR. R. S. BONSB (Tanners' Council of U. S. A.):** By serving on a committee, the workmen come to realize their responsibility and overcome

that inherent instinct to "pass the buck" to the people over their heads. In other words, by getting the workmen on the committees, you are placing the responsibility on the individual. The thing I have found to be one of the best ways of getting really good suggestions is to have the workmen themselves sign their names to the report. Now, the effect of that is this: a man is going to be pretty careful when he signs his name. If he doesn't sign his name, he will make a lot of foolish and senseless suggestions, so if any of you fellows have committees, be sure to have the workmen sign their names to the reports and I think you will get very good results.

MR. G. A. BROWN (Cleveland Provision Co.): Mr. Eaton speaks of rewarding men with promotion. I would like to know what point he makes there.

MR. EATON: Our idea is that if a man shows efficiency in safety work, he is very apt to show efficiency in his own line of work and this is an added merit in his favor. When the foreman is considering promoting a man to Assistant Foreman or some other position, with an increase in pay, the man who is equally efficient with another man and has the added merit of being a good safety man, and has acted on a committee is given the preference.

MR. H. K. BATCHELDER (A. C. Lawrence Leather Co.): I want to outline the Safety Committee at our plant. We have committees composed of both foremen and workmen and we have committees covering main divisions and plants of our business. In addition to these committees, generally made up of three or four, foremen and workmen together, we have what we call a head of each unit, that is, we pick out a bright young man who acts as speaker and head for that unit, and after the inspections are made, that head of the unit gets together with the Inspection Committee and talks. Also, at the monthly safety meeting, the head of the unit is the spokesman for the Committee. We find that plan works out very satisfactorily.

MR. J. M. SANDEL (Swift & Co.): In connection with the organization of the Safety Committees, this point has not been brought out and I should like to hear some comments on what should be the personnel of the committee. Should it be all men who are superintendents and foremen, should it be some foremen and some workmen, a combination committee, so to speak, or should it be all workmen? In Swift and Company's various plants we have all three kinds, and we have made no attempt to have any standard form of safety organization, because we want to see which works out the best and the time which has elapsed since I have been with the company is not sufficient for us to determine which form of committee has given us the best results. I have heard a good many comments at this convention that the combination Foremen and Workmen's Committee has given the best results to other companies and I wonder if any one here has anything to offer along that line.

#### A PROGRESS COMMITTEE

CHAIRMAN DRUMMOND: The Wilson Company have what is commonly called a Safety Committee, but is really a Progress Committee. That

does not touch merely on safety matters, but heating, ventilation, lighting, efficiency, and almost everything you could ask a man to take an interest in. Safety, as a rule, where men don't have any greater responsibilities, gets monotonous, so we give them something else to think about. They are getting some mighty fine results. We have on these Progress Committees one man or woman from each department throughout the plant to meet once a month and discuss every subject in their minds. There is nobody from the Executive Board, except one representative from the Superintendent's office and myself. We generally arrange to hold the meetings as I get around to the different plants and we are getting results in this way, because we have given them something else to think about, except the one safety idea and I think something along those lines will work out well.

In our local "No Accidents Week," the last week in August, in the 153 different locations around the country, only four reported accidents in the entire time, so I think we are getting results. I think it is working out for us very satisfactorily. There must be some other thought, however, on the Safety Committee idea. I know some people feel rather strongly on not having the working men and others on them and some on combinations of workmen and foremen, but there must be a plan in each different plant that has proven successful and this is the place to discuss it.

MR. BROWN: It seems to me, by having the foremen on this Committee, that the workmen might fear to make suggestions because they might get in bad with the head of the department and I have seen it often result that way. I think, myself, that the Committee ought to be composed of the workmen in the different departments.

MR. EATON: Answering Mr. Sandel, I believe that a large plant requires two committees; a small plant does not. In a small plant, the Committee could be composed of foremen and workmen, but in a larger plant, especially where there are various nationalities working, you will get better results by allowing them to have their own workmen's committees, with their own foreman as a member, as it enables them to give free expression to anything they wish to discuss. I have found in one of our plants that we get very good results where we have the workmen's committee. In another plant we don't, on account of nationality. In one of our plants the Irishmen predominate; they want to talk and don't want any interference. In another plant the Polish predominate; they are very timid and don't have much to say, so conditions of nationality, as well as living conditions, have to be taken into consideration when figuring on the committees. You can't have a fixed rule for any committee at any particular plant or location. You have to take into consideration the number of people and the work they do, whether it is hazardous or not.

MR. SANDEL: Along the line of who should compose the personnel, I have heard quite a few persons make the statement that the foremen make the best members of committees; because when your educational work gets under way, it is necessary, first of all, to convert your foremen and, if the foremen in committee meeting determine any operating prac-

tices which make for safety and follow them out, your workmen will follow those practices when they see the foremen doing it. That is one argument that has almost converted me to foremen committees, and foremen committees are doing good work in various plants.

MR. W. F. McCLELLAN (Armour & Co.): I might add that we have a plant executive at our place and four divisions, one for athletics, one for safety, one for education, and one for Americanization. Under our Americanization Committee we went through the plant with a series of lectures on Safety, starting in February and not ending until July and we also took the Entertainment Committee on that and each afternoon, three days a week, in our various departments we have a safety meeting. We have a sign in advance, notifying them to this effect. In a large department, we would knock off ten minutes of twelve and would go in to the entertainment and put on our "Safety Talk," and I want to tell you we derived more good out of those meetings than all the committees we ever had on the plant, because the men came forward and told about various little things going on in the department that they would not tell the foremen about. We got in and cleaned them up.

CHAIRMAN DRUMMOND: I will ask Mr. Bonsib, Director, Industrial Bureau, National Tanners' Council, New York City, to read his paper on "Tanning Industry Hazards."

## HAZARDS IN THE TANNING INDUSTRY AND THEIR REMEDIES

R. S. BONSI, DIRECTOR, INDUSTRIAL BUREAU, TANNERS' COUNCIL OF THE  
U. S. A., NEW YORK CITY

### INTRODUCTION

Contrary to the general opinion, the converting of hides and skins into leather is not a hazardous occupation. Considering the large number of people engaged in this industry the number of serious injuries is surprisingly small. I say "surprisingly" because it has only been within the last few years that any concerted effort has been made along accident-prevention lines. Although the leather industry ranks as the fourth largest manufacturing industry in the United States and the tanning of hides and skins is man's oldest art, this industry has been backward in accident prevention only when compared to those industries which have become the most efficient along these lines. Since the establishment of the Industrial Bureau of the Tanner's Council there has been an active campaign in accident prevention propaganda and advice on the most effective methods of complying with the requirements of insurance companies and state factory laws. However, it must be remembered that the leather industry, which because of the character of its operations requires the employment of unskilled labor almost entirely, necessitated the use of immigrant labor of the lower type. This in itself imposed a hardship upon the industry because the employee is very largely unable

to understand instructions issued in the English language, besides being innately careless in his habits.

Hazards of the tanning industry may be divided into two general heads—occupational hazard and accident hazards.

*Occupational Hazards*—Occupational hazards will simply be touched upon lightly in this paper, as this is a subject more in the realm of the medical world than in that of the safety engineer. Taken as a whole, the health of tannery workers is remarkably good in spite of the fact that in some departments very large quantities of water are used in the process, but the workers are protected very well through the use of clogs, leather aprons, and other necessary clothing. These conditions are apt to cause rheumatic and catarrhal affections, also skin diseases, unless proper precautions are adopted. In the old days there was a little trouble among patent leather workers, due to naphtha and amyl-acetate poisoning, but with the improvement of methods, this hazard has been practically eliminated.

An occupational hazard, which has been given the greatest notoriety, but unjustly, is that of anthrax. Anthrax is a disease to which tanners who handle infected hides, especially the dry ones from China, Russia, and Asia Minor, are liable. With the enforced disinfection of hides by the Bureau of Animal Industry and precautions which are now being used by tanners of the above mentioned skins, anthrax is gradually disappearing.

*Accident Hazards*—Accident hazards are due to machinery, plant conditions, and the human element. Owing to the absence of detailed records, it is impossible to determine the frequency and severity of rates for the tanning industry but, generally speaking, unguarded or improperly guarded machinery is the cause of probably about 40 per cent of the accidents, the remainder being due to the human element.

#### PART I—UNGUARDED OR IMPROPERLY GUARDED MACHINERY

There are a great many machines, peculiar to tanning operations, which are not found outside a tannery. It will be impossible in the limited time allotted me to discuss all of these machines or to go very much into detail as to their operation or safeguarding, consequently only a few of the more important ones will be discussed.

##### SHERIDAN PRESS

This machine is considered one of the most efficient embossing and plating presses available, especially in the finishing of upholstering leather. It has, however caused some serious accidents.

Two types of guards have been developed which have proved satisfactory. As a basis for proper protection to the operator a fixed guard should be provided in front of the press plates on both of the "operating" and "take-up" sides of the machine, which will enable the operator who feeds the machine to insert the leather but prevent him from getting

his hands between the plates, and also allow the man on the other side to catch the emerging leather without being caught. This type of guard simply fences in the machine, making it impossible for the operator to get his hand caught. The principle above mentioned is now in practical operation in a number of large tanneries. A more convenient form of guard has recently been developed which has several advantages over the above mentioned type, although it is not entirely "fool-proof." The guard consists of a thrust frame attached to the rocker arm. This frame is so arranged that it descends slightly in advance of the plate of the press, so that if a man should have his hand in the press, this warning frame would come down upon his hand and enable him to withdraw it before the press descends.

There are two or three other types of guards which either force the frames away from the machine through the raising of a table or bar, or which require the operator to pull down a lever so arranged that both hands must be used. I do not believe that these types are effective, because in the first mentioned class the table or bar "gets broke." In other words, a large part of the men would rather take a chance of losing their hands than use the device; consequently, they disconnect it or bend it so that it will not operate as it should. In the other type (levers), both of the handles are usually tied together and operated by one hand, thus exposing the other hand to injury.

I would, therefore, most strongly recommend the fence type as first choice and the warning frame as second. The fence guard should be securely fastened to the machine, but arranged so that it can be readily opened up in case repairs to the press are required.

In connection with the prevention of accidents on presses, it is highly important that the attention of the operator be kept on his work. Therefore, there should be a strict rule that no one should talk to the operator. It is also important that he should not be suddenly approached from the rear but from the front so that he can sense the approach and not have his mind suddenly distracted. Flat sticks should also be provided to help straighten out the leather placed on the press and the operator required to use this stick.

#### REVOLVING DRUMS

Many serious accidents have been caused by revolving drums, due to the accidental starting of the drum and also due to the projecting lugs and other projections catching the employee's clothing and whirling him around the drum.

*Accidental Starting of Drums*—In the more up-to-date plants where individual motor drives or friction clutches have been adopted, this danger has been eliminated. In all other cases, however, the belt shifters should be provided with a lock to avoid any possibility of the belt shifting from loose to tight pulley and thus starting the machine. A prominent New England tanner has developed a spring lock which is purely automatic in its action and securely holds the shifter in a safe position, thus eliminating accidents which might occur if the operator were

depended upon to fasten the shifter in place by a wooden pin or rope. Some companies have adopted a lock arrangement in which the drum is securely fastened in position by means of a chain hooked to the wheel. This method has two disadvantages due to the fact that there is danger of the chain breaking if the wheel is started accidentally and also to the fact that the workman might neglect to attach the chain. Another tanner fastens his drums by means of a lock, consisting of a hand screw and sliding block. Whenever the drum is stopped and is to remain stationary while the workmen are placing and removing the hides, the hand screw is turned which forces the sliding block against the end of the staves. This is, I believe, more safe than the chain arrangement, but it is also subject to the liability of the workmen forgetting to make use of it.

A belt tightening arrangement has been adopted in several tanning districts in place of belt shifters. The belt is allowed to run loose when the drums are being filled or emptied. When it is desired to start them in motion, the belt is tightened by turning a wheel which moves out the belt by a ratchet and pinion arrangement. This is apparently a very successful method.

To guard against the possibility of a loose pulley "seizing" from lack of lubrication or other causes and turning the drum, a mechanical lock should be provided. There is practically no danger, however, of pulleys "seizing" if the loose pulleys are provided with bronze bushings and oiled every morning. When bronze bushings get dry, they do not stick, but give out squeaky noises whereas the cast-iron bushings stick without giving any warning.

#### UNHAIRING AND FLESHING MACHINES

Improperly protected unhairing and fleshing machines have occasionally caused the loss of hands, and arms. Probably the best method of guarding this machine is by means of a wire mesh guard. The cylindrical knives of the machine operate downward and remain clamped to the bolster, holding the hide in place while the revolving cylinder makes its return trip upward and automatically releases the gate at the front of the machine and allows the same to move upward, permitting the hide to be removed and a new hide to be placed on the bolster. Fine mesh wire should also be placed over the top of the gate to prevent the operator from reaching over the gate to smooth out the hide while the machine is in operation. The gears at the side of the machine should also be protected with a standard angle iron and wire mesh guard.

#### SHAVING MACHINES

This type of machine frequently causes the loss of tips of fingers, but it is not as serious a hazard as previously discussed machines. One of the simplest guards consists of a curved piece of heavy sheet metal attached on either side of the cylinder wheel hood in front of the rubber bolster. This prevents the operator's hands from being drawn into the

revolving cylinder from the side of the machine. A  $\frac{1}{4}$ -inch bar should also be placed over the bolster as an additional protection against the hands of the operator being drawn into the revolving cylinder.

#### STONING AND GLAZING JACKS

Accidents on these machines are rare. There are several types of guards, but they interfere with production. The type which has proven most popular is a finger guard which has a "D" shaped attachment set as close to the bed of the machine as will make it practicable to operate. This guard may be adjusted to various heights, but should not be higher than  $1\frac{1}{4}$  inches from the bed of the machine.

#### STAKING MACHINES

Accidents on this type of machine are also rare. There is no danger so long as the operator keeps his mind on the work and attends strictly to business. I know of no guard that could be installed which would not interfere with production and which might also increase the hazard rather than eliminate it. It is advisable to equip these machines with a rotary belt shift to prevent the accidental starting or stopping of the machine.

#### SPLITTING MACHINES

There have been a few accidents on splitting machines, especially of the belt or band knife type, due to the operator coming into accidental contact with the blade of the knife. Consequently, the area between the rolls and the pulley should be protected by wire mesh, both at the top and bottom.

#### MISCELLANEOUS MACHINES

There are several types of machines used in tanneries, such as rolls, brushing wheels, and buffing wheels which, although not particularly dangerous, may be effectively guarded by special types of guard. However, it will be impossible to go into these in detail, due to lack of time.

### PART II. PLANT CONDITIONS

#### PROPER LIGHTING

It has been proven conclusively that there is a direct relation between light, safety, and efficiency. In the older plants comparatively little attention has been paid to proper lighting, but this subject has been fully recognized in the construction of the newer plants. Great care should be taken in placing lights, or equipping them with shades, so that there will be no glare or chance of light shining directly in the eyes of the workmen. Glare not only interferes with the efficiency of the workmen, but is apt to be the cause of serious accidents.



## FLOORS AND FLOORING

Due to the great amount of trucking in this industry, thereby requiring the full maintenance of floors, poorly maintained floors appear to be one of the inherent evils in the tanning industry as there seems to be a tendency not to pay any attention to this subject until the floor gets into a very poor condition. In the construction of the newer plants, more attention has been paid to proper drainage systems and the selection of floor materials, so that the tripping and stumbling hazard has been greatly reduced. This is a very vital subject which unfortunately cannot be discussed more in detail on account of limited time.

## STAIRS AND STAIRWAYS

Falling downstairs has been the cause of some serious accidents which could have been prevented by proper construction, proper lighting, and the installation of hand-rails. Since the greater proportion of people are right-handed and since there is more danger of injury to people falling downstairs than there is of people falling up, I believe that the hand-rail should be placed on the righthand side going down. When a person stumbles or falls, he instinctively throws out his right hand, and, when there is no hand-rail to catch him, he falls and is injured. These hand-rails should be built to comply with the standards adopted by the Compensation Board.

## PART III. PERSONAL CONSIDERATIONS

## CLOTHING

As a whole tannery employees are very careless about their clothing while on the job. A study of statistics shows that ragged sleeve ends, loose ties, and open jackets have again and again wound around a part in motion and frightful, sometimes fatal, injuries have resulted. The union type of overalls is the safest to wear, but if these are not available, then the overall coat or jacket should be worn inside the trousers. Under no consideration should loose jackets or torn clothing be worn.

Whenever women are employed for work on machines, they should be instructed to wear some type of overalls. This is not only a life-saver, but will add greatly to their working efficiency. Women and men with long hair should wear a cap or some other means for keeping their hair from being caught by moving machinery. Many fingers have been lost on account of rings catching on projecting parts of machinery, and rings should, therefore, be prohibited. One of the most glaring instances of improper clothing is the shoes worn by men and women. Some of these shoes are simply a mass of tatters, which are apt to get caught on projecting corners, causing the employee to be thrown and more or less seriously injured. The wearing of improper shoes is especially dangerous in the tacking room where there is danger of stepping on tacks which may cause wounds leading to serious infections, lock-jaw, or even the loss of a leg.

**HANDLING ACIDS**

Acid burns are injuries which commonly occur and are doubtless due to the men not being properly warned of the dangers of the acid, but clinator reduces the acid-burn hazard and also greatly facilitates the work.

**HANDLING LIME**

Men working in and about the lime house or lime vats get burns, which are more or less painful, and, unless proper treatment is given, particularly to improper methods of handling. The use of a carboy in are apt to become infected. Most tanneries provide rubber gloves for their employees but sometimes the lime gets down into the gloves and causes trouble. Lime burns may positively be prevented by the following method:

Before starting to work have the men cover their hands and wrists with a half and half mixture of fish oil and pine tar, and then slip on a pair of canvas gloves, covered with the same mixture. Fish oil may be used in removing the tar from the hands, although kerosene is equally effective.

**PROJECTING NAILS**

Stepping on nails is one of the common causes of injuries around any industrial plant. There is a tendency to swear at the nail and kick the board aside. The wound seems to be apparently an insignificant one, but it is often followed with serious results. Every man should be made to realize the importance of going immediately to the First-Aid room or plant physician and have his injury given prompt and proper attention. Projecting nails around the tops of kegs and boxes cause more injuries than stepping on nails. A rule should be adopted compelling the person opening any keg or box either to remove the nails or bend them down in a horizontal position.

**CONSTRUCTION AND PLACEMENT OF LADDERS**

The construction and placement of ladders is an important consideration as there have been several injuries due to ladders breaking or falling when they are used. In the first place, ladders should be built strong enough to support more than an average man without breaking or the rungs coming off. They should also be properly placed so that there would be no danger of slipping or falling down. The men should be instructed always to face the ladder when ascending or descending, also not to go up or down the ladder without the free use of both hands.

**NEGLECTING MINOR INJURIES**

Infections cause one of the most painful injuries which the average tannery employee experiences. Prompt attention at the time of the injury will positively eliminate any chance of infection. Every man

should be made to realize that no matter how slight the injury, he should have it attended to promptly. I believe that every plant should have an experienced First-Aid man right on the job; and, in case the number of employees is sufficient, a capable doctor should be in charge of a well equipped First-Aid Room.

#### CONCLUSION

In this rather brief survey of a very broad subject, it has not been possible to go very much into detail. An effort, however, has been made to give a general idea of some of the main hazards in the tanning industry and methods whereby they may be remedied or eliminated. The Industrial Bureau of the Tanners' Council is carrying on an active, accident-prevention campaign by means of a weekly bulletin, which we have called a "Safetygram", in which the methods of eliminating various hazards is gone into in minute detail, in most cases photographs and drawings of the most effective devices being given, also by plant inspections and illustrated lectures. Interest in this subject is rapidly growing, and I am happy to state that the tanning industry is gradually being made one of the least hazardous of the great manufacturing industries of this country.

CHAIRMAN DRUMMOND: I am sure that Mr. Bonsib has covered the matter of the tanning industry very thoroughly, but I don't think we should close the subject without hearing further from some other men. I am going to ask Mr. Hoffman, of the Michigan Tanning and Extract Company, to say something in connection with the tanning industry.

#### DISCUSSION

MR. B. HOFFMAN: I think Mr. Bonsib has truly said that in the tanning industry the number of accidents is small. In our plants practically nothing was done until this last year. In fact, the real organization is even less than a year old. I listened with some interest to the discussion here about the types of committees at these plants. The time elapsed has not yet been sufficient to say whether we should have an all foremen's committee or a mixed committee. I am under the impression at the present time, for the average tanner, the type we have, that the mixed committee will get the best results.

In regard to the matter of safety devices, our machines, most of them, are not such complicated machines and the matter of safety devices is not so hard to take care of, but in practically every case they are different and I believe it is entirely a matter of local concern as to the type of device that should be used. In this connection, our safety committees are doing some very good work and I am pleased to say that many of our best suggestions have come from the workmen and not from the foremen.

CHAIRMAN DRUMMOND: I feel quite sure that Mr. Batchelder will have something to say on the hazards of the tanning industry.

MR. BATCHELDER: I might say, if you want a word about our work in Peabody, that we have thoroughly guarded all machinery, belting, and

every hazard that we could find and we are looking hard for hazards all the time, through our various safety committees. We go into the safety work, I think, in a whole-hearted way. We have a monthly meeting of our foremen. We have a dinner and light up the cigars and then go to it. We have a report from the head of each Safety Unit on the accidents, which are thoroughly discussed, to take up every means possible to prevent similar accidents. We have meetings at other periods of the head of our Safety Units. We put out propaganda in our pay envelopes, through our factory magazines, the A. C. L. and through bulletins and various other ways we try to keep the safety idea constantly before our workmen. I think we have accomplished good results in reducing accidents. I think on the embossing machine alone, previous to the time we went into the safety work, there were a good many accidents. We have fixed the table so the man can't reach under the plate if he wants to and since that time we have not had one accident. We have a living example of those accidents in our plant. One man has both hands off and I think the fact that we have eliminated the accidents on that machine alone will repay us for our work. I will be glad to answer any question.

CHAIRMAN DRUMMOND: The purpose, Mr. Batchelder, of getting additional talks would be to see if we can't arouse some discussion on some point, something a little different from the idea expressed before. Our entire idea of gathering here was to get new ideas. I am going to ask Mr. Charles Coker of the National Calfskin Company, Peabody, Mass., to speak to us.

MR. C. G. F. COKER: I don't know that I can add anything. Our company is an allied industry and Mr. Batchelder has covered it pretty well on the safety work. I felt, while sitting here, that in connection with this sectional conference we are like the tail of the cow, we seem to be tacked on the packers' industry, although Mr. Bonsib told us it was the fourth largest manufacturing industry in the country.

However, I think the line of safety work that we are pursuing has accomplished great results. We have, I might say, just one thing in connection with the prevention of lime burns which was spoken of and the solution which was mentioned as a preventive. We have tried out that solution and are following out the suggestion in the pamphlet issued by the United States Department of Labor, and although undoubtedly it is a help, we have found that it is a hindrance in the man's work, for the reason that the solution makes the inside of his gloves slippery and he cannot handle the tools necessary to perform the operation in the lime house. I would like to have Mr. Bonsib, or perhaps some other gentleman, tell us how that can be overcome.

MR. BONSBIB: In answering that question, it is very important in applying this mixture to rub it thoroughly into the hands. I should have mentioned in my paper that the great trouble is that they plaster it on too thickly—the whole thing is to have the epidermis thoroughly saturated with the half and half mixture. If you have it too thick, there will be slipping, but if you get a good creamy consistency of your mixture, rub it into the hands and put the gloves over, it will be all right. We

say half and half, but it all depends on the thickness of the liquid you use. However, if you have a great excess, there will be slipping, but the idea is to saturate the epidermis with this mixture and I know it will prevent lime burns. I know a man working in the lime house for fifteen years and his hands are as soft as anybody's and, where it has been used that way, I have never heard any complaint of it interfering with the efficiency of the man. As I say, I have been in 299 tanneries and I would be glad to answer any questions along this line.

#### TANNING INDUSTRY IN THE HAZARDOUS CLASS

MR. BATCHELDER: I would like to ask Mr. Bonsib if I understood him to say that the tanning industry was not hazardous.

MR. BONSI: Not particularly.

MR. BATCHELDER: I have not known so many different industries, but it seems to me that in the tanning industries there are a good many machines, that is, more than in any of the industries I have visited. I think we have in our twelve plants twelve hundred machines and, of course, that in itself seems to me rather hazardous.

MR. BONSI: When I say hazardous, I mean compared to other manufacturing industries. That is a comparative statement. Of course, any industry that has machines is more hazardous than one that does not have machines, but the common impression is that the tanning industry is especially hazardous. In fact, our insurance brethren inform us it is among the hazardous industries. However, when compared with other industries, it is not particularly hazardous, although we do use a large number of machines, and, as I point out in my paper, we have a number of machines not used in any other industry. I would like to have the Chairman call on Mr. Pope.

MR. POPE: I have only been with the Pfister Vogel Company for about two years and previous to going there I did not dig into past history in reference to the tanning industry and why it should be classed as it was classed by the insurance companies as an extra hazardous occupation. I did not come here with any definite figures or percentage, but I might say that we employ in the Pfister Vogel plant in Milwaukee about twenty-five hundred men and, for the year 1920, up to the present time, we have had nine lost time accidents, that is, lost time of over a week. After the beginning of the eighth day we count it a compensation case and, up to the present time, of the twenty-five hundred employees, we have had nine lost time accidents, and the largest limit of time has been seven weeks. That occurred from a bad scald from hot water. As far as our machinery accidents are concerned, operating accidents, I will simply give you the figures of the Industrial Commission, compared to the metal trades. We had 33½ per cent as many machine accidents as the metal trades had, regardless of the fact that we were classed as an extra-hazardous occupation. Our experience has been such that a year ago we put into our plant group insurance and we had some trouble. Two of the largest and oldest companies in the country positively refused to take us. However, we were accepted at a very moderate rate by one of the large insurance

companies of the country and our experience was such that at the expiration of the first year we got a decided decrease in the cost of insurance, based on their experience, which of course is about the most reliable authority we have.

I might offer a suggestion to Mr. Hoffman on his Committee proposition. I don't know whether you can take advantage of this idea the way we have but we have found it very satisfactory. We have four plants in the city and in appointing the Safety, Sanitation, and Inspection Committee, I take three foremen from the three plants and they inspect the fourth, and the next week the fourth man, with two of the others, inspects the plant of the remaining man, and so on. This has brought very good results, as there is a rivalry between the fellows and one says, "That fellow jacked us up pretty hard this week. If there is anything wrong in his plant next week, we will get it," and they do get it. If there is anything loose around the place, an unguarded machine or insanitary condition, they find it. Those reports are handed in to me and I copy them and send a copy to each foreman and the superintendent of the plant inspected by the other three. It seems to me if you are not situated where you can have plant compete with plant, you can have department compete with department. We change our Inspection Committee every week—we don't have the same men on it at all—it is not a permanent position. We make our selection of different foremen, because I find that where one foreman will find some one particular fault, another will miss it, and the next month he goes around the other fellow will find the one the other fellow missed the previous month and, in that way, I think we get very good service.

CHAIRMAN DRUMMOND: I think your system is a rather good idea, for the reason that (all the insurance men in the audience will bear me out in this) some men can find set screws and nothing else and another a defective elevator, so by changing your men from time to time you are going to get better results.

#### ANTHRAX IN TANNERIES

MR. POPE: Regarding the hazardous part of it, in twelve years' experience with twenty-five hundred men, we have not had one case of anthrax and our Chicago plant in twelve years had only one case of it.

MR. BONSIE: May I say a word? Somehow or other, as soon as a man gets a little sore around a tannery he goes to a doctor and it is immediately anthrax. I have talked to a large number of physicians regarding how to differentiate anthrax. At a certain stage it looks very much like carbuncle, but if you press the pustule of a carbuncle it is very painful. Pressure on the pustule of anthrax is absolutely painless. It is a very simple way to tell. We are not denying that we have it. We have a few cases, but it is rare. It is not a common thing in the tanning industry any more, but it is something I wish the doctors would take the time to study up on so they can tell a case and not call up the editor of the town paper and say, "We found a case of anthrax in such and such a tannery." That is a good front page story, but if the doctors

would take the trouble to tell the difference it would help matters. The disease is not so hard to differentiate and it should be a proven case. Anthrax kills a person in three or four days, and they should be able to tell exactly what it is and not get the industry in bad when it is a case of lack of diagnosis on the part of the physician.

MR. COKER: We have never had a case of anthrax in twenty years and we have handled a good many of the skins about which Mr. Bonsib spoke, skins coming from the other side, so I think it is largely, as Mr. Bonsib has indicated, a case of bugaboo on the part of some people, although the disease is a real disease, but it is not so hazardous in the tanning industry as some people would have you believe. I wish that the gentlemen would tell us what experience they have had with their lime burns.

#### LIME BURNS

MR. POPE: We don't take any extra precaution in guarding the lime burns, with the exception of rubber gloves and insist on the men wearing them. We don't use the fish oil that Mr. Bonsib speaks about, for the reason that you can tell the man to take the time to rub it on his hands and he won't do it. If you rub it in for him and pay him for the time, he will have it done, otherwise he won't. However, we have a very strict rule that a man absolutely must report to his foreman the moment he has a sore of any kind and when it has the appearance of a burn, we send him to the first-aid house and the record is kept, and he comes back every day. If he does not, the nurse calls for him. That is the only thing to do.

CHAIRMAN DRUMMOND: Mr. Batchelder is going to read his paper tomorrow on "Burns and Scalds" and I think we are stealing some of his thunder.

#### DISCUSSION REGARDING A JOINT ORGANIZATION OF PACKERS AND TANNERS

Mr. Coker brought up a question a while back about the tanners being more or less the tail of the packers' cow. I don't think that is quite the right position. We had intended to put it to the members of the organization at this time whether or not we could make a joint section, that is, a tanners' and packers' section, rather than have the tanners, as he expressed it, as the tail of the packers' section and I think, as long as the question came up, we should have some discussion on that as to whether or not it is advisable, whether you feel there is any value in joining up the two. I rather feel we have too many things in common not to derive much benefit from each other and it would be a desirable proposition, but I am going to ask you to give it a free discussion. I hesitated in appointing a Nominating Committee, because I did not know whether it was the desire of the members to combine and, therefore, we would want a representation from both sections on the official staff, so I am going to ask Mr. Bonsib to start the discussion.

MR. BONSI: What I say is as an individual, not as a representative of the Tanners' Council, because I have no authority to speak for them as an organization. For some reason or other, the National Safety Council has not been able to get a very large percentage of our members into the

Council. The tanning industry is in its infancy and, if we could get every one of our members to become members of the Safety Council, the work of the Industrial Bureau would be wonderfully facilitated. At the present time, some of our smaller members are just beginning to realize that safety is a good thing, as a paying proposition. It will take a little time to sell the idea to them, but they are beginning to realize it, but at the present time, under the present circumstances, it might be a good idea to form a joint organization of the packers and tanners, and later on, when safety becomes a big factor in the tanning industry, as it should be, we can divorce the packers' section and have a little section of our own; but personally I would be very glad to see it come about, although I am talking as an individual and not as an industry.

CHAIRMAN DRUMMOND: I would like to have some more discussion.

MR. GEORGE LONG (Cudahy Brothers Co., Cudahy, Wis.): Some time ago I was asked to join a certain organization and I feel that my company ought to pay my expenses in joining that organization, so I went to them and the first question they asked me was, "Have they got a tanners' section?" and that same question will be asked here. If you make it packers' and tanners', at least you put our name up there, it will be much easier for you to get the co-operation of the tanners all over the country. They will begin to feel that they are being represented and there is some section in which they can bring up their troubles and some section in which their particular problems can receive special attention. I believe there is hardly enough representation from the tanners alone at the present time to make a good section and, so far as I am concerned, I would feel well satisfied to be tied up with the packers at the present time, but I certainly want to see that the name "Tanners" is added.

CHAIRMAN DRUMMOND: How do you feel, Mr. Batchelder?

MR. BATCHELDER: It is my personal opinion that if the tanners were represented by name, more tanners would attend the national conferences and, of course, the value of attending a conference is in meeting members of your own trade and getting together and talking over things and I think if the tanners were represented by name they would be more agreeable to sending some one to the conference, thinking they would get more good from it. I am heartily in favor of seeing the tanners represented. I think it would help both the packers and tanners.

CHAIRMAN DRUMMOND: Mr. Coker started this. How do you feel about it?

MR. COKER: I was wondering how many things in common the tanners and packers did have. The tanners handle the product which a number of years ago was supposed to be a by-product of the packers. At present the tanners' industry is not sufficiently represented to have a section of its own and I think the combination of the two trades is a grand idea. You might go a step farther, although I don't know whether it would be desirable or not, and consider the boot and shoe industry, which is considered an allied industry, to put us well on our feet. Perhaps that is not to be considered at this time, but the boot and shoe industry should be represented in the National Safety Council some way or other and I think it is not now.



CHAIRMAN DRUMMOND: As I see it, it is a constructive proposition entirely. The boot and shoe people are not represented, the packers and tanners are in small numbers. It seems to me we have to do something constructive and get the thing started. If necessary later, there could be a Boot and Shoe and Tanners' Section.

MR. COKER: I simply brought it up as a possibility of the future.

MR. BONSBIB: There are a large number of industries that work up the leather. On the other hand, you are complicating your program and it would be pretty hard to get something where the conditions are common. That is another thing we want to look out for, to get something where the interests are partly allied. For example, this morning I imagine the packers are bored while we are talking about tanning hazards and some of the tanners will be bored when talking about the hazards peculiar to the packers' industry. That is one of the things we want to look out for.

CHAIRMAN DRUMMOND: I think it is a mistake at this time to take in too much of the leather section. That should be future development. I don't think anybody has been bored by listening to things that are not closely allied to his own trade, because after all 98 per cent of the accidents that happen in one trade are common in another trade. You will notice I have been very careful to call on tanners. Now, I am going to ask Mr. Eaton his idea.

MR. EATON: As I am really representing the food canning industry, I have not very much to say. I think the larger we get this section, even though we take in the leather industry as a whole, will produce more interest and we will have more members coming in. As it is, we are very small and the more we get the better off we shall be. We are bound to get good information no matter who talks. I was listening to the A. B. C. and the Round Table discussions which had nothing to do with packing, but I got a lot of stuff I am taking back with me.

CHAIRMAN DRUMMOND: How do you feel about it, Mr. Brown?

MR. BROWN: I think the idea is a very good one. I think the tanners will in a short time have a session of their own and I think the general knowledge we shall all derive will be beneficial to all.

MR. SANDEL: I welcome the tanners into this section, as long as they wish to stay, and I think that this would be an opportunity for the tanners to boost their membership in the National Safety Council which Mr. Bonsib says he would like to see. There are some hazards common to them both and while Mr. Bonsib was speaking this morning there occurred to me one which is common to both the tanning and the packing business, that is, it applies to the packing business just in part. I refer to the method used in protecting the vats where the skins are soaked in the tanning liquor. We have the same proposition in our glue houses and so far our experience has been very good. The vats in our houses are not very deep, but we have found that the men would be injured more by the falls than the lime and I wonder whether the tanners could give us any suggestion or information whether it is necessary to take special precaution.

CHAIRMAN DRUMMOND: We have not heard from Mr. Long, I wonder how he feels on the proposition of the joint section.

MR. LONG: We are not very well represented here, considering the number of packers in the country and I believe personally that a joint section would be the thing, until it grew to a point where segregation would be the proper thing.

In answer to Mr. Sandel's point, there are many other open vats besides the glue vats, particularly in older plants where there are slush vats. They are very dangerous things and most houses have the old vats, where they discharge from the side of the tank and it is necessary to lift the platform off the top and discharge the tank, and the men don't take the necessary steps to protect themselves.

CHAIRMAN DRUMMOND: How do you feel, Mr. McClellan?

MR. MCCLELLAN: I am heartily in favor of having the tanners come with us. When we started here a year ago, we had a very small meeting, but today I think we have a few more than we had last year. As has been expressed, there were only a few of each, but we ought to stay together until we get started and then we can divorce one another.

I highly enjoyed Mr. Bonsib's paper, because lots of things really struck home. We handle lime and have machines and I think both of us are in common on the one object.

CHAIRMAN DRUMMOND: Of course, you realize that in order to put this over as a Packers and Tanners' Section, the entire matter will have to be referred to the Executive Board of the National Safety Council, but I think we have thoroughly agreed that the proper thing to do would be to make a combination of the two sections and join them together and they will come through and give us their support on boosting the thing, but it seems to me that we will have to do a lot more work in the coming year than in the past, in order to make the section as it should be. With the large number of each in the country, there is no reason why we should not grow and I believe the time has arrived for some one to make a motion that the combination go through, so we will put it before them officially with the approval of everybody present.

NAME CHANGED TO PACKERS' AND TANNERS' SECTION

(The motion was made by Mr. Coker, seconded by Mr. Sandel, and carried unanimously, that the name of this section be changed to the "Tanners' and Packers' Section".)

CHAIRMAN DRUMMOND: Now that the benediction has been placed on the Section of the Packers and Tanners, it will be in order for the Chairman to appoint the Nominating Committee. Mr. Coker was the man who started the discussion, so I will place him on the Nominating Committee as Chairman.

MR. COKER: I should prefer that a packers' representative be appointed. I would rather give way to one of them.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN DRUMMOND: In view of Mr. Coker's declination of the Chairmanship of the Nominating Committee and his suggestion that we appoint a representative of the packers, I will appoint Mr. Brown, of the Cleveland Provision Company, as Chairman of the Nominating Com-

mittee. I will appoint Mr. Coker, of the National Calfskin Company, and Mr. Long, of Cudahy Brothers, as the other members.

The Chairman has been given the pleasure of speaking on the "Hazards of Conveying Machinery."

#### HAZARDS OF CONVEYING MACHINERY

A. B. DRUMMOND, MANAGER, SAFETY BUREAU, WILSON AND COMPANY,  
CHICAGO

Without conveying and hosting machinery, we should still be sleeping on the banks of the Nile. Without elevators, for instance, the factories of the present day could not be more than two stories in height and, without hoisting and conveying machinery, many of the things we use from day to day would be absolutely impossible to get hold of.

In the main, the conveying machinery hazard is due to mechanical defects. I mean by that they are not placed properly; or the engineering department has not considered the accident hazards in placing box hoists, chutes, barrel hoists, or other conveying and elevating machinery. They are not given the proper consideration and I think it is necessary for a man to consult, from time to time, with his engineering department to see that everything is considered from a safety standpoint. There is such a varied amount of conveying machinery it would be rather impossible to go into the hazards of all, but the one most common is the hazard in connection with elevators, something we have in all our places, regardless of whether we are meat packers or any other line of manufacture or industry.

It is true that very few accidents happen on elevators due to mechanical defects which can be exposed by very careful inspection by competent people. In our plant we have a series of inspections made, at least one every two weeks, by a different man, and a report in detail must be filled out covering all possible mechanical defects. The most common source of accidents on elevators is the gate. In the packing industry, it is almost impossible to get a gate which will fit all the situations that are peculiar to the packing industry. The semi-automatic types of gate in use on most elevators, where feasible, can never be kept in such shape that they are truly a safe proposition. This is the experience of those of us in the packing game and I think obtains in most industries. I have not prepared a paper on this, and I am merely saying some things you people may not agree with, in the hope that it will arouse a discussion.

You undoubtedly have all been solicited from time to time by men who have gates supposed to be accident-proof, to be applied by mechanical interlock, or electric, or electric and mechanical, but due to the conditions in most packing houses we have found that most of them are not workable. I am not going to state my opinion on this, with the hope that it will arouse a further discussion.

#### DISCUSSION

MR. SANDEL: I have been searching hard for some kind of mechanical interlock, which will make safe the horizontal opening door and I have

not found anything which shows any real results. It is only lately that I have been able to get on the track of an installation with an interlock used in connection with the type of door or gate where half of the door is above the hatchway opening and half below. I have not seen the details of that yet, but if anybody here can give me any information on a mechanical interlock, which can be used on the horizontal opening door, I will be mighty glad to have it.

CHAIRMAN DRUMMOND: It is a really vital subject and I would like to hear it discussed all the way through, because we will all agree that most of the accidents are due to so-called gate accidents, and I know in the packing industry, due to the almost general use of the friction hoist elevator in the enclosed hatchway, some device is necessary and I feel that so many people have had experience on those things that we ought to get a discussion valuable to all of us. Can you give us some idea, Mr. McClellan?

MR. McCLELLAN: I cannot say that I can give you any ideas on friction elevators. We can't overcome these ourselves. We placed an order a short time ago with the Otis people for a new gate they have and when we get it in Mr. Sandel can come over and look at it.

CHAIRMAN DRUMMOND: Mr. Bonsib, you must have some elevator gates or other elevator apparatus in mind.

MR. BONSI: They have few gates in the tanneries, with the exception of the very large ones. Most of the smaller tanneries are in buildings not more than two or three stories high. In a lot of those places chutes are used, in conveying things downward. As far as I know, we have not had so very many accidents through elevators, nor have we developed any particular gate, other than that ordinarily used. It isn't as in the packing industry, where you have to go through areas—we don't have that.

CHAIRMAN DRUMMOND: We are talking both from the packers' and tanner's viewpoint, rather than just the packers'. It is true that the elevator accident is not the most common one in any of our plants, but it is a costly one and I know we have all given a lot of thought to it. I am sure there must be a little more discussion on this to make it worth while. Is Mr. Duncan with us?

MR. DUNCAN: Well, it depends how you run your elevator. We have packing houses where there is an interlock. The door has to be closed before you can move the elevator. No one can interfere with the elevator at all—you can't open the door. I know you must be familiar with that kind of lock.

MR. BATCHELDER: In regard to elevator accidents, I have made out a good many reports of elevator accidents and the majority of them read like this: "The man was riding up on the elevator and caught his foot between the elevator and the frame of the elevator." We have had a good many accidents that happened in just that manner. We have had many since the time that help was changed from American, or English-speaking help, to the foreign-speaking help from abroad, several years ago. We were running fine at one time and a man was caught in this manner and caught his legs and we had to chop out the frame work

of the elevator well and it resulted in a fatal accident. Up to that time there was nothing that we could think of that would prevent such an accident, but our Master Mechanic, Mr. Ballentine, (I think he is here now) thought of the very simple idea of hinging a part of the floor, cutting away and setting in a heavy plank, so when the elevator came up, if a man's foot stuck out the side, it would hit the plank and the plank would go up over it and the man would not be crushed. I think that has worked out very satisfactorily.

MR. BALLENTINE: I can say we have never had an accident of any kind on the elevators equipped that way. It does not open the space between the car and the floor; it simply requires a plank hinge, ten to twelve inches wide, supported by brackets outside the platform of the car. The man can sit in front of the car and go up without any injury.

MR. BATCHELDER: If a man is going up the elevator and this is the floor and he sticks one foot over and comes up to the next floor, he is going to get caught, but instead of coming against the edge, he comes against this hinged plank and this hinged plank goes up and lets him by.

MR. W. W. WILLIAMS (Ocean Accident and Guarantee Corporation, Peoria, Ill.): We have seen the device and it works very well.

CHAIRMAN DRUMMOND: The time for adjournment is twelve o'clock. If there is anything still fresh in your minds, or if you feel that more information is desired, we still have a few minutes to bring that out.

MR. G. S. BIXBY (Mechanical Mfg. Co.): We are not members but are manufacturers of machinery, of course some tanning machinery, so we are taking an interest. We feel that this safety movement affects us as well as it does you. I want to ask Mr. Bonsib if the photographs and cuts he spoke of having on file are available.

MR. BONSI: Did I speak of having any on file? The only way of getting anything from the Tanners' Council would be to be a member or make a special request to the Board of Directors, stating the reason. I have no authority whatever. You might take this up with the Directors.

MR. BIXBY: I want to say that if anything comes up in the way of safety appliances that can be applied on the machine when being built and we can co-operate with you, we will be glad to do so, if you will only put it to us.

MR. BONSI: I might say there is a book in which there are a large number of drawings which I think you can get from the Department of Labor if you will apply to them.

CHAIRMAN DRUMMOND: I am rather glad that Mr. Bixby spoke as he did, because I think the Nominating Committee should arrange for some one whose duty it would be to communicate with the manufacturers and tanning industry, to the end that they may incorporate any ideas at the time the machine is manufactured. All of us have been more or less lax in not seeing that our Engineering Department bought guarded machinery as we should do.

MR. BIXBY: May I add a word to bring it out as strong as I can? We have followed this policy for the past three or four years and, as you stated, it does add to the cost of machinery, but not in proportion to

what you have to do in the end, and it is hard to make a Purchasing Agent realize this, unless it is particularly brought to his attention.

CHAIRMAN DRUMMOND: Is there anything further for discussion? If not, the meeting is adjourned until tomorrow morning at 9:30.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

**T**HE meeting convened at 9:30 a. m., Mr. A. B. Drummond presiding.

CHAIRMAN DRUMMOND: Mr. Sanford has been kind enough to come to give us his views on fire protection, and I think we ought to give him the courtesy of letting him start in and put on his show and not detain him any longer than necessary.

#### FIRE DRILLS AND FIRE ALARM AND DRILL SIGNAL SYSTEMS

G. E. SANFORD, GENERAL ELECTRIC COMPANY, LYNN, MASS.

In considering the subject of fire drills and fire alarm and drill signal systems it must be assumed that you represent industries, some of which occupy one or more buildings, and some of which occupy only a portion of a single building. The employer with a whole building under his control can easily develop a drill system, but it is also highly advisable for the man who has a small factory in a portion of a building only to be able properly to drill his employees to leave without confusion, in case of emergency, as he has no way of controlling the situation in the other parts of the same building.

##### SIGNAL SYSTEMS

With these two factors in mind it is necessary to consider more than one type of signalling system. The system best adapted to the building occupied by more than one manufacturer is often used by the General Electric Company in large buildings, but it is complicated and in some places too elaborate considering the fire hazard and the building construction. For example, a one-floor factory building, particularly a machine shop or foundry, is very easy to leave at time of emergency and although a fire signal system is desirable, fire exit drills seem to me to be unnecessary, especially where the bulk of the employees are males.

The practice commonly used where a manufacturer occupies the entire building is a signal which sounds throughout the entire building and all employees of the building leave at once. Where more than one manufacturer occupies the same building, such a signal while highly desirable in the case of fire is not desirable in case of fire exit drills, as no individual manufacturer would sound the fire signal without incurring the enmity of other occupants of the building and if all of the manu-

facturers occupying the building agreed upon some one time to hold the drill, the chances are that the bulk of the employees would know ahead of time that a drill was to be given at such and such a time. Furthermore where the responsibility is divided the fire drill is very liable to become slighted.

The General Electric Company have had a signal system in use in their plant at Newark, N. J., for the past few years and which has proven so satisfactory that it is being adopted in other plants of the Company. This signal system is there used in a plant of about five buildings, but is equally adapted to a building containing a number of factories, as it will allow any manufacturer to drill his people without disturbing any others, but in the case of actual fire will sound complete alarm throughout the building. This signal system was developed by engineers of the General Electric Company in conjunction with engineers of two fire alarm signal system companies. This system has a box on each floor of each building. The first figure of the number indicates the building number, the second number indicates the floor, No. 1 being the first or ground floor, No. 2 the second, and so on up, using the figure next higher than the highest floor of any building in the plant as the basement number. In a large building where more than one box per floor is desired, the first figure of the box number should be in the same relative position on each floor of the building.

In addition to the usual connections with factory whistle, if there is one, there should be a sufficient number of electro-mechanical gongs, so that a gong may be located at or near each box. Other gongs not located at the boxes are desirable in places where there is any extremely noisy machinery which would drown the sound of the gong at the box. The boxes on this system have inside a set of buttons with a sliding arm. When box door is closed, the sliding arm is on the alarm button only. If arm is on any other button, the closing of the door will automatically throw it on to the alarm button. For drill purposes when the box is opened, the arm may be moved to one of the other buttons as desired on that particular drill.

The wiring connections allow the striking on the gongs, blowing of the whistle, and recording on the register the number of the box pulled for fire. A box pulled for brigade drill is repeated on the whistle only; a box pulled for employees' drill is repeated on all the gongs of the system, but not on the whistle. A box pulled for local floor drill sounds only the gong in the immediate vicinity of that particular box.

The reliability of this system is, that if floor drill is being held and a fire breaks out during such drill, the pulling of another box for fire would cause its number to be blown on the whistle and sounded on all the gongs, except the one being used for local floor drill. If a drill is being held with all gongs in use, the pulling of another box for fire will interrupt the drill box on all gongs and sound the fire number. If the whistle is being blown for brigade drill, no other box will come in until after the brigade signal is sounded four times, after which the box pulled for fire will cut in and sound its number four times on all gongs and whistle. In case two boxes were pulled for fire at the same instant, the internal

operation of this particular case would be that both boxes would start together and work in unison until the smallest digit number wheel holds the line open longer than the other. This causes the largest digit number box to drop out without confusion; then when the control box finishes its four rounds, the other box will in turn signal its four rounds.

#### DRILLS

The system to be followed in drilling employees out from any building follows in general the same plan; although in some particular instances it is necessary to add to or subtract from the average plan. On the sounding of the alarm signal, employees should first shut off the power from their machines and those who are seated should rise and push their chairs underneath or close to the benches. This last is a very important point as it at once leaves side aisle clear for passageways (firemen entering). Lines should be formed in the nearest main or side aisle and should march under the direction of leaders to a designated exit. Each side aisle should have its leader in addition to those for room in general. A marching signal for a room can well be given by the man in charge of drills on that floor, using a loud sounding whistle. One of the policeman's type is recommended.

While the line is forming certain men employees should be assigned to stations on stairways to keep the line orderly, also to assist any girl who might fall. Other employees either men or women should be assigned to the task of closing windows, opening main power switches and turning off gas from ovens or heaters. Those employees as soon as their individual tasks are done should fall into the line passing out. It is highly advisable for every individual who has any task whatsoever in connection with the drill other than marching out on command, to be provided with an understudy. Each understudy should be thoroughly competent to handle his or her part of the drill in the absence of the regular employee whose duty it is to assume this work.

I would recommend that employees be frequently given what is known by us as a local floor drill or assembly, the idea being for them to form in column the same as if passing out for a fire and then at the signal from the leaders go back to work. The signal in each room is the same for floor drill as for fire, and by pre-arrangement with leaders, the employees can be sent back to work without loss of more than a minute's time.

A plant should not get in the habit of holding fire drills in the middle of the forenoon or in the middle of the afternoon, but they should be held at widely different periods of the day, as the operatives will soon become accustomed to drills at specified times and if an alarm came in at any other time, might have a tendency to throw the room into confusion under the impression that there was actual danger of fire. I visited one factory some few months ago where I was told that the fire drills were always held at four o'clock in the afternoon. Such practice ought not to be allowed. Every fire drill should be treated the same as if there were actual fire conditions present, and I would strongly recom-



mend that the time of the drill be changed in every instance. Drills might be held occasionally five minutes after employees come in to work, or five minutes before closing time. Furthermore, when a drill alarm is pulled, the fewest number of persons possible should know that the drill is to be held.

(Lantern slides were then shown, with explanatory remarks by Mr. Sanford, in which the following additional suggestions were made.)

It is desirable a good many times to have doors in your factory that you don't want to have the employees passing through, although in cases of emergency it is highly desirable to have the door opening in the shortest possible time. In such cases, we place a key to the door inside a glass covered box and use an emergency sign on the door showing that it can be opened in a very few seconds, if necessary, to allow passing in case of fire or any other emergency.

One person should be assigned in each department to visit the women's rest and toilet rooms to see that persons there are also notified of fire alarms, and it is called "fire alarm" in all cases and not "drill."

On the signal for going out in any one direction, certain employees hold open any double swinging doors which may be necessary to pass through. After passing through the doors, those holding the doors open fall into line.

The stair towers provide a double hand-rail and are wide enough to allow four persons to pass down abreast. In the multi-story buildings, one file coming out goes to one side of the stairway and the file coming from the floor below goes to the other and the two of them practically parallel each other without confusion. The girls next to the hand-rail are required to keep hold of the rail and be ready to take care of the girls next to them in case of any slip.

#### DRILL THE FIRE BRIGADE

The training of the fire brigade is one thing that is advisable. Carrying hose up the ladder, the correct method for carrying a nozzle is over the back of the shoulder. Another thing, too, on training fire brigades: I believe in sending a brigade over a ladder every time it is called out. I visited a plant not long ago, in looking up these various practices of brigade drill, where they very proudly told me that their fire brigade had won all the championships around there for fast work in laying hose. I told them I would like to see them lay the hose in the second story window. They put up the ladder; the man leading carried the nozzle in the proper position, but his foot slipped three times. The man behind him went up holding a loop of hose straight up over his shoulder with one hand and having only one hand for the ladder rungs, so it is advisable to give them plenty of ladder practice.

The General Electric buildings frequently have different roof levels and in such cases we use a particular ladder which is about halfway between an ordinary ladder and step-ladder, for the convenience of the firemen in going over from one roof to another.

In case the clothing of the occupants should happen to catch fire, we

have heavy woolen blankets, ordinary army blankets, which are located in departments where the hazard of catching the clothing is more or less possible. These are kept in containers or sometimes in wooden boxes with paper or glass ends.

At the end of the fire drill, each drill foreman is required to make out his report, giving the number of employees present, time for dismissal, number of exits used, time of drill, and time of recall. In one case it took 195 employees two minutes and twenty-five seconds; I don't know why it took so long, unless it was the considerable number of floors. I am not familiar with that building, but I saw a drill at one of the General Electric Lamp Factories last week, in which 635 employees, mostly women, were taken out of three floors in two minutes and forty-one seconds. That came without any warning whatsoever. They were not even thinking of a drill.

There may be some doubt in the minds of some people as to whether or not fire drills amount to enough in the long run to repay the employer for the loss of time in the holding of such drills. In this connection I wish to quote from a Newark, N. J. newspaper in reference to a statement by a woman employee of a factory in that city which had been destroyed by fire with loss of eleven lives.

"It was the worst fire I ever saw. It did not seem to be a minute after the fire bell rang before a cloud of black, stifling smoke spread over one end of the top floor. I heard tapping of the bell and immediately started for the exit. Before taking this job, I worked for eight or nine years with the Edison Lamp Works of the General Electric Company. They have the best kind of protection for their employees, and fire drills there are so rigidly carried out that to hesitate a moment when you hear the gong, even if you know it is only a drill, is almost as much as your job is worth.

"At the button factory, I was one of the aisle leaders. When the gong struck, I had to drop everything on the instant and take my place at the head of the line. Before I reached the door, I saw the dense pall of smoke and the next moment tongues of flame began to shoot through it. Every girl, however, kept her place in line, and not one of them lost her head as we tore down the stairs."

The example of bravery and coolness in the face of danger set by this young woman saved a dozen lives. With the first clang of the fire gong, she instinctively dropped her work, called to the other girls to follow, and went immediately to the nearest exit. Thanks to the years of rigid training in fire drills received in the Lamp Works, she knew just what to do when the alarm sounded, and so her own life and the lives of her companion workers were saved.

At the inquest, half a dozen employees testified that no fire drills had been held for over a year. On this point the superintendent and the girls differed, but the testimony tended to show that even if the drills were held, they were conducted at such widely separated intervals and so carelessly, that they made no lasting impression on the employees. When the fire confronted them, they were utterly helpless; panic seized them

and they jumped from windows or ran hither and thither without knowing why. If those who were trapped by the flames at the other end of the third floor had had the benefit of fire drills, they would have instinctively sought the stairs at the first alarm and so escaped as did the others on the same floor who were led only by one girl who had received her training in the General Electric Company's factory.

In the General Electric Company's plant at Schenectady, New York, there is a large building, three floors in height with a fourth floor for about one-fourth the length of the building. This fourth floor had an exit in a stair tower at one corner on the end of the building, the other a fire emergency exit consisting of a door opening from the other side of the room out on to the roof of the main building across which it was necessary to walk for 300 to 400 feet to a stairway near an elevator pent-house on the side of the building. The bulk of the employees on this upper floor were women. During working hours a few months ago a heavy wind storm blew in the end wall of this upper floor and blew out the side wall, leaving the stairway inaccessible. A fire drill signal was sounded, the girls in that room formed in line, marched out across that open room despite the wind, and down to the stairway in perfect order.

It may be stated by persons objecting to taking the time for practicing fire drill that the chance of a fire in a factory is very remote. Let us hope so, but if we can be the means of saving lives, not only in our own factories but in others through the training received by our former employees, I believe it is money well invested.

#### DISCUSSION

MR. BROWN: Have you ever had any experience with sending the fire call through the factories? For instance, we use the call system for calling them out.

MR. SANFORD: I don't think that is used in any of the factories. We have that call system in some of our plants, but I don't recall any plant that uses that as a fire signal. There has been some talk of it in places, but I don't think it has ever been carried out.

MR. BROWN: I think there will come a time when laws will be passed and enacted in every state, compelling them to have fire drills and fire alarm systems throughout the plants. That law is now in effect in Ohio.

MR. SANFORD: It is in New Jersey and some other states.

MR. BROWN: Just recently it has gone into effect in Ohio and we have received notice that we have to have fire drills in buildings of three stories or more. We are about to install one in our plant and I was wondering whether to use the system in our plant.

MR. SANFORD: I don't see why it could not be.

MR. BROWN: The reason I state that is because there are so many whistles blowing at times that it might be mistaken and they might not hear. For instance, you could have one blast for one house and two for another and all the way up to five blasts and it doesn't mean anything at all to the average employees.

MR. EATON: Mr. Sanford, do you have a Fire Committee as part of your Safety Committee? We have in all of our plants a special Committee, which inspects all alarm apparatus.

MR. SANFORD: We have the Fire Committee in some cases in the small plant. They may be part of the Safety Committee, but the large plants are entirely separate. At the Lynn plant we have two men who spend all their time inspecting fire apparatus.

MR. EATON: Making recommendations, etc.?

MR. SANFORD: It is a case not so much of making recommendations as seeing that the equipment is kept up.

MR. EATON: Ours is a little different. The Committee consists of about three men, whether it is a large or small plant, three men assigned out of the fire squad, one used as a fire marshal, with two assistants. They inspect and recommend to the General Safety Committee any addition they think necessary.

MR. BONSB: I would like to ask three questions. First, how often should the fire hose be inspected and should it be inspected under water pressure or not?

MR. SANFORD: I think you had better put that up to the company carrying your fire insurance.

MR. BONSB: I wanted to get a practical man's view. I will change my question. How often are the hose in the General Electric Plant inspected and is it under water pressure?

MR. SANFORD: Very seldom under pressure.

MR. BONSB: Don't you think hose should be inspected under pressure?

MR. SANFORD: That is a matter I would rather you would refer to the people that carry your fire insurance. Opinions differ.

MR. SANDEL: Do you think the question as to whether or not you should inspect hose under pressure depends on your facility for drying the hose afterward? In some places where there are the fire brigades and they have fire towers for drying the hose properly it is all right, but without that your hose is more liable to deteriorate and mildew.

MR. BONSB: My purpose in asking the question was that I noticed some time ago a fire in which pressure was put on the hose and it burst, although the hose had been inspected at regular intervals. Of course, I don't think a hose should be inspected under pressure during the winter time when it would freeze, as that would naturally cause cracking.

Another question I wanted to ask was do you think in connection with the ordinary word "exit" an arrow should be used pointing to the exit, thereby eliminating the mental effort of locating the word?

MR. SANFORD: Where the sign is immediately over the door I don't see any need of it. With that large illuminated sign which I showed, there is the smaller sign over the door and that small sign is plainly visible twenty or more feet away.

On that other proposition, I think it might be a little difficult to test the hose under the water pressure, because an unlined hose will at first leak in all directions, but as soon as the fibre swells up, the leaking stops, and a good deal of the hose commonly used is unlined.

MR. LONG: At our plant at Cudahy Brothers, we make it a rule to test once a year under higher pressures, run it up to 100 or 110 and if it doesn't leak, we use it for another year. We find if you get the cotton hose dried, it will be all right. The little dampness in the rubber won't hurt. It seems to prolong the life of the rubber. That seems to be the opinion of the manufacturers of hose and the insurance companies.

MR. BROWN: How often do you inspect fire apparatus?

MR. SANFORD: Where chemical extinguishers are used, they are re-filled at least yearly. Most of our plants, however, use pails of water or pails of sand, and those are inspected weekly. There is always some evaporation from the water pail and those are inspected every week. The man who inspects does not say, "Here is a pail that needs filling, some one fill it," but carries a pail of water right along. The fire pail system is used in more cases than the other. We have another combination which is used where we are liable to have an oil fire and that is bicarbonate of soda and sawdust in large bins with long-handled shovels to throw it on the fire. Those bins when filled are sealed over with heavy brown paper, the shovel left with handle projecting through a hole in the paper and that is considered to be all right until it is wanted. If the paper is torn, it means immediate inspection to find out why it is torn and to replace it.

MR. BONSIB: What proportions do you use of the sawdust and bicarbonate of soda?

MR. SANFORD: Ten pounds bicarbonate of soda to one bushel of dry sawdust.

MR. BONSIB: It is mixed dry, of course?

MR. SANFORD: Yes.

MR. SANDEL: Are your exit lights on an electric circuit or gas?

MR. SANFORD: Electric.

MR. SANDEL: Is that circuit different from the floor circuit?

MR. SANFORD: Yes, the lighting circuit and the power circuit are different.

MR. SANDEL: But the circuit for lighting the floor generally is the same as the one you use on the exits?

MR. SANFORD: It is the same circuit from the power house, but in case of a fire drill the lighting is never touched. The power circuits are pulled pulled off on each floor, but that has nothing to do with exit lighting or the elevators. The elevators are left in commission as long as anybody wants them.

CHAIRMAN DRUMMOND: Does the Building Code in your vicinity demand that power for exit signs be from outside source?

MR. SANFORD: In some cases. You see I am interested in the General Electric Company factories in all states. Some have rules and some don't have any.

CHAIRMAN DRUMMOND: I am sure we are mighty grateful to Mr. Sanford for his explanation of the General Electric Fire Equipment.

CHAIRMAN DRUMMOND: "The Value of Foremen's Instructions to New Employees," by Mr. McClellan, Safety Inspector of Armour and Company, Chicago, is the next paper on our program.

**VALUE OF FOREMAN'S INSTRUCTIONS TO NEW  
EMPLOYEE**

W. F. MCCLELLAN. SAFETY INSPECTOR, ARMOUR AND COMPANY, CHICAGO

No analogy can be found for the position of the foreman in modern industry. The foreman of today is typically the product of this age, the age of gigantic achievement, tremendous ventures, and delegation of duties. As there is no time in the world's history which is a counterpart with this in industrial life so there is no figure in history who takes the place of this key man of the factory and shop, the foreman.

**THE FOREMAN THE PIVOT OF PRODUCTION**

For the foreman is the pivot of all production. Sometimes we safety men and others who are not concerned with the actual work of getting out material forget, or at least gloss over the fact, that business exists for its ability to serve the world by getting out the product. Society would not allow business to exist as it is today were it not for its efficiency; and if society would permit it (a thing which is impossible) such a business would crumble of its own weight.

I want to define the position of the foreman so I can demonstrate the value of his instructions. With the development of big industry, the owner,—the man who has a dollars and cents interest in production, the man of whom society demands results,—has been driven by force of circumstances away from his employees. I will not attempt to go into the reasons. You know them as well as any one. At first he appointed a superintendent to represent him but the advent of highly specialized methods, the more complicated machinery, forced the superintendent away from the man on the job and then the industrial relations manager had to come in to fill the vacant place.

When the industrial relations manager took his job he was soon forced to recognize that he could do nothing without the aid of the foreman because he did not have an actual job-work-a-day contact with the wage earner. I understand the leading industrial relations men of the country are now bending their utmost efforts to delegate their work to foremen. This is the irreducible level and I think it is the logical working scheme.

As mentioned above, the foreman has no counterpart in the world's history. You might say he stood somewhere between the learned doctor of the Old World and the chancellor, the keeper of the king's conscience. The foreman today is the instructor of youth in industry, and the keeper of the employer's conscience in the shop. In every day English he is the teacher of the new employee and the man who hands out a square deal to every one be he either old or new in the employ of the company.

**THE OLD TYPE OF FOREMAN**

Let us first take up the foreman as a teacher. You all know how it is if any of you started in the ranks, the first job you applied for you came to the gate and waited until some foreman yelled out, "six truckers

for the storeroom." You happened to be nearest that foreman and you rushed forward. After going through the necessary preliminaries of being put on the payroll, the foreman bit off a chew of tobacco, told you to find a truck and "follow that fellow over there out into the next room and do what he is doing." In the old days you were supposed to have been sufficiently instructed when the foreman or "boss" as we used to call him, gave you this careful and painstaking apprenticeship. You found a truck, too, if you wanted the job, for if you came back to this foreman and told him you couldn't find one you were informed there was no further use for your services, only he used more vigorous language. If you found a truck the chances were it belonged to some one else and you had to fight for it and later this would result in your being discharged for quarrelsomeness.

To a group of safety men and women, this may seem a little strange that an employee could come and go without being given a course of instructions in safety by the foreman, but as a man who has been in an industry for a long time, I want to tell you there was no instruction in safety in the old days, for the very good reason there wasn't anything to instruct about. If you got hurt there was another man to take your job. If you didn't, well that wasn't any of the foreman's business either.

It would be a waste of time for me to tell you how things have changed; it is sufficient to say now we regard man-power and human life and limb as things we have a moral obligation to preserve. We safety men were hired to supplant this old regime. We were put in to do away with such scenes as the one I have just described, but we all know that if we started out by ignoring the foreman we were quickly brought to the realization of the fact we were getting no place. The foreman was the man who had the actual job contact with the help. He was indifferent to our work either through old-fashioned prejudices or through our fault in not securing his co-operation at first and we were not making more than a dent in the big accident problem. We had to teach the foreman to teach his men and, we might as well admit it now, the foreman taught us a great deal.

If our foremen are not given proper instructions on safety and other matters connected with the business it is our fault. We are the men who see the foreman on the job with the new employee and our task is something bigger than the mere preparation of an accident report and assuring the superintendent that a guard is on a machine.

Let us take a typical case of a foreman doing his full duty in the instructions of a new employee. The man is hired at the employment office and taken by a guide to the Packing and Shipping Department. On the way the guide starts the instructions. He shows him the various exits, tells him the best car lines to take to get to his home, and gives him general information concerning the lay out of the plant and the rules of conduct for employees. The pair arrive in the Packing and Shipping Department and go to the foreman's office. If the guide is on the job, he will say: "Foreman Jones, here is Frank Smith, a man Mr. White has just hired. We think he will fit in your department very nicely." "I am glad to meet you, Mr. Smith," says the foreman. Right here the ice is broken.

The new employee is put on the basis of a human being and not No. 8251; he knows the foreman's name, the foreman has called him "Mister" extending to him the courtesy to which every man is entitled. The guide leaves, and the next five or ten minutes conversation between the foreman and the new employee determine to a large extent the future usefulness of Frank Smith.

#### THE UP-TO-DATE FOREMAN

If Foreman Jones is thoroughly up-to-date in his methods, he walks to the time clock with Mr. Smith and on the way his instructions go something like this: "I want you to understand our method of time keeping here. As a matter of fact, it is your method because you keep your own time. You see this clock? Have you ever used one like it before? You have. Well perhaps some of our rules are a little different and the clock slightly different in construction so I will explain it to you thoroughly. Your number is 8251. You had better write that down so you won't forget it. You will find your card in the rack to the left of the clock. When you come each morning pull it from the rack and stick it in this slot in the clock. When you get it clear down pull the lever and you will see it registers the exact time you started to work. If you are more than two minutes late it will register the time in red. After you have punched the card put it in the rack to the right in the slot with your number at the top. Be sure you punch your card before starting to work and as soon as you are through. Never punch any one's card but your own and never allow any one to punch yours. A violation of this rule will mean your discharge. The hour of starting is 7 A. M. unless you are notified differently by this blackboard here. You work eight hours a day, half an hour for lunch time. Your rate is so much an hour and you receive time-and-a-half for overtime. You will find all these instructions concerning punching the clock on the back of your time card; read them carefully."

As they walk away from the clock the foreman tells him that he is on trial and his permanent connection with the firm will be determined by the interest he shows in his work. As they go to the place of work the foreman points out the various exits, shows him how to get to the lunch room, giving him some idea of the prices charged for the food. Next the man is instructed in any machinery which may be in the department, with full instructions that he is not to operate a machine unless told to do so by the foreman himself but, in the meantime, it is up to him to try and learn the working of the machine by the present operator. Strict instruction is given that the guards are not to be taken from the machine because they are put on for his protection as well as for the company. He is then taken to the elevator and the methods explained about the signals, and also told that he is never to get on or off while it is in motion, and never under any circumstances to go into the pit while the elevator is above him. If any article falls off the truck into the pit he is to notify the operator and not get in there himself.

Last, but perhaps most important because it makes a man feel at home, is the introducing of a new employee to an old hand. It could be done



something like this: "Mike, I want to introduce Mr. Smith. Mr. McGuire knows how everything should be done around here, as he has been in this department for twelve years, and the fact that he has been here twelve years shows that he does things right. I am going to ask our friend McGuire to look after you until you get well started. Anything you want to know, no matter how trivial, don't hesitate to ask Mike because he takes great pride in the fact that the men he shows the ropes always stay here a long time, and of course we hope you will be with us too."

After the introduction comes the specific instructions as to the exact work the man is to do. These should be thorough and clear. A man who is introduced to the job in this way immediately becomes an asset to the company because he feels that he is a part of the business and the spirit of loyalty has been instilled and he is a better accident risk than the employee who says, "I've been working here eight years and never had an accident. I don't think there is sense in this here safety stuff."

The foreman who has given a series of instructions similar to these has turned a green hand who is potentially a liability to a concern into a potential asset. The foreman determines on which side of the ledger the man's account should be kept. The new employee who feels that he is a stranger in a strange land has to search for the lunch room, the drinking fountains, the toilet rooms, and exits; who makes mistakes in recording his time because he does not understand the mechanism of the clock is on the road to becoming one of the firm's liabilities.

We safety men know that not only the man who has an accident, but the man that is always nearly having an accident is a liability. We know that the man who is forced to spend five or ten minutes of each half-day explaining to his fellow-workers what a great risk he took, and how he just escaped an accident or losing an arm, really is not making much money for the company. The man who, because of carelessness either on his part or on the part of the foreman who is charged with the duty of instructing him, has a string of trivial accidents causing repeated trips to the doctor's office, should have his account with the company entered in red ink. The foreman is charged with the duty of securing production, and he cannot secure a maximum from his men if they are always discussing accidents or near accidents and he always has a man or two absent for medical treatment.

At the first of this paper, I said the foreman held a position which was a cross between a teacher and a chancellor. He is the keeper of the employer's conscience. The human element of a large corporation is in his hand. It is upon his recommendation and upon his judgment that men are advanced, discharged, or transferred. He is the arbitrator of their petty squabbles and he must see that they not only get paid for every hour they work but that the company gets an hour's work for every unit of pay.

This paper is not devoted to the discussion of the foreman's duties along this line. We are concerned here only with his instructions and their values. I am mentioning this aside from his work merely because it dove-tails in with his duties as an instructor. There could not be any

happier combination than that the teacher should be the arbitrator and dealer out of a square deal. The value of his instructions to any individual is based on the faith that man has in him and no employee could be expected to have faith in a man who does not perform his administrative duties intelligently and judiciously.

The foreman is interested in the production because that is the thing that shows up to his credit at the end of the week or month as the case may be, and when he instructs a new man on safety, he reaps the benefit for it keeps every one on the job. The foreman is in favor of safety from a human standpoint. He knows that he has been in the other fellow's job or came up from the ranks after starting in as a new man and he knows something of the suffering that would be caused by an accident, not alone to the injured but also to his family. He realizes that injury destroys the morale of the unit because the strength of a chain is the weakest link. So it is true of the unit or gang. The speed is indicated by the slowest man in the gang, which may be brought about by accident.

From the beginning, the foreman should understand and present safety to the new man as a business proposition and a part of the company's work. Loss of time by perhaps the best man in the gang means replacing him by a much slower man and perhaps a green hand entirely. Inferior work which is due to the new man not being up on the quality of work and if he takes time to do the job properly that means cutting down the volume or the production end of it which counts so much to the foreman's credit. I believe that both the new man and the foreman benefit by this instruction, but especially more by an actual demonstration in the safe way to do their work, i. e., how to stop machinery, motors, etc., how and when to clean the machinery, and how to reach the nearest fire exits in case of fire. To be specific and show the man what to look out for and point out the danger that is in each operation will add to production, and keep down his medical expense and the labor turnover.

CHAIRMAN DRUMMOND: I know personally that Mr. McClellan knows whereof he speaks and has proven the things he said in his paper, to the complete satisfaction of his superiors. There may be some disagreement or further enlightenment desired by the members of the audience and I am sure he will be glad to either defend his position or give more information.

MR. BROWN: Mr. McClellan, have you had physical examinations in your plants?

MR. MCCLELLAN: Yes, up to the last two months.

MR. BROWN: When is a man examined; when hired or after he has worked a while?

MR. MCCLELLAN: After he has worked a while. He is hired and put through the employment office and later notified to go to the doctor's office.

MR. BROWN: Have you ever had any trouble about a man refusing to be examined?

MR. MCCLELLAN: Not to speak of.

MR. EATON: Where your foreman does not speak a foreign language, is he assigned to some man who does, to give him instructions?

MR. MCCLELLAN: We generally have some man in the department who speaks his language to explain the operations to him. Generally some man from the gang can explain to him. The foreman stands there while he is being instructed.

MEMBER: How do you handle men that are temporarily disabled.

MR. MCCLELLAN: That all depends on the doctor's report. If he is fit for work, he is sent back to the employment department. If the work in the department he is in is too heavy for him, he is transferred to some department where he can have a lighter job.

MR. EATON: I would like to bring up the point I mentioned to you at the Round Table. I would like to get the opinion of various men here as to the advisability of taking an injured man, not seriously injured yet through his own carelessness, through the department with the bandage and every time he goes to the doctor's office for redressing have him go through the department and thereby keep in the minds of the balance of the employees the penalty of carelessness. They usually know this man was careless or he would not have had his fingers injured. I would like to have some opinions on that.

CHAIRMAN DRUMMOND: I should say that a plan of that kind would result more or less in the loss of time among the men of the department and you would have some objections from your operating men on that. You might get good results if you printed a man's hand and picture on a bulletin in the department, outlining the accident, but I believe if you made a man an object show every time he went to the doctor's office, it would result in such a loss of time that the Operating Department would be hindered on their work all the way through. I am not opposed to the horrible example idea—it is a mighty good stunt, but it does not agree with every one's viewpoint. Some people think we are making a mistake in holding up the horrible example.

MR. SANDEL: I know of a case where they had a "No Accident" campaign at the plant. The safety engineer secured the co-operation of several of the men, injured severely enough to have bandages, had them stand at the entrance to the plant, getting there in time for the men coming to work to see them. Nothing was said, but the plant employed about a thousand men, so the news of any accidents would be pretty generally known. They claimed to receive good results during the week from the exhibit of those men and it seems to me that would be a better plan than parading the men through the departments. I personally do not feel it is a good thing to take an injured man through the department where the machinery operates. It is my policy in discussing an operation of a machine or any dangerous machine to get away from the operator, because it makes him nervous, when he realizes that somebody near him is discussing the machine he is operating. There may be a chance of an accident, because of the way he feels.

MR. COKER: I think in most cases the injured employee resents that.

MR. EATON: I just wanted to get an opinion. I agree with most of you fellows.

**MR. ROSSELAND:** You will probably remember having read in one of our publications of the scheme pulled off by one of the Du Pont plants. They had a man injured carry a large sign on his shoulder, telling how he was injured and, as I recall it, how long he had been off. This is in line with the idea you speak of. If I may venture my personal opinion, it seems to me that wherever you have a man fairly well known, a good sport, whom you can get to do so, taking him through the plant would have a good effect, once in a while. I am inclined to agree with the other speakers who thought that as a general thing it might interfere too much with production.

**MR. BATCHELDER:** At times we have had an accident in a certain department and sent the man around to the particular machine the accident occurred at, to explain the accident. I think that had some very good effects.

**CHAIRMAN DRUMMOND:** The success of a safety man all depends on the co-operation of the operating departments and any time you put in too much effort which results in loss of time you cannot expect a lot of co-operation. I have in mind an object lesson. One of the largest locomotive companies in this section had been rather opposed to the safety idea. I was up in the office one morning and looked in the yard and a man had his leg broken and he lay in the watchman's shanty for two hours. I could see out the window and there was not a time during the two hours that there were not at least two hundred men coming and going. The Works Manager saw what the stoppage meant in lost time. Everybody knows that when an accident happens in a department you generally find a lot of people immediately around the accident, and all those things mean such a loss in time that I am afraid if you go too strong on the idea of stopping the work, these lessons instead of contributing to the income of the company will become a liability.

**MR. EATON:** The whole department is interested, stops or does not keep up its efficiency for quite a while, and I have adopted a plan of sending out a report immediately, if a man is only slightly hurt, advising that he is O. K. and it reassures those around and they go back to work in better spirits.

**CHAIRMAN DRUMMOND:** We shall now pass to the report of the Nominating Committee.

#### REPORT OF NOMINATING COMMITTEE

**MR. G. A. BROWN:** The Nominating Committee beg to submit for your consideration and approval the following:

For Chairman—Mr. A. B. Drummond, Wilson & Co., Chicago.

Vice-Chairman—Mr. Henry Batchelder, A. C. Lawrence Leather Co., Peabody, Mass.

Secretary—Mr. W. F. McClellan, Armour & Co., Chicago.

We recommend that the following gentlemen be appointed chairmen of the following committees and in addition thereto, that they have the power to select their own committeemen for their respective committees and in

so doing, take into consideration the advisability of having equal representation of both packers and tanners on their committees:

**Educational Committee**—Mr. B. Hoffman, Michigan Tannery & Extract Co., Petoskey, Mich.

**Standardization**—Mr. J. M. Sandel, Swift & Co., Chicago.

**Entertainment and Program**—Mr. J. M. Eaton, Libby, McNeil & Libby, Chicago.

**Membership and Program**—Mr. F. E. Pope, Pfister & Vogel Leather Co., Milwaukee.

**Bulletin**—Mr. R. S. Bonsib, Tanners' Council, New York, 41 Park Row and A. A. Bureau, Morris & Co, Chicago.

(The report of the Nominating Committee was unanimously approved.)

**CHAIRMAN DRUMMOND:** I feel quite sure that the Nominating Committee had several things in mind for the upbuilding of the Section. I know they have given careful consideration to many of the phases that will result in an upbuilding of the work and they have attempted to place men on the different committees that could do the work required of them, but did not tie their hands as to the number of men on the Committees. I think it is a good plan for the Chairman of each Committee to have the right to appoint as many men as he pleases and, with the progress made last year, I don't think the Committees can be too large. I think the Section should grow much faster than last year with the new interest shown and the combination.

Mr. J. S. Marks of the Security Mutual Casualty Company, Chicago, was to deliver a paper on "Preventing Stub Knife Cuts." Mr. Marks is not present, but his paper will be published in the Proceedings.

## PREVENTION OF KNIFE CUTS IN THE PACKING INDUSTRY

JOHN S. MARKS, CHIEF INSPECTOR, SECURITY MUTUAL CASUALTY COMPANY,  
CHICAGO

Experience has shown that about 30 per cent of packing house accidents are the result of knife cuts. These accidents can be divided in two classes:

**First:** Accidents where knife slips and cuts the workman's hand with which he is holding the product being worked on.

**Second:** Stub knife cuts caused by knife being forced back through workman's hand in which he is using the knife.

Many experiments have been made in an attempt to prevent the first class of knife injuries but up to the present time no method has been devised or used with any degree of success. This class of knife accidents is much larger in number but much less serious than cuts to the right hand.

Cuts to the right hand are caused by knife slipping, due to greasy hands, or when workmen are cutting frozen product knife frequently glances from material being worked on, striking hand. The majority of these cuts are superficial. In an attempt to prevent this type of cuts, leather finger stalls have been worn by workmen and while they have

not, in all cases, prevented the workman's thumb or finger from being cut, they have materially reduced the seriousness of the injury.

Leather finger stalls reinforced with metal staples have also been worn by workman and were found impractical as they were too cumbersome. Canvas finger stalls reinforced with metal staples were worn by workmen and these also proved impractical as the workmen complained about their interfering with the free movement of their fingers.

The second group of accidents are caused by point of knife blade coming in contact with hard object such as bone in meat being cut, forcing the knife blade back through the workman's hand, causing a severe cut. A great number of these stub knife cuts are due to the point of knife blade striking the edge of the hot water box when the workman is in the act of dipping his knife in hot water.

A number of stub knife cuts have left a permanent loss of use of one or more fingers. To prevent this type of accident, there has been invented a guard for every type of knife used, in the various branches of the packing industry where cutting is done.

#### GUARDS FOR KNIVES

Guard used on Specimen No. 1 is made of No. 12 gauge iron, wire coppered, and is attached to the forward part of knife handle by means of looping wire around knife handle, leaving the lower part of wire looped for the purpose of inserting the first finger of hand in which knife is being held. This type of knife is used in the Pork Department, sticking hogs.

Guard used on Specimen No. 2 is made of a small piece of galvanized iron attached to the right side of knife handle by two small screws. That part of the guard toward the point of knife is slightly bevelled at right angle to prevent workman's hand being forced up on to the knife blade. Knives equipped with this type of guard are used by hog string cutters, ham shavers, shoulder shavers, re-shavers, bung gut trimmers and by workmen engaged in cutting off bladders, facing hams, hog marking, cutting off heads, shaving heads, trimming out gullets, trimming plucks, cutting out caul fat, trimming livers, cutting off snouts, shaving snouts, skinning heads, cutting off lips, skinning jaws, cheeking, trimming heads, cutting tonsils, trimming gut ends, boning beef, trimming pellets, tripe inspector, tonguer, fat inspector, tongue trimmer, and pluck trimmer.

Guard used on Specimen No. 3 is made of a galvanized wire loop which is attached to right side of knife handle by drilling two holes through knife and cleating ends of wire on opposite side of handle. Knives equipped with this type of guard are used by the men engaged in the following operations: trimming bellies and trimming, skinning, and cutting off hams.

Guard used on Specimen No. 4 is made of a small galvanized wire loop placed on right side of knife handle, and used between the first and second fingers, the handle of knife being wrapped with burlap. Knives equipped with this type of guard are used in place of Specimen No. 3, i. e., for trimming bellies, neck bones, back fat, ham fat, belly strips, plates, pig feet, diamond bones, and for skirting ribs.

Guard used on Specimen No. 5 is made of a galvanized wire loop attached to the right side of knife handle extending up over top of knife blade and rests against thumb. Guard is attached to knife handle by drilling two holes through knife handle, cleating ends of wire on opposite side of handle. The knife handle is then wrapped with burlap. Knives equipped with this type of guard are used for trimming and boning shoulders, trimming loins, slitting sides, raising spare ribs, ribbing, and cutting down.

Guard used on Specimen No. 6 is made of scrap Babbit metal and is attached to the knife in the following manner: One-half inch of the knife handle on both sides is sawed off; the knife blade is then notched on both top and lower parts, after which a mould is placed around this part of knife and Babbit metal poured into it. After metal becomes cold and mould is removed, it is necessary to file off sharp edges. This operation requires very little time. Knives equipped with this type of guard are used exclusively in the beef and sheep fancy meat department and for general floor work, such as beef killing and sticking cattle.

Guard used on Specimen No. 7 is made of No. 12 gauge iron wire coppered, and is attached to forward part of knife handle by means of a loop. The lower loop is used over the first finger of hand in which knife is being used. This type of guarded knife is used on the Hog Killing floor and in the Fancy Meat Department.

Guard used on Specimen No. 8 is made of tape wrapped around knife blade in front of handle. This type of guarded knife is used in Sheep Dressing Department.

Guard used on Specimen No. 9 is made of No. 12 gauge iron wire coppered and is attached to forward part of knife handle by means of looping wire around knife handle leaving the lower part of wire looped for the purpose of inserting the first finger of hand in which knife is held. This type of guarded knife is used as skinning knife on Cattle Killing Floor, also for sticking cattle.

Guard used on Specimen No. 10 is made of aluminum and is manipulated with the thumb of hand in which knife is being used. This type of guarded knife is used for opening hogs and the guard not only protects the workman's hand but also prevents the gut from being cut.

There are also a number of very serious cuts to the arms and wrists of butchers engaged in boning shoulders and like operations which have been prevented by wearing a heavy leather cuff. The specimen of cuff shown was worn by a butcher boning shoulders, for a period of about four months. The numerous gashes that it contains is the best evidence of its usefulness in protecting the arm and wrist from knife cuts. Since these cuffs have been in use there has been but one cut on the wrist of a man boning shoulders and this occurred when another butcher was relieving the regular man and failed to use the cuff.

#### REPORT OF INJURIES CAUSED BY KNIFE ACCIDENTS

A close study of the injuries caused by knife accidents, covering a period of one year, at a plant employing about 2,000 men shows as follows:

|                      | May       | June      | July      | August    | September | October   | November  | December  | January   | February  | March     | April     | Total     |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                      | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days | Cuts—Days |
| Left hand.....       | 3 0       | 4 5       | 7 55      | 2 4       | 3 0       | 9 8       | 4 0       | 5 0       | 4 0       | 7 2       | 4 14      | 4 7       | 56 96     |
| Thumb.....           | 15 0      | 13 10     | 7 13      | 12 5      | 19 13     | 21 6      | 11 14     | 12 8      | 15 8      | 5 9       | 5 7       | 7 14      | 142 107   |
| 1st finger.....      | 9 10      | 8 2       | 6 7       | 7 9       | 7 2       | 14 82     | 15 10     | 8 14      | 12 13     | 15 19     | 5 3       | 6 13      | 110 143   |
| 2nd finger.....      | 5 4       | 13 13     | 5 15      | 3 15      | 3 0       | 8 16      | 3 0       | 8 0       | 3 6       | 5 4       | 5 7       | 6 11      | 89 88     |
| 3rd finger.....      | 2 2       | 3 0       | 1 0       | 2 0       | 1 0       | 6 15      | 2 0       | 3 13      | 4 0       | 1 0       | 4 27      | 5 5       | 29 56     |
| 4th finger.....      | 4 0       | 1 0       | 7 0       | 2 2       | 5 14      | 3 6       | 3 7       | 3 0       | 1 2       | 1 1       | 1 6       | 1 1       | 28 31     |
| Right hand.....      | 1 0       | 2 0       | 2 0       | 1 4       | 1 0       | 2 10      | 3 7       | 2 0       | 1 0       | 1 1       | 2 18      | 1 0       | 12 39     |
| Eye.....             | 1 0       | 2 0       | 2 0       | 1 0       | 1 0       | 2 3       | 3 0       | 1 0       | 2 6       | 4 0       | 1 0       | 1 3       | 15 9      |
| Thumb.....           | 4 4       | 2 10      | 1 14      | 1 0       | 1 4       | 1 0       | 3 13      | 7 46      | 2 16      | 1 7       | 1 15      | 1 0       | 29 98     |
| 1st finger.....      |           |           | 2 2       | 1 0       |           | 1 0       | 1 0       | 2 4       |           | 1 2       |           |           | 8 45      |
| 2nd finger.....      |           |           | 1 0       |           |           | 1 0       | 1 6       | 1 17      |           |           |           |           | 5 21      |
| 3rd finger.....      |           |           |           |           |           |           |           |           |           |           |           |           | 6 11      |
| 4th finger.....      |           |           |           |           |           |           |           |           |           |           |           |           |           |
| TOTAL.....           | 44 29     | 48 44     | 89 106    | 32 44     | 40 33     | 67 96     | 46 50     | 50 103    | 44 51     | 40 44     | 35 95     | 25 48     | 510 743   |
| Knife, other hand... | 37 21     | 45 42     | 82 39     | 28 35     | 31 29     | 54 52     | 37 26     | 40 40     | 34 24     | 35 31     | 23 55     | 23 45     | 419 448   |
| Knife, same hand...  | 7 8       | 3 2       | 4 30      | 3 9       | 6 0       | 10 6      | 7 19      | 10 54     | 10 21     | 5 13      | 8 40      | 1 3       | 74 210    |
| Knife, both hands... |           |           |           |           | 1 4       |           | 2 5       |           |           |           |           |           | 1 4       |
| Another's knife...   |           |           | 2 0       |           | 2 0       | 3 39      |           |           |           |           | 3 0       |           | 12 44     |
| Sharpening knife...  |           |           | 1 37      | 1 0       |           |           |           |           |           |           | 1 0       | 1 0       | 4 37      |
| Grand Total.....     | 44 29     | 48 44     | 89 106    | 32 44     | 40 33     | 67 96     | 46 50     | 50 103    | 44 51     | 40 44     | 35 95     | 25 48     | 510 743   |



From the preceding you will note that there were:

|                                 |                    |
|---------------------------------|--------------------|
| 56 cuts left hand.....          | 95 days lost time  |
| 142 cuts left thumb.....        | 107 days lost time |
| 110 cuts left first Finger..... | 143 days lost time |
| 69 cuts left second Finger..... | 88 days lost time  |
| 29 cuts left third Finger.....  | 56 days lost time  |
| 28 cuts left fourth Finger..... | 31 days lost time  |
| 12 cuts right hand.....         | 39 days lost time  |
| 1 eye.....                      | No time lost       |
| 15 cuts right thumb.....        | 9 days lost time   |
| 29 cuts right first Finger..... | 98 days lost time  |
| 8 cuts right second Finger..... | 45 days lost time  |
| 5 cuts right third Finger.....  | 21 days lost time  |
| 6 cuts right fourth Finger..... | 11 days lost time  |

---

Total 510 cuts.....743 days lost time

Of this total, 419 cuts occurred while using knife in the other hand from the one cut and entailed a loss of 448 days, or a little over one day for each cut; 74 cuts entailing 210 days lost time occurred while using the knife in the same hand that was cut, an average of three days to each cut. These 74 cuts, of course, are what we term "stub cuts," and this shows clearly that while not so numerous as the other cuts, they are more severe.

An interesting feature of the above knife cut report is that on the left hand 377 cuts happened to the hand, thumb, first, and second fingers, and caused 433 days disability; 57 cuts happened to the third and fourth fingers and caused 87 days disability. On the right hand, 64 cuts happened to the hand, thumb, first and second fingers, causing 191 days disability and eleven cuts happened to the third and fourth fingers, causing 32 days disability. It is apparent, then, if a suitable guard could be devised for the thumb, first and second fingers of the hand opposite to the one in which the knife is used, it would eliminate approximately 60 per cent of the lost time due to knife cuts.

It is apparent from the foregoing that knife guards are practical and are doing a great deal in preventing serious knife injuries.

The success plants have in inducing employees to use guarded knives depends entirely on the co-operation between the workmen and the foremen and the latter's insistence that guarded knives be used.

While much has been accomplished in preventing accidents by knife guards, we feel much remains to be done and we are constantly seeking to develop new devices which will overcome all objections of those who may be prejudiced against their use.

Swift and Company, one of our largest assured, we think, were the pioneers in this phase of safety work and, using as an argument the excellent results obtained by them, we have been able to induce all of our assured engaged in the same business to follow their example with similar results.

The guards referred to in this paper are fitted to the knives without cost to the employees and arm cuffs are also provided free of charge.

CHAIRMAN DRUMMOND: Stub knife cuts are something that worry the men in the packing industry considerably, and I am wondering if Mr. Sandel can tell us something from his experience. Mr. Marks has sent up a number of guarded knives which you might use in your explanation, Mr. Sandel.

#### DISCUSSION

MR. SANDEL: I can't tell a whole lot about the subject, because it is one that I have not given so very much time to, but I think some one could derive some benefit from the samples if the knives were passed around and they were given a chance to examine them. I know in the South St. Joseph plant, we have had more success in using knives which could be termed "Guarded knives" than in any other plant. Several times there have been 100 per cent guarded knives throughout the plant, but the success of the movement depends on supervision. A man dislikes to use a knife with any protection; he takes off the guard at the first opportunity and it was always a case of the foreman being on the job and the Safety Inspector following up the situation very closely.

At the South St. Joseph plant we get periodic reports as to how they stand and if in the Safety Inspectors' report it was found that knives were not 100 per cent guarded, the foreman would be called into the Committee meeting and asked to explain why that condition prevailed. The people in our different plants feel that the use of the guarded knives prevents accidents. At the same time we have quite a number of accidents to the other hand, but I do not know if there are quite as many as would prevail without guarded knives. It seems to me at various times we might get along a whole lot further in our work on this knife question if we would not use the term "Guarded knives." There is a pronounced repulsion, you might say, to the use of a guard and, in one of our plants, we stopped using that term and instead use the term "Improved knife handles." It is simple camouflage, but we think we are getting somewhere with it.

CHAIRMAN DRUMMOND: Has an effort been made to carry the knife with the improved handle into the store rooms where the employees may purchase them?

MR. SANDEL: All those handles and guarded knives are carried in stock.

MR. ROSSELAND: I am interested in what Mr. Sandel said about the aversion to the name "Guarded." It seems to me there is considerable ground for that aversion and I wonder if it would not be more truthful for the packers generally to adopt some such description as Mr. Sandel suggested, as "Improved Knife Handles" or "Swift and Company Standard," or something of that sort? Take for example this knife, from the standpoint of accident prevention, that is probably guarded but, inasmuch as the guarding consists of this stop, it does not quite come up to the definition of "guarded." You might very properly call it "Swift and Company's Standard Knife" or "Improved Knife Handle," it seems to me, and get away from this objection that Mr. Sandel mentioned.

MR. SANDEL: Our South St. Joseph place has issued a blueprint on these different handles.

(Mr. Sandel then explained the use of various guarded knives, in connection with the blueprint.)

MR. BROWN: What do you do to protect your steel?

MR. SANDEL: The only protection for steel is to put a round guard into the handle; fibre works out better than rubber.

MR. BROWN: What do you do to carry your knives to the dressing room.

MR. SANDEL: The men of the killing section are more or less going from place to place as they do their work and those men are provided with pouches, which hold four or five knives. They carry the pouch on the belt and usually at their back. We have very little trouble with those men getting them to carry the knives in the pouches to and from the dressing room, but we do have some trouble getting them to return the knife to the pouch as soon as they have finished. That is one point we are making a special drive on now. The men on the killing floor, however, have not been carrying any pouches, due to the fact that they use only two knives at the most and most of them use only one knife. That is the point we have taken up in several of our plants and will soon furnish all those men with pouches.

MR. BROWN: How about the girls in the trimming room?

MR. SANDEL: The girls in the trimming room we have furnished with a canvas bag large enough to hold all the knives they will use and a whetstone and we make one pocket in the bag for the whetstone and one for the knives. The pockets are deeper than the blades of the knife, so when the knife is put into the pocket, the handle is held at the top and the point of it does not touch the bottom, so that there is no chance of the knife cutting any person or hurting her by projecting through.

MR. BROWN: Has anybody else any ideas on carrying knives to and fro?

MR. McCLELLAN: Mr. Sandel, what guard do you use for ham boning and legging sheep?

MR. SANDEL: I am sorry I cannot tell you about the ham boning, because there we have not been able to get anything that works out satisfactorily.

MR. EATON: That is just my trouble.

MR. SANDEL: The same way on the beef boning, although the men at South St. Joseph believe that this is a guard which will work out satisfactorily on beef boning. That was the idea of putting that ring on the handle, so they could use it in this way and when they change the hand, the ring would be there to guard.

MR. McCLELLAN: Do you furnish these pouches?

MR. SANDEL: No, they furnish their own. At East St. Louis they have purchased those canvas sacks for the girls in the trimming room, I believe.

MR. BROWN: Mack, how do you carry your knives?

MR. McCLELLAN: They are furnished with little wooden boxes to put the knives in.

MR. BONSIB: I would like to say a few words about knife cuts in the tanning industry. In cutting sole leather especially, there have been several accidents, due to the knife slipping and cutting the tendons. One of the plants conducted a number of experiments with various types of

guards. It was found that the use of wire irritated the hands, which might lead to infection, so they developed a guard something like this. That prong is not curved enough to give a real good hold; the thing is apt to slip out and scratch the fingers, but this type of knife has been found to increase the efficiency of the man by giving him a stronger hold, as well as decreasing accidents. Since they have introduced this type of guard, they have never had any knife cut injuries. They make them for right-handed and left-handed men, by simply changing the guard.

CHAIRMAN DRUMMOND: I am wondering, Mr. Bonsib, whether the use of copper would not increase the chance of infection, rather than decrease it.

MR. BONSI: Copper is the germicide. The only trouble is that copper might corrode under the influence of some acid, such as sulphur, but copper itself is a germicide. You have seen the green film on copper, which is disastrous to the internal organs, but from an infectional standpoint, you have never heard of an infection caused by copper—at least I never have. In fact, I am under the impression that copper is one of the few metals that has a germicidal action.

CHAIRMAN DRUMMOND: That is rather important information. I rather felt the other way about it.

MR. BONSI: That is the common impression. You have heard of people being poisoned by eating this, but that is the action of acetic acid on copper, but regarding an infection, or anything of that sort, I have never heard of a case. I may be wrong, but judging from my own experience, this is so.

CHAIRMAN DRUMMOND: I don't want to terminate this mighty interesting discussion, but Mr. Batchelder has prepared a paper on "Burns and Scalds" and can probably give us some good information along those lines.

#### BURNS AND SCALDS—TANNING INDUSTRY

HENRY K. BATCHELDER, A. C. LAWRENCE LEATHER COMPANY, PEABODY, MASS.

In the tanning industry the A. C. Lawrence Leather Company was quick to realize the importance of the safety movement, and as one of the pioneers in accident prevention work in Massachusetts took up the task in their usual whole-hearted way. At first we shared the thought, then prevalent, that all accidents in our factories were caused by machinery, but after the thorough guarding of machinery, and taking all precautionary means to make our buildings safe, we realized the importance of the education of our employees, and we turned toward this phase of safety work.

A study of the industrial accident hazards shows conclusively that every industry has a particular occupational hazard—so the manufacture of leather-tanning has its burns and scalds. These occur in numerous ways and may be classified as follows: lime burns; acid burns; scalds; friction burns; steam pipe burns.

## LIME BURNS

Lime burns are most frequent and in our experience most severe. Lime burns are of two types, the first being a surface burn which readily responds to treatment, the second which is at first superficial, but rapidly develops into a deep-seated affair having all the characteristics of a boil and is treated not as a burn but by incision and drainage. We have had a fatal case as the result of a man getting a solution of lime in his rubber boot. He carelessly neglected bringing the matter to the attention of his foreman and continued to work throughout the day in this condition in spite of the burning sensation which he must have felt. Blood poisoning set in and this man died after a period of intense suffering. Lime burns are caused by the use of slacked lime in conjunction with other chemicals to remove hair from hides preparatory to tanning. It is a fact that some men are more susceptible to lime burns than others, especially new men until such time as they become "seasoned on the job." Among Beamhouse men who have been following the trade for years lime burns are almost negligible.

Our company furnishes each employee engaged on this work with rubber gauntlets, gloves, sleevelets, and aprons, also insists that they wear rubber boots in good condition, and not wear imperfect gloves, but in spite of constant warnings they allow the finger tips of gloves to break open, with the result that the chemical action of the lime attacks the epidermis of the exposed members, and with the usual neglect of slight burns on the part of the average man, the constant rubbing causes the skin to break open and become infected.

Our experience over the past few years proves conclusively that lime burns can be reduced to a minimum by education of employees in protecting their hands, arms, and feet with proper rubber covering. In the past two years this class of injury has been reduced 50 per cent, and our statistics just completed for 6 months ending July 1, 1920, show that we have reduced this hazard 30 per cent over the year 1919. The reason for the improvement we feel to be in a great measure due to the attention given to this feature of safety work.

## ACID BURNS

Sulphuric and muriatic acid are extensively used in the tanning industry and when carelessly handled cause burns of a most severe kind. A few drops spattered in the eyes may result in partial or complete blindness. When the carboys of acid are received the metal cap over the top of the carboy is fastened on with plaster of Paris. The action of the acid sometimes causes this top to become loosened and in order that an accident may not occur from this cause in unloading and moving all carboys, a piece of burlap is thrown over the top of the carboy so that if the top does become loose it will not spatter on the man handling it. We have also installed in all departments a pyrene acid pump which we find has been of great service in reducing the hazard of acid spattering on a man while transferring it from the carboy to a measure in its use in the factory.

**SCALDS**

One of the most frequent reasons for a man to be scalded was that the cold water and steam valves being generally placed together for convenience in the work men in haste frequently opened the steam valve instead of the cold water valve with the consequent result of a severe scald. These scalds have been reduced to almost nil by the use of metal tags on the wheel of the valves.

**EMBOSSING MACHINE BURNS**

Up to a few years ago (or to be more explicit, up to the time when our company first gave serious consideration to the safety movement) embossing machine burns were quite frequent. At that time little or no attention was paid to the guarding of the embossing machine and although the burns were insignificant as compared with the loss of hands and arms, however the burns caused by the hot plates closing in on these members which were withdrawn before being crushed, were both numerous and severe.

A study of the hazard of the embossing machine was made and in order to combat this hazard a table was installed on each machine which automatically rises when the machine is tripped as the machine closes, pushing the body, hands, and arms of the man away from the machine. This device has almost entirely eliminated the major hazard and likewise reduced the burns.

**FRICTION BURNS ON BUFFING WHEELS**

The buffing of leather on an emery wheel requires considerable skill and as the skin or hide must be passed directly over the exposed surface of the wheel by the operator's hands regulating the pressure according to the condition of the stock, sometimes while buffing a shank or the edge of the skin, the skin breaks or the operator's hands slip over the skin onto the surface of the wheel. This causes a friction burn generally on the under side of the wrist. We do not know at present of any guard that would be practical to prevent these burns that could be used without seriously interfering with the operation.

**STEAM PIPE BURNS**

In the old days this was quite some hazard but steam pipe burns have been reduced in recent years due to improved methods of drying leather by machinery, also to covering of all exposed piping with wire guards both for safety and the elimination of the fire hazard, also the better covering of main and branch lines with asbestos.

**TREATMENT OF BURNS AND SCALDS**

Burns and scalds are injuries due to the action of heat. Scalds are due to heated fluids or vapors. There is no pathological difference between burns and scalds. Burns have been classified into six degrees as follows.

1. Characterized by redness

2. Characterized by inflammation with formation of blisters
3. Characterized by partial destruction of the skin which structure is not, however, entirely burned through
4. Characterized by destruction of the skin to the tissue beneath
5. Characterized by destruction of the skin and part of the muscular layer
6. Characterized by destruction of the whole thickness of the muscles

The local treatment varies with the degree of the burn. In burns of the first and second degrees a bland ointment (such as 3 per cent soda bi-carb. in vaseline) though not antiseptic, makes a comfortable dressing. The 1 per cent picric acid solution treatment, which consists in applying gauze moistened in the solution, is good. It greatly decreases the pain, but should be used only in limited burns of the first and second degrees. If used in a large or deep burn it may poison the patient. When extensive destruction of tissue has taken place, skin grafting should be begun as early as possible. This, of course, is a hospital measure. The greatest advance in treatment of burns was brought about by a Frenchman in the early part of the late war. This consisted in the application of a hot wax compound directly to the burned area. The method is as follows:

The part is freed from any foreign matter and cleansed with a 2 per cent solution of chloramine T. It is then thoroughly dried with a hot-air dryer, or by gently mopping with wads of soft gauze. The wax which is heated to a temperature of 140° to 150° is applied with a cotton swab over the entire area. The part is then covered with a thin sheet of absorbent cotton and another coat of wax applied. Over this the usual gauze and bandage dressing. This is repeated daily.

This treatment has many advantages in that it is painless to apply, quickly hardens and so seals the area from outside air, is readily removed (as easily as a glove from the hand) without injury to the new forming tissue and seems to promote the growth of new skin with a minimum of scarring.

The treatment as outlined is the usual procedure at our plants. Our medical staff consists of a full-time physician, one trained nurse, together with several first aid workers. These first aid workers are stationed at each of our three plants in Peabody where we have at each plant well fitted hospital rooms.

#### ORGANIZATION

Our organization is probably similar in many respects to that of other companies engaged in safety work. We appoint a safety committee made up of five members, each selected from a unit manufacturing different lines. Each unit has a leader who is given the title of safety director of his unit and is responsible for the results of his unit. This committee plan and execute all safety activities with the chairman of the safety committee. A few of the main features of activity are our monthly foremen's meetings, monthly workmen's inspections of all plants, bulletin boards, articles published twice monthly in our Factory Magazine the "A. C. L.," pay envelope publicity and blue-print charts of statistics showing severity, frequency, and costs monthly.

The monthly foremen's meeting is the most potent factor in effecting a reduction in accidents and hazards. At these meetings we have some of the foremost speakers on this subject in our section. The Safety Directors make a report on all accidents in their unit for the past month showing how they occurred, who was responsible and what has been done to prevent a repetition. Next the plant physician makes his report from a medical standpoint on the same accidents and his recommendation covering same.

The phases of each accident are then threshed out with the particular foremen in the department where the accidents occurred so that the foremen are fully conversant with their responsibilities as safety supervisors.

In our factories we have achieved wonders in the reduction of the number and seriousness of accidents since the formation of safety committees and educational propaganda of the past few years. The reduction which has been increased with each year is a great source of gratification to us, for it surely indicates that our people are all co-operating for a "safe place to work."

#### DISCUSSION

MR. McCLELLAN: Not being familiar with leather, I would like to take up a moment to explain something we have in our plant. For the ripping, which is done on the cutting floor, we have a leather wristlet. The thought occurred to me that if the leather was brought over the hand, it might stop the friction.

MR. BATCHELDER: They lay their hands on the leather. They have to have the feel of the hand to do the work properly. It might cover the wrist all right.

MR. BONSIB: In connection with burns, I found that tags are not nearly so effective as brilliant colors to distinguish cold and hot water, etc. We tried that out at the Pacific Coast in one of the shipyards. We found that tags did not work at all and there were occasions when those tags disappeared for one reason or another, but by painting it some brilliant color, they will take more precaution. In one plant we painted the hot water a real brilliant red and that was so prominent that a fellow could not possibly make a mistake and, if he could not read a tag, the fact that red is usually a danger color would appeal to him. We have started a plan in our plant of using standardized colors for each of our pipes.

There has always been a number of burns on account of the shower bath not provided with proper regulators and I would like to emphasize the fact that if any of you have shower baths in your plants that you be sure and get some form of regulator that works, so it is not possible for a man to get under a shower and think it is cold and then have the water scalding hot. That has happened and I want to emphasize that. There are several good regulators on the market now; they don't cost very much and it is impossible for a man to get scalded. A regulator should not be where a man can get to it. It should be set by the engineer. Man is essentially a curious creature. I have never seen a man who did not want to investigate how a thing is put together, so put the regulator where



the man can't get it and have it in charge of the Master Mechanic, or somebody who understands it.

In connection with acid burns, I think it is very important to have the supply of running water near where acid is handled. At some plants I find that they have tablets in which ammonia carbonate is used for the body and soda bicarbonate for the eyes, but there is nothing which will come up to a bountiful supply of running water to wash out, rather than treating it. That is something important which I would like to emphasize, a bountiful supply of running water near places where accidents happen.

In connection with the rocker, somehow or other unless the foreman or somebody is on the job when the new carboy is put on, it gets loose. The pump seems to be popular with people—they seem to like to play with it, although I am inclined to think the pump is better.

CHAIRMAN DRUMMOND: I went through a large acid plant recently and I noticed they had a shower and would rush the man right in and get plenty of cold water to wash everything off as soon as possible and the treatment followed that.

ADJOURNMENT.

## FRIDAY MORNING SESSION

THE meeting convened at 9:30 a. m., Mr. A. B. Drummond presiding.

CHAIRMAN DRUMMOND: We have a new member who has not been with us on the previous meetings, Mr. A. A. Bureau, Safety Engineer of Morris and Company, Chicago. Mr. Bureau is going to read a paper on "Value of Physical Examinations and Reconstruction".

MR. BUREAU: Gentlemen, we have found in our plant substantially what I have noted here and if you want to ask anything about any of these details, have us furnish any charts or anything of the sort, we will be glad to do so.

## PHYSICAL EXAMINATIONS AND RECONSTRUCTION

A. A. BUREAU, SAFETY ENGINEER, MORRIS AND COMPANY, CHICAGO

One of the great problems today before the Industrial Committees of big industry is the finding of the exact place physical examinations should occupy in the selection of employees. In the past we have hired men upon the basis of education or skill. In this day when physical examinations (army and industrial) are so common, we are beginning to realize that there is still another great factor in the hiring and placing of men. A man's mental alertness, soundness of judgment, or efficiency and skill in his trade depend, to a large extent, upon his physical condition. A man in poor health is like a dirty machine. He cannot make his body respond quickly in the face of impending danger. Also, he cannot do his best regardless of how good the working conditions may be. As to

safety, an abnormal man is never 100 per cent mentally or physically alert. As such, he decreases the safety of his fellow workers. Accidents are costly misfortunes, both in human suffering and cold cash. As to efficiency, anything less than his best is a decrease in the production of that department. The loss in production caused by the physical health of one man, when multiplied by many such men, soon can make a marked difference in the total amount of production for the plant. Therefore, the physical condition of the employees is an important factor; first, in the reduction of accidents, and second, in the cost of production.

Looking upon physical examinations as one means of controlling the number of accidents and the cost of production, I believe that the place of the physical examination department shall be looked upon more and more as an absolutely essential part in any well-regulated industrial organization. Also there will, as time goes on, be more emphasis laid upon the grading of workers as to their physical fitness to perform the work of the particular job for which they are hired. In industries where there are no physical examinations, they will be required, and in industries now conducting such, the work will be done with more care and precision.

Physical examinations as now conducted in army, civil, or industrial life, are to keep out the physically unfit from that particular organization. The army refused the imperfect man, the life insurance company rejects the poor risk, and the industrial organization turns down the man liable to be injured at his work. Then we have the just-passable class in industry which may be in the unfit class of tomorrow. Our physical examinations accordingly in the future must take on a broader scope—in other words, if they are to serve the community and industry as a whole they must build up some form of reconstruction work to be followed among their employees.

In this brief introduction, we have seen the reasons why physical examinations have a place in industry, a glimpse of what their future must be, and a bird's-eye view of their present status. Now let us examine step by step how we provide for the safety of our employees in the elimination of the unfit and in medical reconstruction.

EMPLOYMENT MANAGER MUST BE HELD ACCOUNTABLE FOR CLASS OF MEN  
HE HIRES

The first step in the elimination of the unfit takes place in the Employment Office. It is the duty of the employment manager to hire those he deems good risks of industry—that is, men who have the necessary strength and energy to perform safely the duties of the jobs open and to pass up the run-down and the physically unfit otherwise. This may seem a divergence from the subject, but it is a very important step and must not be overlooked. The doctor's office is not then made a weeding out station. The doctor must ever stand as the friend of the plant worker. In fact, he must take the place of the employer, as the caretaker of his injured employees. In the olden days in case of an accident, the boss went personally and looked after his hired man. But the times and conditions

have changed with the rise of big industry. In his examinations, the examining physician must stand as a reconstructionist, if confidence is to be placed upon his advice for the physical upbuilding of the one examined. If the doctor's office is seen as their true friend in the time of their physical disability, there can be no more powerful influence in the getting of the good will of the employees. Therefore, the doctors should be called upon to reject very few men; in fact, only in case where the disabilities are hidden. The employment manager must be held strictly accountable for the class of men he hires. It makes a much better impression with labor to pass up a man than to have him rejected because he cannot come up to the company's set rule. Under no circumstances, should the employment man be allowed to pass the buck to the doctor's office for the rejection of all the unfit.

#### EXAMINE MEN AFTER THEY HAVE GONE TO WORK

After the hiring of the applicant ultimately comes the physical test for fitness. The examination may be conducted immediately and before the man goes to his job or after he has been on his job for a few days. We examine our men after they have gone to work. Several obvious reasons present themselves for this procedure. First it is easier to induce the men to go to work. They do not have ever in their mind that immediately following the acceptance of the job they will have to be subjected to a physical examination—a thing ever repulsive to the workers. This way they will be given a chance to see if they like their job and want to stay with it. Our experience is that the men don't mind the physical examinations so much after they are hired. In fact, a refusal is a rare thing. These are usually among the ignorant whites.

Second, the examinations can be made more thorough and will be of greater benefit to the employees. Our big hiring day is Monday. The rest of the week is slow in comparison. Thus, if the doctor had to examine all of Monday's applicants on Monday, he could do nothing else but give them a very superficial examination. In very few cases could he actually take time to give advice. If the doctor has more time, he can advise each one personally. Also, he will have only as many as he can handle by calling the applicants from their work.

Third, examinations on which the doctor can spend time and give adequate counsel create loyalty to the company, and will give the man a view that the company's doctor is a real friend, not one who does just as little as possible because he is a company doctor.

The calling of the men up to the doctor's office is an ordinary matter of routine. First, the time office furnishes a list of additions, transfers, and take-offs from the payroll to the examining physician's clerk. Then he makes up a list of the men required for examination. The record card of those transferred is automatically renumbered and refilled. The record cards of the take-offs are removed from the live file and placed in the dead file. The list of the unexamined is sent to the different foremen by a messenger boy who goes to each and notifies him of the men he is to send to the doctor's office that day. The foreman gets a duplicate copy of the

list and puts his name on the original list to show that he has been duly notified, and he is thus held responsible for sending those men to the examining room that day as he can spare his men. With each man is returned an O. K. card to show the foreman that the man has been to the doctor's office, examined, and accepted.

The examinations are conducted more or less on the army style. We have the applicant remove his clothing. Every irregularity is diagnosed and noted on his record card. The examinations are thorough in every respect. Then at the bottom of the card we note our opinion of the safety risk and fitness of the applicant.

#### STUDIES OF PHYSICAL EXAMINATION FINDINGS

During the month of July we made some rather broad studies of our physical examination findings, based upon the record cards of 855 men. It rather startled us at first to find so many defective men; however, in a study made by a Life Insurance Company, it reported only a little over two per cent of the men they examined were found perfect. Out of this 855, we found sixty-eight men, or 8 per cent had some defect of the hand or arm, such as amputated fingers, stiff joints, rheumatism, cut tendons, etc. Thirty-three men, or approximately 4 per cent, had some defects of the feet, as bunions, deformed toes, amputations, etc. Fifty-eight men, or about 7 per cent, possessed some varicose veins which, in most cases, are not now serious but will in old age be a very serious annoyance. Two hundred and sixty-two, or 30 per cent, were afflicted with flat feet. This includes from slight to extreme flat feet. One hundred and fourteen men, or 13.4 per cent, had some form of organic heart disease. Seventy-seven, or 9 per cent, possessed a hernia, either umbilical, single or double inguinal hernia. Seventy-six men, or 9 per cent, had piles. Nine men, or 1 per cent, were found to be blind in one eye. Taking 20/40 as a basis for poor vision, sixty-five were found to have poor vision in one eye and ninety-seven, or 11 per cent, to have poor vision in both eyes. Also, we found sixteen other defects of the eyes, such as strabismus, cataracts, nystagmus, ulcers of the eye, etc. Six men were found with some form of venereal disease. In most of the cases, the defects were minor and did not affect the efficiency of the worker to any great extent. However, they make him liable to accidents.

In a more recent examination at our car shops of 182 men, we found 55 defects which made the men employed more or less of a risk to the company. Of this number of men we classed 142 men as good safety risks, 34 men as fair safety risks—that is, they were passable—and 6 were classed as poor risks, or below the standard to be employed.

The causes for which we reject men are: First, contagious diseases of various sorts, such as venereal diseases, tuberculosis, and skin rashes, and eye diseases; second, poor safety risks. This includes those who are more or less a safety risk to the plant, endangering their own well being or that of their fellow employees. In this class are hernias, very poor vision, paralysis, fits, and the like. When possible, we place this class of men in positions that do not require the same energy or strength as

the ordinary job. Third, the physically undesirable, those who should not work at some particular classes of work. This includes the weak lunged in the fertilizer or hair house, rheumatic people in the pork room, tripe room, or freezers, where there are wet and cold conditions. In most of these cases we try to find something else open in our plant where these men may work without injury to their health.

#### PHYSICAL RECONSTRUCTION WORK

Our physical reconstruction work may be divided into three different classes: First, medical advice (a) advice regarding simple medical treatment which they can do for themselves, and (b) advice as to the work which they can and cannot perform to their physical well being; Second, medical and surgical aid; Third, advice and instruction as to free dispensaries.

For minor medical cases we often write a prescription. In many cases we recommend something that the man can buy at the drug store at a very small cost. This applies to skin rashes of a non-contagious nature, bronchitis, colds, etc.

In the case of bad varicose veins we either recommend that the man have an operation for the same or wear a rubber elastic stocking.

In the heart cases we give these men advice as to what kind of work they can do with safety to their health and also general advice such as to avoid running upstairs and the like.

Our venereal cases are simply directed to go to a good physician and get a permanent cure or go to a government or city dispensary and get the proper medical treatment there; also to avoid quacks. In no case do we allow them in the food producing departments.

For hernias we advise operations. To the young man we especially recommend an immediate operation while he is young and can easily undergo the operation. In the case of an old man we recommend that he get a truss. In all cases, we require either an operation or the wearing of a truss before they come back to work.

Also we find a lot of men who have not been vaccinated, especially among the colored. Here we require vaccination either by their own doctors or the examining physician.

In case of failing vision we lay strong emphasis upon securing of the proper glasses for their eyes. If they haven't the money to purchase glasses, we send them to a certain eye dispensary where they only have to pay for the lenses.

The amount of ignorance prevailing among the ordinary workman, as to where he can get free medical attention without cost or expense to himself, is appalling. In most cases, this free medical attention is far better than he could afford. In the large cities there are hundreds of free dispensaries for every kind of an ailment, dental, eye, operative, skin, lung, medical, etc.

Many workmen have serious defects often unsuspected by themselves. Many come in who have no idea as to the condition of their lungs, others as to their heart, etc. Most workmen do not realize the seriousness of

having a hernia. We question them about it and advise the proper treatment, and they will come back invariably with the statement that it has never bothered them. Many would rather quit their job than buy and wear a truss. Many do not suspect at all that they have a hernia,—in fact, good sized hernia,—until it is brought to their attention. One case especially, the old colored man said to the doctor, "I got a swelling and I've been putting everything on it, salve and poultices, and it won't go away." What he had was a hernia.

Then there should be physical examinations of the old employees at intervals to reveal if there is an approaching disease. Many a disease, if caught at the beginning, can be forestalled or warded off. The great trouble is that most workmen allow the disease to get a great hold upon them before seeking proper medical service. In fact, statistics show that 650,000 workmen die every year from preventable disease.

The finding of the unsuspected defects is the greatest good that can be derived from a physical examination department. Only in this way can the man, his company, or the community be able to help him in maintaining his good health. If for no other reason, this aid to the individual employee will justify the existence of physical examinations in every industrial organization. Then the placing of men in jobs according to their strength and energy often saves the loss of life and limb. The saving of one life is worth the necessary expense of a whole department.

In conclusion, I wish to say first, that the hiring of men under a physical examination system is the only way of intelligently employing men. When the employer does not know the fitness of his men or the men do not know their own fitness, it is as though the blind hired the blind. Second, that physical examinations are not conducted to bar men from industry, but to place them where the safety of their own well being is not endangered. Third, that by the examination system only can the employer get at his men to carry on any kind of physical reconstruction work among his employees. Fourth, from the view-point of efficiency, physical examinations are essential. To industries where they do not place their men according to their physical fitness, weak help is paid for very heavily. Fifth and last, from the view-point of safety to the employees, physical examinations are not only absolutely essential, but should be required by the community for its own protection. No industry, because of its lack of oversight over its employees' physical condition, has a right to turn out men upon the community crippled and inefficient to be more or less a public charge.

Physical examinations pay from every point of view—safety, efficiency, humanitarian, and cold cash.

CHAIRMAN DRUMMOND: Are there any questions?

#### DISCUSSION

MR. BONSIB: I believe in the very near future every company is going to adopt physical examinations. I know during the stress of war, labor was scarce and they were glad to get any kind of help, but with increased cost it will be necessary to economize and the best economy is getting an

efficient man on the job, who can produce. I would like to ask Mr. Bureau just how thoroughly the men are examined. Is it a thorough examination such as the Life Extension Institute gives; or general?

MR. BUREAU: An absolutely complete examination, from head to toe, lungs, eyes, and everything that can be taken in in the examination.

MR. BONSB: Is a copy of that report placed in the hands of the superintendent of the department or is that sent to the doctor?

MR. BUREAU: It is held in the doctor's office and the superintendent is notified that the man has been accepted for the work.

MR. BONSB: Do you think it would be of any benefit to have a copy sent to the superintendent? Don't you think that would give the superintendent a better chance to understand the men individually and not ask them, in a burst of enthusiasm, to do things they are not fit to do.

MR. BUREAU: A man can't be changed from one job to another without a re-examination for the work.

CHAIRMAN DRUMMOND: I should think the record of a man's physical condition is a thing between his physician and himself. There is enough opposition by the labor organizations against physical examination to make it more or less of a matter between the man and the doctor. The labor organizations are opposed to physical examination, because in the past it has been used to weed out.

MR. BONSB: I did not mean the complete examination should be given, but if the man would know an employees' principal defect (not make it public) I am wondering if it would be advisable. Of course, I think the complete examination should be confidential between the medical officer and the man.

CHAIRMAN DRUMMOND: I think your idea is good and might be worked out on a code system. For instance, a man in Class "A" might have a defective heart, in Class "B" defective lungs, and so on.

MR. BUREAU: We have a series of charts covering that exact thing. We haven't got it in practice yet, but are working up the chart.

CHAIRMAN DRUMMOND: Regarding the thoroughness of examination, would it cover urinalysis and would you make a Wassermann test on each man?

MR. BUREAU: No, the examination is nothing further than what you can give a man on his general physical condition, including eyes, lungs, and any venereal disease that is shown.

CHAIRMAN DRUMMOND: In other words, nothing except the ordinary physical examination, with the aid of the stethoscope? They don't make a urinalysis test in each case?

MR. BUREAU: In cases we suspect, but not in all cases.

MR. SANDEL: I have an idea that you might incur considerable opposition from a good many men, if you attempt to perform this Wassermann test. We had this point up at our East St. Louis plant some time ago and because of the fact that we have so many colored people there and the doctor's attitude toward the help was not quite right, there was opposition.

CHAIRMAN DRUMMOND: I did not mean to give the impression that I

was in favor of the Wassermann test, but I was trying to assist Mr. Bonsib to see how complete the examination was.

MR. BONSIK: A question of urinalysis, of course, is something that has to be determined by the doctors and we are not doctors, but it seems to me that is a very important thing that should receive more attention than the others, because that is indicating a hidden condition, which you can't determine any other way. I know a case where a man was apparently all right; he was hired and it turned out later that he was not as good as he looked to be. In other words, we have all some time during our lives bought a nice rosy apple on a fruit stand and biting into it found that it had a hollow core. That is my reason for mentioning that. It is a good thing for us to think about, because in lots of places the medical department is in close connection with the safety department.

MR. SANDEL: I would like to ask Mr. Bureau if his company carries any group insurance and if the time of physical examinations is determined in any way by insurance features.

MR. BUREAU: We conduct our physical examinations as we see fit.

CHAIRMAN DRUMMOND: I believe that Morris and Company has an employees' mutual benefit fund, in connection with their work.

MR. BUREAU: We have.

MR. SCHMIDT: I have been connected with one of the large packing house concerns in Buffalo, New York, and there was quite a little opposition shown first to the physical examination of the employees.

CHAIRMAN DRUMMOND: I wonder if Mr. Bureau would tell us of the method used in making examination of women employees?

MR. BUREAU: We have not yet started to make the actual examination of women employees, but we are working on that now.

CHAIRMAN DRUMMOND: Is it the intention to use the same doctor for examination of women as you are using for the men?

MR. BUREAU: I think we shall have to employ a woman for the women.

MR. McCLELLAN: Armour and Company has employed a woman.

MR. BONSIK: I would like to ask if you insist on a physical examination of the foreman. That is a point the men raise with respect to physical examination, "If they examine us, why not the bosses?"

MR. SCHMIDT: The superintendent at our plant is firmly determined to have all examined and says "All," and I was included in that examination. He says we must make no distinction. We are all examined and he was the first one that went up to the doctor and said, "Here I am," and the President of the organization said, "I want my record in this office, to show whether I will live fifty years more or not."

CHAIRMAN DRUMMOND: At our plant we make examinations of every one on the operating end. We have not yet got in the office, except in those cases where the members of the employees' mutual benefit fund are office workers, and then they have the examination, too. I think it is mighty wise to have every one included in the examination. It removed a lot of objection.

Any further discussion on physical examinations? It is a mighty important subject and some things that haven't been disclosed yet might be asked.



If not, Mr. Squires of the White Motor Company, Chicago, will read his paper on "Motor Truck Accidents." In Chicago quite recently they attempted to organize, and have been very successful, an automobile section, the main idea being to create a greater interest in the public, especially among the drivers of automobile trucks that you can't control, so twenty-five or thirty large corporations with large fleets of motor cars, including the street car companies, have become very much interested and have prepared a series of lessons that I think are mighty fine.

### MOTOR TRUCK ACCIDENTS

F. H. SQUIRES, WHITE MOTOR CAR COMPANY, CHICAGO

I have not had time really to write on the things I would say. I had one thought, however, that this "Motor Truck Accident" topic probably might be introduced, carried through, and closed by a suggestion, that wherever motor trucks are handled, we imitate the soap ad by "Good morning, have you tested your brakes?"

#### MENTAL ATTITUDE AND PHYSICAL DEFECTS OF OPERATOR

The brake system of any motor vehicle is probably one of the most important things about it and keeping them in proper shape and operating them properly means much toward the prevention of accidents. In thinking over this subject, it appears that the causes of motor truck accidents may be practically listed under the four heads, first the mental attitude of the operator of the motor vehicle; that is, as to whether he is careless or reckless, has a bad temper or criminal disposition, whether he is revengeful, considerate of other people, whether he is discourteous, lazy, whether he has poor judgment,—all mental conditions which in the negative mean sooner or later that something will happen, something that is not right.

Second, physical defects in the operator. The paper just read has been very interesting, the discussion also; right along that line, indicating that the physical well being of the individual employee means much toward efficiency in any kind of work he does. It means much toward prevention of accidents, of the spreading of disease. In the operation of motor vehicles, physical defects may have much to do with the safe or unsafe operation of vehicles. For example, bad sight, bad hearing, physical weakness, make a fellow unable to handle the vehicle of which he is put in charge. If the fellow is tired or sleepy, if he spends a lot of time off duty out on the street, or somewhere where he is not getting the proper rest, he can not do his work properly. A man who goes to sleep at the wheel is a rather dangerous operator. I know—I tried it once, but fortunately did not have a serious accident, but awakened up very suddenly. I have noticed a number of operators with deformed limbs who have attempted to handle trucks. The other day I saw a man with his left foot bandaged up and he could not put pressure on it. It is a very unsafe proposition.

## MECHANICAL DEFECTS AND HAZARDS OF OPERATING CONDITIONS

Third, mechanical shortcomings in the vehicle itself; if your brakes are out of order, will not stop the vehicle or control it, if your clutches are slipping, if your engine is out of order, missing cylinders and not working right, if the wheels and the tires of the vehicle are not in proper condition, not properly set, these things will all lead to accidents. If the steering mechanism, next to the brakes, is bad or weak, that is a mighty dangerous thing. I can think of nothing more awful than a wild motor truck, that is, one that can't be steered. Then if the lubrication system is bad, something happens that causes accidents.

Fourth, conditions under which motor vehicles are operated. Just a little misty rain on the street will make the pavement like a glass surface—heavy rain is a more satisfactory driving condition. Water on the pavement sometimes makes your brakes refuse to work and in checking up the statistics of the Police Department and the Coroner's Department, many, many times you will find the testimony "My brake refused to work". A man charged with manslaughter or criminal negligence, or that sort of thing, said, "I tried to stop the vehicle and the brakes would not work." The obscure causes are bad corners, bad grades and congested traffic conditions.

## ACCIDENT STATISTICS

Last year in Chicago the total number of people injured in accidents, in which motor vehicles were concerned, was 5,299 persons; 274 of these were fatal. Of this number motor trucks were responsible for a total of 962, of which 91 were fatal. This year, up to September 1, there were 109 deaths chargeable to motor trucks. This morning's *Tribune* says that three died from motor vehicle accidents in Chicago. There seems to be quite a considerable increase in the number of accidents, but naturally there would be because there is such a tremendous number of vehicles in operation and that accounts for it.

In New York City, the total number of deaths in 1919 was 767, not quite double the number in Chicago. The total number of deaths for the first seven months in 1920 was 298.

So much for statistics. They give one some idea of why there should be desperate efforts along the line of preventing such sacrifices and I would suggest as a slogan along this line that you put before your chauffeurs or operators of your vehicles a printed slogan, on the windshield, that it is better to be safe than sorry.

## N. S. C. LESSON OUTLINES

A reference to the lessons gotten out by the Safety Council will give you a better idea of what they are doing and through these lessons you can get tremendous help, wonderful ideas of how to promote safety in the operation of motor trucks. For example, they have twelve lessons outlined.

In checking over these things, this is one thing that appealed to me. I have been interested a good deal in the past, and still am, in rifle

shooting, hunting, and that sort of thing. I have given some thought and a little time to this and it occurred to me to check up what a motor truck means on the street as a projectile. Did you ever think of it in that way? Take a five ton truck, for example. You have about a ten thousand pound weight and, if traveling down the street at ten miles an hour, you have there about 300,000 foot pounds of energy. That energy, concentrated on an object, would bring ruin to anything short of a very thick concrete wall. Now, if you increase that speed, you increase your damage accordingly. I just suggest this as a thought that you might carry with you and I would recommend still further another old adage as a slogan. That is, when it comes to the handling of motor trucks, we shall always find that an ounce of prevention is worth a pound of cure. That is true in handling the brakes, in handling the power plant, the lubrication and that sort of thing. It is just a little tiny step in taking care of the vehicle in proper shape so it is in position to operate.

"GOOD MORNING, HAVE YOU TESTED YOUR BRAKES?"

Use the slogan, "Good morning, have you tested your brakes?" If the brakes are not right or out of adjustment, the control rod broken or anything of that sort when you leave the garage, turn around and go back to the garage, and make that a last thought. "Go back and fix the brakes." If you have a knock in the motor and it sounds like a connecting rod bearing, your lubrication is not right—don't run another foot. For example, a man operating a truck on the south side of Chicago called at our service station one day and said, "This truck has a kind of knock in it and I don't know whether I should run it or not." The service man said, "Describe it." He said, "I had been driving along pretty good and it started knocking more than it was." The service man said, "If it has a knock like that, I imagine it is a bearing knock, although I can't tell from what you say to me, but find out what it is and get it fixed." The next morning he came up with parts of the crank case connecting rod and said, "On the crossing the connecting rod went out through the crank case and smashed it to pieces." Well, it meant an expense of several hundred dollars. We had the whole thing fixed up, new tank, rod bearings, new motor, because the whole thing exploded, it was a wreck. That is just one of those careless things, in which the ounce of prevention is worth a pound of cure, and so on down through the line.

Another thing I had in mind was a passenger car (I happened to be in the car) and my brother-in-law was operating it. He had a knock in the car and it was losing power. I said, "George, I would not run it if it was my car. I am positive it is a connecting rod and you are taking a chance every foot you run. Every time the motor turns over, it may reach the point where it will not hold any longer." He said, "Oh, we will go a little farther." I said, "You do as you like, but if it were my car, I would not run it." The next morning we went to get it, opened it up and found that the oil pipe had broken next to the pump and the oil had been pumped out of the motor so we were running the motor without lubrication and three bearings were badly burned. One was gone entirely.

If we had stopped in the first place, we might have saved all but the one bearing, so an ounce of prevention is worth a pound of cure. In other words, one can't be too careful.

CHAIRMAN DRUMMOND: Mr. Squires, I was just wondering whether you could not read a few little lines out of the lessons, just one or two little things that strike you on the lubrication as being worth while.

(Mr. Squires read from the lessons prepared by the Safety Council several paragraphs regarding lubrication. Lesson No. 2, "Safety Lessons for Automobile Drivers." This may be obtained from N. S. C. headquarters.)

CHAIRMAN DRUMMOND: There has not been sufficient attention paid by the majority of people to street accidents and it became necessary that something be done to arouse a little more interest and I don't know where it could be more properly aroused and to a better advantage than in the National Safety Council and I believe street accidents are as much part of the work as anything, as nearly all of us have motor trucks or other vehicles running around the street, that we should look over. Insurance costs, of course, interest quite a few of us. If there is any question you have to ask on anything that may come to your mind, in regard to the accident prevention on motor trucks, I am sure Mr. Squires will be glad to answer it.

#### DISCUSSION

MEMBER: I might say that I came to the convention to hear his paper, as far as getting something from the convention is concerned. I would like to ask what method Mr. Squires is using in dealing with the human element, that is, seeing that rules and instructions are carried out by the man.

MR. SQUIRES: That is one of the hardest things to do. About the only way you can accomplish that is to deal with the psychological side of the thing, the mental condition of the driver. Personally, I am greatly in favor of the small bulletins that have been discussed in the committee meetings on this series of lessons—small poster bulletins illustrating the human side. For example, a recent bulletin published by the Safety Council showed a picture of a street car, and truck rushing down the wrong side of the street, a woman with a little boy in her arms and a little boy on her hand, trying to hurry her across the street, and here is the truck bearing down on her and the whole thing is labeled "Too late." It is hard to bring the same kind of feeling and sentiment to all individuals alike, but I imagine to a man who has a home of his own and wife and children, that very thing would stir within him a tremendous desire to be safe rather than sorry. The idea was suggested that a lot of these bulletins, pictorially illustrating the terrible things that happen when a man does not use his judgment, be posted right in front of him on the windshield, and it is everlastingly before him. Then he won't do a lot of things he might otherwise do. I believe in getting sessions together and talking things over and that is what these lessons do. It is considered here from the mechanical side and the human side. It is always better to be safe than sorry.

MEMBER: One more point I would like to ask Mr. Squire's opinion on is this: There is a manager of a large truck concern in Detroit, who lays great emphasis on the rule that the truck driver must never have anybody with him on the seat. They make that a primary requisite and, in fact, enforce the rule strictly. If the driver is found breaking that rule, he is liable to immediate discharge. I would like to ask Mr. Squires how universally that rule is adopted and what he thinks of it.

MR. SQUIRES: On that score, I could not give you the statistics, but it is my impression, from general observation, that it is not universally adopted. In many instances it could not be adopted very well, because heavy duty trucks, especially, require a helper, that is, the driver and helper, and where a helper is necessary he always wants to be on the seat. Then, I have met this condition also, that many concerns are requiring a cab built on the truck, wide enough to accommodate three people on the seat, instead of two. One concern I have in mind a few months ago bought some trucks and the men complained because they were not as wide as they wanted, that is, wide enough for three men on the seat.

MR. SANDEL: Not so very long ago a peculiar set of circumstances arose, in connection with the investigation of an automobile accident in Cleveland. One chauffeur was involved in three accidents and a careful inquiry of witnesses and examination of the truck, and his own story all tallied to the extent that this chauffeur was not responsible for the accident. It seems to the branch house manager and to our insurance department that this man was a victim of circumstances. The insurance department manager said that he was a carrier of bad luck and we thought the best thing in that case was to lay off the man, rather than keep him. The branch house manager said he was the best chauffeur he had and he hated to do so, but ever since that the experience in Cleveland has been quite good.

MR. BUREAU: We had a chauffeurs' efficiency contest. We awarded five prizes, first, second, third, fourth and fifth, for efficiency shown in handling trucks and it is working out first rate. Before long, we will probably have something to say about the benefit of that experience.

CHAIRMAN DRUMMOND: Mr. Turley of the Wilson and Company Automobile Service Department has a system which awards prizes in two ways. One is a tire saving contest and the other a no-accident contest—a bonus proposition—and five prizes are given.

Out of 97 accidents at railroad crossings, 45 of them were occasioned by the vehicle attempting to cross, hitting the train, rather than the train hitting the vehicle.

MR. BUREAU: What does this show, lack of control?

MR. SQUIRES: It may be that the brakes were not properly tested before they went out. I think, however, that the mental attitude of the driver has more to do with it, whether he is careless, reckless, or uses bad judgment.

MR. SANDEL: I would like to ask Mr. Squires if there is a real honest-to-goodness non-skid tire on the market.

MR. SQUIRES: We have had a good many discussions with our men and members of the committee. There is no such thing as a non-skid tire, except the cog wheel. I should say it could be made a non-skid device. In handling motor vehicles, I think you safety engineers would do well to make as much of that point as any other, that the chauffeur should understand how to control his vehicle with the brakes and power plant. Personally, I believe that thing ought to be developed or taught more than any one thing. It is easy to lock brakes of vehicles and it is easy to slide into things, as most folks do. In other words, the average operator gets excited, jams on his brakes and slides.

MR. SANDEL: Don't you think, Mr. Squires, that a good many drivers should blow the horn oftener than they do? It seems they neglect blowing the horn at street intersections, and this is not fair to the other man.

MR. SQUIRES: Frankly, I have been as sore at the fellows who keep screeching all the time as at the one who does not signal enough, but I think that signalling ought to be done more.

MR. BONSIB: I had occasion to call down a motor truck driver about not using his horn and he said that anybody who blew a horn was an amateur, it was not professional, and I think it would be important to show him that it is necessary to blow his horn.

MR. SQUIRES: Let me cite conditions. I realize the feeling, but take the middle-aged, or elderly woman who is standing in the street, or rather crossing the street. The expert automobile operator who does not blow his horn may be thoroughly conversant with all conditions surrounding this traffic jam and go through all right, but suppose he does not blow his horn and gets close to the individual who suddenly realizes the situation, the tendency is to get nervous and she may step in front of another vehicle. Many street accidents are recorded because of that and I believe it is only fair to the other party for the driver to blow his horn, to give the other fellow a fair chance.

MR. SANDEL: On the subject of blowing horns, it is rather amusing down South, on some of the country roads. The drivers, when they come across some colored people, blow their horns and step on the gas, and let the other fellow take care of himself.

CHAIRMAN DRUMMOND: Mr. Sandel, from Swift and Company, has some very valuable information on the "Value of Comparative Accident Statistics."

#### VALUE OF COMPARATIVE ACCIDENT STATISTICS

J. M. SANDEL, SAFETY AND EQUIPMENT ENGINEER, SWIFT AND COMPANY,  
CHICAGO

The chief reason justifying a safety engineer's use of accident statistics is that a means for prevention of accidents can readily be found. Every plant will have its individual accident problems dependent on the nature of the work, the conditions of work, and the character of the workers. The means of meeting these problems adequately can be discovered only by carefully compiled accident statistics. The proportion of accidents

which are due indirectly to poor physical condition, overwork, and inadequate wages with the accompanying indifference and lowered vitality of the workers, or directly to ill-guarded machinery or inability to understand English may be developed in any statistical analysis.

No doubt the greatest booster for statistics of any kind is Mr. Roger W. Babson. I suppose that Mr. Babson has statistics for every meal in the day and even dreams them for the greater part of his merchandise is information of a statistical nature. According to Mr. Babson, most anything can be foretold in part if the statistical records of the past are complete; and the best argument that safety engineers can use at any time and at any place is successful past experience and successful past practice. I think many of you will agree with me on that point for no doubt all of you have been asked when proposing action along any line, "What has been our past experience?"

Having no statistics of accident experience is like operating a business without an inventory. While figures can be made to lie as well as to tell the truth, within your own organization they should serve the purpose of clinching an argument for action where it is a question of facts. Without accurate records of the past, it is so much harder to get action, for there are no facts to support contention. Likewise it is impossible to tell if any progress is being made in safety work or along what line it is preferable that the safety work be concentrated. No executive will consent to even a moderate expenditure without definite reasons for doing so, and it has been my experience that an accurate array of figures will get approval with a minimum amount of verbal argument.

Briefly, statistics should show the safety engineer:

- 1 The department or operation which has the most severe accidents
- 2 The section of the plant where consistent work is needed
- 3 The operations or equipment which are involved in the largest number of accidents

Contrast a plant where no accident statistics are kept with one of the same size keeping statistics. In the first instance, we have nothing but a memory of the past which all of us recognize that, although valuable, is very inaccurate; especially if we would like knowledge for a long period of time. We would know of accidents where the loss both in life and money was heavy while those accidents which cause only temporary disability would hold no place at all. It would be possible that some of the men who have been in the establishment a long time could tell of several who were injured in one department or one location but a report of the extent of those injured would not be found to be very satisfactory for presentation. An operating man in a plant will consequently earnestly believe that work under his supervision is not hazardous. If he should send a man to the Doctor's Office to be treated for an injury, that is very often the last thing which causes him to have anything to do with the case so that he proceeds to forget about it until the next man is sent. The more trifling the injuries are, the less is he liable to give them further consideration and the danger is that he may fail to realize the necessity of sending men for proper treatment. On the other hand, such a

state of inaccuracy would not exist in the presence of statistics however simple or complex they may be. As a means of dismissing a condition of lethargy they are the safety engineer's right arm.

Statistical study is quite inexhaustible. As one of my good safety engineering friends has very often said, "You can go in for and work with accident statistics until you are blue in the face, and then you find that you do not get anywhere." The biggest problem, therefore, is to decide what to use and then how to use it. Usually there are other departments than the safety department interested in the figures we would publish as well as the data from which they are obtainable, so that their wishes should be considered. The form of presentations will sometimes be governed by practice in other departments. Sometimes this is not a very easy thing to do as the units used by the production men and accountants are not readily applicable for advantageous presentation by safety engineer.

Most of our information regarding an accident is written on an accident report form; other information is in the form of statements and conclusions. None of this information is valuable unless it is accurate. Because it is desirable to present the information on the prescribed forms, those forms should be arranged so that we have accuracy in concentrated form, so to speak. Insurance companies have simplified their forms considerably since carrying compensation risks. The character of this change is from purely legal information to that which is of greater assistance to the safety engineer.

Four parties are interested in every accident. They are the injured man, the employer, the doctor, and the safety engineer. The necessary information regarding every accident is the place of employment when injured, the experience and service records of the man, the nature of the injury, and the cause of the injury. There is no hard and fast rule as to where this data should come from but, in order to obtain accuracy, a good rule for the safety engineer is to turn to the Employment Office, the foreman of the man, and the Doctor's Office for what he needs.

The Employment Office should be able to give the correct name and address of the man; the names, ages, relationship, and addresses of his dependents, if any; his conjugal condition, his length of service, and his service record.

The foreman should be able to give us the length of time the man worked on the job where he was injured and if that particular work was a part of his job; a description of the work place which should include conditions such as light, ventilation, floors, equipment, and machinery, and enable the determination of primary and secondary causes.

The doctor should tell us the nature of the injury which very often would include the part of the body injured.

When investigating the accident, the safety engineer usually sees the foreman of the man injured. Very often these two men can determine the best remedy. At any rate when the safety engineer gets all of the information mentioned above, he is well equipped to determine the next necessary step to prevent repetition of an accident.



These details are doubtless familiar to all of you but I have included them to emphasize the necessity of two things in all statistical work—accuracy and thoroughness. Many of the sections of an accident report are more useful to others than the safety engineer, but in order to be certain that any one bit of information is correct, thoroughness in all work on the report is necessary. We can easily get this by requiring a signature on the report from those who supply various information. The necessity of signing gives a hint of responsibility, and at the same time is a reminder that an accident has occurred and that an accurate accident report must be compiled.

The next step is to get all statistics in a form that they can be compared. The methods for doing so are numerous and I shall pass over that phase of the problem. What we want more than anything else is the cause of injury. The nationality of the man, his experience, the time of day, and day of the week that accident occurred, part of the body injured, and nature of the injury are all minor considerations to the cause, but those features give us much information that is useful.

It may be the thought of some persons present that cause of injuries in any one plant would be well known to the management. That is quite true but without any statistics no one would be able to tell how many accidents occurred from any one cause during a period or how many different causes can be assigned even the most outstanding accidents in a given period. As mentioned previously, it is easy for a person to remember when a severe accident took place and very likely what caused it, but there can readily be many accidents of a minor injury costing in time lost, wages lost, and compensation paid, fully as much as the severe injury and yet these accidents are not given their due consideration. As you carry your statistics over a period of time it becomes readily apparent which causes are the ones desirable to expend the efforts of prevention of accidents. Usually we conclude to direct our attention to the accidents resulting in the greatest severity. By the term "severity" we mean, loss of time by the employee, loss of wages by the employee, and loss of compensation by the employer. The first two figures are the most useful in promoting safety among the men of the plant and the latter is useful in insuring action by the company.

Desirable sections of an accident report which were mentioned previously, include information from the Employment Office. From there we get the length of service and service records which are sometimes very important considerations for the safety engineer. At some operations a new man is very liable to be injured while at others the new employee is far less liable to injury than the older man. That may be one answer to the cause of the accident. Service record, whether with the present employer or former, may give us some information that would assist us in determining a secondary cause if not a primary cause.

In most instances we inquire if a man is single, married, or widowed. It seems to me that the Employment Office should ascertain, upon hiring, those who are divorced or separated. Domestic trouble very frequently is one cause of inattention and thoughtlessness, and in some accidents I

have investigated in the past, it appears to be very close to the primary cause.

Several times I have mentioned the terms "primary" and "secondary" causes. In many accidents we find that there is more than one thing that is definitely the cause. Probably a better term would be "direct and indirect causes" but the fact remains that more than one feature merits consideration. Often the poor testimony of witnesses and frequently the injured man himself does not enable us to determine accurately both primary and secondary causes but I believe that there is such a thing.

What should be included as causes? I receive quite a few accident reports where the cause is stated: handling material, knife cut, knife slip, and sometimes sore eyes. Because it seems to me that the cause of an accident is the most valuable part of the report, stating the cause in any of those ways reduces the value of the report to less than the paper it is written on. Handling material, whether you specify the material handled or not, cannot be considered the cause. That term more accurately describes the work the man was doing. Mishandling material, however, is a cause and in order to get anywhere, it is better to state to what extent and how the material was mishandled. The expression "knife cut" and "knife slip" more accurately describes what occurred but is not the cause of the accident. They are inaccurate expressions which have grown up with our business, but a more accurate term would be "handle slipped".

After the causes have been determined, the information can be used in foremen's and employees' meetings and on safety bulletins. Take for example, an operation which has produced several accidents. When you discuss this with the foremen and other parties interested and arrive at a remedy for it, make it up into a bulletin preferably illustrated by showing the safe and unsafe methods of performing an operation and what will result if the unsafe way is used. Quote some accident figures on the same bulletin which will back up your argument for safe practices and safe operation. From a number of causes a good subject for a moving picture film can be secured. That is a method used by several large corporations in producing safety films.

There is only one feature which should govern the use of statistics and that is the results which can be obtained from their presentation. All forms of statistics are not desirable for display. The two methods commonly used are an illustration or a curve. More than two subjects treated on one graph cause confusion to the reader, and no subject is thoroughly "driven home". A detailed analysis covering all of the important sections of accident reports is valuable only as a source of material for the presentation of one of those subjects. In order to ascertain what to use, individual idiosyncrasies of those receiving the information sometimes must be subject to change so that the most effective method will be used.

#### DISCUSSION

MR. BONSB: I would like to ask Mr. Sandel if he does not think it is advisable to keep a record of the most minute accidents.

**MR. SANDEL:** Absolutely. One reason is that if you have a record of very minute injuries, and something more serious develops later, your case is complete and there is no chance for anybody putting anything over the company.

**MR. BONSB:** I am a firm believer in reporting injuries, and I have had a lot of opposition from the foreman because they say it takes time, but the point is this: It shows there is something wrong. If a man gets hurt, it shows there is something wrong, and it is only a potential injury and might have been worse than it was. It also gives you an idea of the kind of man he is. A man continually getting injured in a minor way you don't want to have around, and you don't have to be much of a prophet to say that some day he is going to be injured by a major injury.

**CHAIRMAN DRUMMOND:** I don't think the importance of having your small accidents recorded, as well as the large ones, can be overlooked. I remember distinctly one man in our general room had been involved in an accident and he said that all he had received was a scratch on the shoulder and bruise on the hip. A few days later he said that he was not feeling well, and I said, "Jim, how did this thing come on?" He said, "I am not going to tell you, I will show you." He had a huge dynamo with an open pit on two sides and around the pit was a railing that had been removed, and he went down into the eighteen foot pit with a dynamo running at full tilt. He should have been dead, but the report only showed a scratch on the shoulder.

**MR. BUREAU:** I agree with Mr. Bonsb, that we should report all accidents. In all our plants at the end of the month we get out a straight line chart showing each plant how the others stand with reference to accidents, and the psychological effect of that is that they are all on their toes to get the least number of accidents and it keeps them keyed up.

**CHAIRMAN DRUMMOND:** This concludes the program we had prepared. We have about ten minutes left. There may be some suggestions in the minds of the members, as to the best way to get results for larger membership for the Section during the coming year.

**MR. BUREAU:** I would suggest, Mr. Drummond, that some of the smaller packers be canvassed, and also the smaller tanners.

**CHAIRMAN DRUMMOND:** The National Safety Council is willing to do everything in the way of carrying on educational work, but they are going to depend on us to give them the information on the way we want it done. I wonder, Mr. Bonsb, if it will be possible to get a complete list of the members of the National Tanners' Council, for the purpose of solicitation.

**MR. BONSB:** Mr. Drummond, there is a directory published by the Boot and Shoe Recorder, giving a complete list of the tanners of the United States and Canada, issued by the Boot and Shoe Recorder in Boston. It will be impossible to give out a list of membership of the Tanners' Council, for the simple reason that we did it during the war and we were simply besieged with requests for copies, which were used as mailing lists, and our members were simply deluged with all sorts of circulars and other material, so we have taken the stand not to give our list

to any one and I think about a third of my time in the office is used explaining to the various societies and organizations and companies why I cannot give them a list and not give other people lists. On the other hand, I am very much interested in seeing our members become members of the Safety Council, but I can't break that rule.

MR. SANDEL: Are we entirely agreed as to what the name of this Section should be? I personally have no special name I think we should go under, whether "Tanners' and Packers'" or "Packers' and Tanners'" but that is a subject, with which I think we should close the day.

NAME OF SECTION

CHAIRMAN DRUMMOND: I want to leave this to the members for discussion, as to what they think would be the proper heading for the Section.

(It was voted unanimously that the name should be "Packers' and Tanners' Section.")

CHAIRMAN DRUMMOND: I do believe that the combination of packers and tanners is going to make this Section a great deal larger next year. I am particularly pleased with the men from the tanners' section coming in, representing the larger interests, and I know from their past history that they will be perfectly willing to devote a lot of time to building up their own end, and it should result in a healthy condition. I think the packers will have to stand up on their guns and fight pretty hard to retain their laurels, and I think that is as it should be. This competition is going to make us bigger, stronger and better in every way and a close relationship will bring out information at our next meeting that will be very valuable.

ADJOURNMENT.

# **Paper and Pulp Section**

**September 29 and 30, 1920**

---

**ROBERT M. ALTMAN, Chairman**

**Marathon Paper Mills Company, Rothschild, Wis.**

**G. W. DICKSON, Vice-Chairman**

**Riordon Pulp and Paper Company, Montreal, Quebec, Canada**

**N. S. STONE, Secretary**

**Wausau Sulphate Fibre Company, Mosinee, Wis.**

---

## **WEDNESDAY MORNING SESSION**

**T**HE first session of the Paper and Pulp Section was called to order at 10 A. M., Wednesday, September 29, by Robert M. Altman, Chairman.

### **REPORT OF CHAIRMAN**

**CHAIRMAN ALTMAN:** It gives me great pleasure to bid you welcome to the sessions of the Pulp and Paper Section of the National Safety Council; in fact, I wish to extend to you a double welcome; one, on behalf of the National Safety Council and in the capacity of Chairman of this Section; the other on behalf of the State of Wisconsin, of which state I am a resident.

A great deal of this pleasure is due, no doubt, to the fact that we have so large an attendance. I am certain that our sessions will prove interesting and to the point, for programs which tend to draw so large an attendance surely cannot prove otherwise.

There are but three new lines of action which were undertaken by our Section during the past year. As to the success of these, I can refer you to the attendance this morning, to the special paper by Mr. Guerrant to-morrow, and to the fact that this section has been assigned the sponsorship of a national safety code for the pulp and paper industry. Perhaps it will be best to explain in more detail.

First we made a special effort to bring together to these sessions as large a representation as possible. It is for that reason that we had a Congress Representation Committee. In addition to the work of this committee Mr. Asche of the Thilmany Pulp and Paper Company, Mr. Shattuck of

the Kimberly-Clark Company, Mr. Stone of the Wausau Sulphate Fibre Company, and your Chairman sent out letters to both members and non-members of the industry advising them of this Congress and urging the sending of representatives. Your Chairman also corresponded with the Chairmen of the various Divisions of the American Pulp and Paper Mill Superintendents Association and enlisted their services in spreading the advice. You see the result.

Regarding the second line of action, with the help of Mr. R. H. Guerant of the headquarters staff, National Safety Council, we began the establishing of data which would give us a standard accident frequency and severity rate in the pulp and paper industry. In this way it will be possible for any one to determine whether an accident rate for a given plant is high or low as compared with the average for the industry. Some very interesting data covering the first six months of 1920 is in our possession but it is not necessary to go into detail at this time as Mr. Guerant has made this the subject of his paper to be presented to-morrow. I strongly urge you to be present for there is quite a treat in store for you.

And last but not least, the matter of formulating a standard safety code for the pulp and paper industry of the United States. Through the National Safety Council, the Pulp and Paper Section is made responsible for the sponsorship of a standard safety code, the basis of which is to be the Safe Practices Pamphlets worked out by previous committees of this Section. It is a splendid opportunity which has been granted us to continue the good work which has already been done and to gain national recognition as the authors of a safety standard for the industry. This is to be approved by the American Engineering Standards Committee, representing all the big engineering societies, and will serve as the basis for safety regulations which may hereafter be adopted by various states.

The members of this Section will be called upon for assistance by the committee working on this code. I sincerely trust that you will all show the same courtesy, the same co-operation which was the chief factor in the success of our previous work on safe practices.

In closing, I hope that the three lines of action which I have mentioned will be developed to such an extent that we will all get the greatest amount of good possible. There should be one more point undertaken during the coming year and that is an increase in membership. While our membership is about 185 today it should be increased. The Pulp and Paper Section should be the section of the National Safety Council and its members should work toward that end.

We will now proceed with the program as outlined, and listen to the report of the Secretary, Mr. N. S. Stone of the Wausau Sulphate Fibre Company, Mosinee, Wisconsin.

#### REPORT OF THE SECRETARY

**MR. STONE:** The past year has been an encouraging one in every respect. The membership list at this time shows a healthy increase over last year. Fewer cancellations have been made, indicating that industries are being

benefited by association with this organization and value their membership.

A mid-year meeting of the Sectional Chairman, the Chairman of the Program Committee, and the Secretary was held at Neenah, Wisconsin, at which time plans were made to send out follow-up letters impressing on executives the importance of being represented at these meetings. Paper mills in the Middle West not holding membership were likewise invited to send their representatives, as we felt that having once attended our meetings they would better understand the scope and importance of the safety movement and become active members.

I would suggest to the Nominating Committee that if possible the Chairman and Secretary should again be selected from the same locality. During the past year your Chairman and Secretary have been able to consult with each other at frequent intervals and to better co-ordinate their work.

CHAIRMAN ALTMAN: Mr. Shattuck, Chairman of the Program Committee will give us his report.

#### REPORT OF THE PROGRAM COMMITTEE

MR. S. F. SHATTUCK: Although the program provided for the two sessions of the Paper and Pulp Section of the National Safety Council might be considered report enough from the Program Committee, the necessity of a report offers the opportunity to express the Chairman's obligation to those whose ideas made the program possible.

The building of this program provided an excuse for two very pleasant meetings around the dinner table for certain congenial spirits, such as Al Kroes of the Employers' Mutual of Wausau, Mr. Asche of the Thilmany Company, Miss Baker and Mr. Hoyman of the Kimberly-Clark Company, Mr. Stone of the Wausau Sulphate Fibre Company of Mosinee, Wisconsin, and our Chairman, Mr. Altman of the Marathon Paper Mills Company, Rothschild.

Our invitations to contribute to the program of the Milwaukee meeting met with a prompt and hearty response and if the members of the section enjoy the program as much as the committee did getting it up, it will be voted a success.

CHAIRMAN ALTMAN: We will next hear the report of the Representation Committee of which Mr. E. C. Gildenzopf is the Chairman.

#### REPORT OF THE REPRESENTATION COMMITTEE

MR. E. C. GILDENZOPF: Each and every member of the Paper and Pulp Section of the National Safety Council was notified by a special letter on or about August 3, 1920, to send one or more representatives to the Ninth Annual Safety Council to be held at Milwaukee, Wis., September 27 to October 1, inclusive, and the chairman also personally called on three of the members, asking them to be represented.

CHAIRMAN ALTMAN: I wonder if Mr. Kroes, the Chairman of the Bulletin Committee, has a report for us this morning.

MR. AL KROES: I haven't any report to make because the Bulletin Com-

mittee hasn't done any work. They are waiting for standardization. If there is any concrete work to be done on that committee it may be possible to get out some bulletins which will be useful to all the mills of the paper industry. I think that the Chairman has put it very well when he said that the future work of this association will be accomplished chiefly through co-operation. I believe there is going to be something done in getting together on the bulletin proposition.

I believe that when we get the code on this paper mill work that we will have a better opportunity to get these bulletins out than we have at the present time, and I will be very glad at that time to give what little assistance I can to the work along that line.

CHAIRMAN ALTMAN: I hope that from the report of the Chairman of the Bulletin Committee, you did not get a wrong impression. We have had, during the year, our regular Sectional Bulletins, but the officers of the Section had to go back to the members of the Section for help, and I am glad to say that quite a number of you responded nicely, and we were able to keep on with the regular issue of bulletins during the entire year.

I really believe that there should be another method adopted for the issuance of bulletins because it seems that there are only three or four, perhaps a half dozen, that give active attention to any requests on the part of either the Bulletin Committee or on the part of the Chairman of the Section.

I appoint as a nominating committee Messrs. F. H. Eberhardt of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wisconsin; A. P. Costigane, of the Ontario Paper and Pulp Makers Safety Association, Toronto, Ontario, Canada, and S. F. Shattuck of the Kimberly-Clark Company, Neenah, Wisconsin.

I understand that Mr. Shattuck is not here and Mr. Rosebush of the Nekoosa-Edwards Paper Company will act in his place. Will you please get together sometime today and give us a list of the nominees tomorrow morning so that we can go through the regular form of election?

CHAIRMAN ALTMAN: Now we come to the main procedure. We always enjoy any program that helps us in our work and there is no doubt of it that the program as outlined today should help us all because we are getting the view-points of all the departments, we can say from all standpoints, in the mill. For that reason we will be able to judge just exactly how far the safety game in the paper industry has advanced.

The Kimberly-Clark Company has been instrumental in giving us quite a number of good things heretofore, and I am sure it is giving us something very good this morning.

### THE SAFETY GAME AS PLAYED IN ONE PLANT

All of the following speakers are drawn from the Kimberly Mill of the Kimberly-Clark Company, Neenah, Wisconsin.

1. The Employment Secretary—Miss Mary Baker
2. The Man on the Job—Mike Corcoran



3. The Foreman—Henry Bongers
4. The General Superintendent—F. G. Wheeler
5. The Safety Director—M. G. Hoyman

#### THE EMPLOYMENT SECRETARY

MISS MARY BAKER

There is the conviction in the minds of the members of our firm that the tragedy of industrial accidents should be eliminated. They realize the industrial hazard in handling the material and human element of the industry, and that the Safety game could not be won by one leader nor yet by one single thrilling action, but that it would follow observation, deep conviction, and conscientious, enthusiastic team-work. As a result of that the spirit of safety is flourishing in our plant. Every one on our payroll takes part.

Five of us were chosen by the firm today to come down and tell how we play the Safety game in the Kimberly-Clark mill. Our stories will have neither thrills nor frills. They simply will picture the every-day doings and I have been chosen to speak first not because of my ability or talent, but simply because I am at the entrance of the plant: the Employment Manager.

#### ONLY SAFETY-FIRST FOLKS SHOULD APPLY

There is a sign that hangs over the entrance in black and white, which says that only Safety First folks should apply, and if signs came true, then my work would be done before it was begun, but funny papers delegate the intelligent work of sign reading to old, long-whiskered hayseeds, so all classes of people slip under, safe and unsafe, and gather in the waiting room. Here the first work in safety instruction begins. We have safety pictures on the wall, safety pamphlets and booklets with safety rules are upon the table, and we don't claim that our applicants seize upon them avidly, but some facts are bound to register and the fact that a great deal of this literature disappears proves that people become interested and carry it away to study.

When the applicants come in for the interview, the first work of the Employment Secretary begins, the first safety work. I never labor under the delusion that any applicant comes in one hundred per cent safety, since all men are subject to fatigue, diseases, worry, and anxiety. Just as that is true, then all men are hazard risks. We do not claim, either, that we can absolutely detect all the risks that our applicants are apt to bring with them.

Our object is not to bar the people who are subject to accidents from our industry, but to save them for the industry and place them so wisely that their employment will not be to the detriment of themselves or the plant. If we have to quarantine a person from the industry we let them know why and they are reasonable about it. Unless you can make the person interviewed feel that you are not trying to bar him but to safe-

guard him, unless you can make him feel that, he will give you little information. The more friendly and informal an interview can be, the more likely you are to get revelations that will help you make your decisions.

#### HOW TO DETERMINE RISKS

For instance, you would be perhaps interested to know how we determine risks. If you watch an applicant enter a room, stand up, sit down, answer questions, you can't help but detect the outstanding hazards. You find out whether or not he is slow of comprehension, whether his vision is poor, his hearing poor, or his joints stiff, and when you have determined these things, you commence to think where you can place that man. Say for instance a man with poor vision, you wouldn't want to make him a driver of a tractor, but he could shovel clay. If his hearing is poor, you wouldn't want him to operate an elevator, but such a man could safely pile pulp or pitch stock, or something like that. If any man has a slightly mutilated hand, you can put him on some machine where he doesn't have to handle complicated machinery, or if it is a bad mutilation, you might put him to work as a watchman; so, I say, that it is not with the idea of barring, but placing them wisely when you find out their points of weakness.

In carrying out the interview one shouldn't be in too much of a hurry. We should let our applicants talk. You get valuable leads in that way.

#### DEFECTS IN DISPOSITION

The other day a bright, sturdy-looking chap applied for a job as electrician. When signing his name I noticed that a bone in his wrist protruded. I commented on it and he went on to tell me how he had had the accident, and as he narrated the story he told every detail and seemed to be having such a good time that I determined he was a venturesome chap, and I commented that if I had such an accident I would be afraid of machines, but he laughed at the idea and told two more accidents he had had. When he finished the stories I made up my mind that he was a dare-devil, and when that type gets in they sometimes try to do stunts like they do in the movies and throw a scare into the workmen. Such people are the greatest hazards in industry. After all, a great many people seem to feel that physical defects are the only hazards, but defects in disposition are worse than defects in body, and if you are getting people who are nervous, excitable, and emotional, you are getting in the type which is much more likely to bring about accidents than if you were getting in people with physical defects.

Before we hire any man we give him a trip through the mill, and we generally try to arrange it so that two or three will go at the same time. We have several reasons for giving this trip. When a man is being interviewed, he is more or less on his guard and you can't detect much about his disposition, but when they start to visit with each other and talk about the process going on they forget their restraint. They become friendly and fall into their natural traits and we get many suggestions

during that trip that help us to place a man wisely. If you go through a wood room and the man watches some one lifting heavy boxes he might say, "I couldn't work here I have a rupture." Or in another room the light may affect his eyes. Or, he may mention the fact that he is subject to sore throat or rheumatism, and so you get many suggestions as you go along. Another thing; you discover which ones are grouchy, which are daring, which are stupid, which seem to lack all comprehension, and which seem to register facts slowly. This trip through the mill, I think, is one of the greatest methods of preventing misfits, and after all they are the breeders of accidents.

As I said before, the placing of people with defective dispositions is one of the greatest tasks. An employment secretary cannot hope to do that unless he is pretty well acquainted with the bosses, the foremen. For instance, you might have a man with a quick temper. If you put him to work with a man of similar disposition you would probably have disaster, but, if you know the bosses well, you can place your men as safety first additions to the firm.

We have in our firm one man who is the father of a good-sized family of normal, active, frisky boys, and he is one of the best men in the world to handle young chaps. He knows when and how to reprimand them and I give him most of the frisky boys to handle. Then we have other foremen who are very patient. You can give them nervous men or foreigners and they can handle them all in first-class shape. We have still another man who is a genius for handling people who are aggressive or quarrelsome. He can handle them so that the risk of disposition is eliminated.

You often find temperaments that surprise you. I remember one man who appeared very stupid and placid. He didn't seem to register intelligence, and when we were going through one of the rooms he saw a burly looking man in charge. He turned to me and said, "If he were my boss I'd trim him, all right," and there was such a glint of ill-will in his eyes that I saw I had mis-read his disposition.

Another thing we do is to tell the foremen the nature of the risk. For instance, I write a note and tell the foreman that I am sending him Bill Jones who has a splendid work record but a hot temper and I ask him if he has a one-man job where he can place this man, or a job with a partner who would be sure to get along with him.

Our chief aim is, of course, to build up defectives physically and mentally, so that they may become safety-first men.

In our plant I think each month there are about 300 men who call upon the plant nurses, the plant dentists, and the plant doctors, and we have discovered that in our plant the time lost on account of sickness has been reduced two-thirds. You can imagine that if all the conditions that are associated with sickness have been reduced that much, safety must have been improved wonderfully, and I feel sure that the good safety record we are building up should be credited to our medical corps. Another thing is true of them, they keep a record of all minor accidents, near accidents, and slight accidents, and those records are the barometers which will guide us in our plant protection. For instance, there is a

condition which would bring about a slight accident, that condition, if neglected, will eventually bring about a major accident.

#### HOME-MADE BULLETINS

I can remember one month that there were some twelve or thirteen jack-knife accidents reported. We got out hand bulletins on that subject. The boys were using the jack-knife for screw-drivers, hammers, and so forth, and as a result of these bulletins the jack-knife accidents disappeared. I don't know whether the boys used more caution or the foremen provided more tools, but the fact is that any safety bulletin based on local accidents makes a greater appeal than bulletins that come in and tell of things which happen in far-off plants to far-off people.

Not only must we build up physical, but mental conditions. I think the slogan we had last night, "Keep Smiling" is the best slogan in the world. If you keep your men in such a mental state you needn't worry much about safety records, and so, when men come to our office with all sorts of grievances, we listen with sympathy, and sometimes a little sympathy will blow the trouble away. Sometimes you have to change the man's partner, and you sometimes even have to put him under a different foreman, but when there is a grievance, we consider that something ought to be done because it is the clearing up of these grievances that keeps the plant smiling.

Last year we were able to keep our labor turn-over down to fifty per cent. We were delighted to keep old friends on old jobs. If you can succeed in this you will succeed in keeping your safety records much better. For instance, when we cut our labor turn-over fifty per cent that meant that we had half as many new men to break in, and twice as much time to spend on each man, so that it wasn't very much wonder that the same year we cut the turn-over fifty per cent we cut our accident record fifty per cent.

Non-English speaking people are a great hazard. We have to study them carefully and we try as far as possible to put them under foremen who can understand their language but you can well imagine that when you get a whole department that has to be instructed by gestures and signs instead of orally, you are getting a condition that is really hazardous. In the first place we wouldn't think of putting a non-English speaking person on a job where he has to give directions or receive them, but we turn him over on work where that is not necessary until he can learn English. If he has friends who have introduced him to us we tell them that he has been put on that job because he cannot understand English. We tell them to advise him to go to an English-speaking school and learn the language so that he can protect himself and get promoted.

We keep statistics because just as all other types of work have to be handled scientifically, the Safety work has to be handled scientifically.

#### VALUE OF STATISTICS IN SAFETY WORK

Before we kept statistics we used to have impressions of what the most dangerous accidents were and thought them absolutely true but when we

began to keep statistics we found they weren't true at all. A machine we thought to be the most dangerous one in the mill because a certain very bad accident had occurred on it, we found when we went back over records, we had been doing an injustice to because it was a really well behaved machine. So when you know the relative dangers of different machines, you know whether or not to place people on those machines.

We had always been under the impression too, at one time, that the man past forty was a dangerous hazard but we were very much surprised when we took our files for two or three years past to find that our men past forty had lost less time because of accidents and sickness than those younger.

We also found what people are accident repeaters and we can either discipline those people or quarantine them out of the plant, or we can place them on work where there is less hazard. Not only do we find individuals, but whole families that seem to flourish along that line of risk. We have also by keeping records, detected fakers who try to get insurance and state compensation by supposed injuries which they received.

#### VALUABLE SUGGESTIONS TO BE OBTAINED FROM EMPLOYEES QUITTING

We like to get criticism in the line of safety from the people entering the plant and from visitors, and from people quitting us. Those who quit are likely to be very critical and we get valuable suggestions from them.

We try to act as safety inspectors when we go down to the mill to visit the men. If there are broken steps or rails out of place we tell the safety director. We also watch out for safety slogans and pictures so that we can send them into our plant or put them on the bulletin board.

We find that visitors are a risk in a plant. They get so interested in the process that they just seem to be oblivious to sounds about them; they see no pillars or signals or signs and if anything unusual happens they get very panicky and do all sorts of things.

We feel that another great part that can be played by the employment managers is to keep a full payroll. When we have eliminated the problem of overtime and double shifts, which are sources of fatigue, and fatigue dulls the senses—and after all man's senses are his personal safety guards—so that it behooves the Employment Department just as far as possible, to keep a well equipped payroll.

We have made great strides in our safety work, not, however, because of any miracle workers and not because we have some strange improvement schemes. We are in the market for suggestions and new ideas all the time, and we hope that the story of the task that we carry on and its successes and failures may bring a few pointers and suggestions to the rest of our paper mill friends so that when they go back they will be able to conserve the human material at their plants.

CHAIRMAN ALTMAN: The next man, the one that we try to reach and all work for and sometimes with very little thanks is the Man on the Job, and Mike Corcoran of the Kimberly-Clark people will tell us his viewpoint and the viewpoint of his fellow-workers.

## THE MAN ON THE JOB

MIKE CORCORAN

I entered the employment of the Kimberly-Clark Company about five years ago, it being my first job in a paper mill. I walked boldly up to the employment office where a sign stared me in the face, "If you are a Safety Man we Want You, if not Just Keep on Traveling."

I walked into the employment office and it seemed strange to me that the employment agent spent so much time finding out my safety record. He didn't seem to want to know whether I was worth a dollar a week as a workman or not but he had to know my safety record. When I got in the mill, however, it was altogether different. The mill was far from being dangerous, yet it was far from being safe. I could then see their point of view. They were putting in a safety guard.

I kept my eyes open and when I saw something unsafe I would tell them. When one tries to find another's mistakes it is much easier than to find one's own. When I saw an unsafe place I would call the foreman's attention to it and if he would say nobody ever got hurt there before, I would ask him if that would stop anybody from getting hurt there now, but usually the thing was taken care of at once and believe me it would make me feel good to see three or four men working on a piece of safety work I had suggested. There is no greater credit to man than to see a fellow workman saved by a safety guard he has had installed.

Any man may forget himself for a minute and it is the duty of some man standing by to show him his mistake.

We always notice that the new men are anxious to find and report unsafe conditions. If an unsafe man comes in, his chance of remaining is very slim.

I remember last year we were running safety rules and the first couple of days there wasn't much doing. Then I got busy and put up some cards on the bulletin board telling the men what we were going to show them in the way of safety. I sure did start something. In about an hour they all had what they were going to do. They pulled the mill through one, two, three, four, five days without an accident, but at night of the last day a large shaft fell on one of our millwright's feet and the whole place went up in smoke. Talk about a sore bunch the next morning! That only lasted a week, and the fellows decided that if they could pull through one week without accidents they could pull through three weeks, and they did. Then came the challenge from our friends of Niagara to an eighteen-day safety race.

Watch the new man, help him along, show him his mistakes and if he thinks there is some one with him, he is always sure to keep safe.

I've noticed that the men in our department not only help in safety but are right on the job to help in ventilation and sanitation and tips taken from new men have helped our case wonderfully. One man alone can do nothing, but get your men organized into a safety union and they will show you what they can do. When a man suggests a piece of safety, don't figure out and point out what that is going to cost; give it a chance.

If it proves a success, tell him it is a good stunt, go up to him and pat him on the back, don't be reaching out for all the credit yourself. Tell him what he has done has been wonderful. If it hasn't tell him anyway, and he will do more for your plant than all the safety literature you could buy.

The next thing that seems to me to be the greatest safety factor of all is the satisfaction of the men in the department, to have satisfied men. You don't want them to come trailing in to punch the clock in the morning with a frown. Have them come in with a smile. Have them come in to a foreman who is a man among men, a man to whom they can come with their troubles or with their jokes. Just watch the safety percentage of the department which is in such a foreman's charge.

When your safety director comes into the plant, let your men be at liberty to come up and talk with him. They can give him tips, some little guard that is needed which he has passed up. When your accidents start dropping off, you will find that it is due to the co-operation of the foremen, the safety director, and the man on the job. They have brought about something that the mere spending of millions could not bring.

CHAIRMAN ALTMAN: I knew there was a treat in store for you. Our program is not nearly complete until we hear from the Foreman of the gang, the man who as Mr. Corcoran says, comes along and slaps you on the back and says, "Mike how are the kids today?" We will hear from Henry Bongers.

#### THE FOREMAN

##### HENRY BONGERS

My work consists chiefly in loading and unloading cars of material such as pulp, clay, soda ash, and so forth. When we unload pulp I am generally with the men when they open the cars, and first of all we find many wood cleats that have nails in them to keep the doors from coming open, or to keep cinders from flying in which have to be removed. This is where I give them their first lesson. They are to take an iron bar and jam it against the door nails sticking up. They never throw down cleats without first bending the nails. Some one might easily step on a nail or fall over them causing an injury.

After the door is open we place a runway to the truck. We use a piece of sheet metal with holes through which to drive spikes to keep the runway from shifting as the truck passes over it. If it is not nailed, it is very dangerous and I watch that very closely. If the boys start unloading and I come along and find that it is not spiked, I immediately call their attention to it and make them spike it.

I am reminded of what might have been a serious accident. Last winter one day, it was very cold and the men were unloading a car of pulp. They were using a runway about four or five feet long and the platform was frozen over with ice. There were three men to a truck, one pulling and two pushing. The boys started to pull out but they had forgotten to nail the runway and as the truck came out the runway slid and pinned the fellow at the pole between the truck and the runway. That the life

wasn't squeezed out of him was a mystery. We took him to the first-aid room and to our surprise found no bones broken, but he was badly squeezed and numb. He lay there a few hours and was finally taken home and laid off for about two weeks.

Believe me the fellows that helped him and saw that accident don't need to be told any more to nail down the runways for trucking.

The next thing is the loading of the trucks. We generally put on three tiers of pulp two lengthwise and one crosswise. The front tier has to be watched closely for if it is piled a little forward and the man who is trucking it goes along with his hand on his back, the pile falls on the handle and it hits him in back of the knees and might cause a very painful accident.

Piling pulp into storage is also very dangerous. We generally select two or three pretty careful men to make straight piles and give proper instructions to bind the sides and corners of the pulp as it is bound to settle. It may look safe, but if it stays there any length of time it will fall over.

Taking down pulp piles is just as dangerous. Men sometimes come along and dig in here and there, then the whole pile is very likely to lean and fall. We always instruct them to take down piles two or three tiers back before they take them down from the floor or it is liable to fall. Taking it back two or three tiers avoids that. Then I also give them instructions, if they happen to notice a pile leaning a little, to go up and shove it rather than to wait until it falls and catches their fellow-workmen.

In loading dry pulp we generally put on eight rolls, six on end and two over the top, but that front roll is dangerous and liable to roll forward and injure a man.

Unloading of clay is dangerous in that car doors are narrow and you have to arrange to have one right hand and one left hand shoveler. If you take two shovels going the same way they are liable to hit each other and the man's hands are apt to be injured.

When unloading barrels of resin or alum in opening the doors, we have to watch very carefully for when the barrels are piled in two and three high, when they jerk the door open, one is very liable to fall out. I have seen that happen and luckily the man wasn't under it or there might have been a very serious accident.

#### LOADING OF CAUSTICS

Very few people realize the strength of caustic. It is poured into cans boiling hot and some are liable to burst open. As the caustic is poured in, naturally some of it gets on the floor and the men cannot load these cans without stepping into the caustic. You have to watch them to see that they have on proper shoes or it will eat through their shoes and into their feet. It is so strong that it may cause two or three months lay-off if it happens to get into a man's feet. Be sure to see that the men have heavy boots on for this work and so do away with that danger.

Good trucks are also necessary. A two-wheel truck, on which one cotter-



pin is nearly worn through, wobbles and the paper is going to fall off. If it doesn't injure the trucker, it will probably injure a passerby.

Sitting in the cars while they are being switched is also very dangerous. I never allow that. Should there be a man in the car near the pulp or paper and the engine gives it a bump he might be buried underneath the pile.

Cleaning out the converse is sometimes necessary and when a man is doing that he should always tell one of his fellow workmen to stay at the switch until he gets out and gives him permission to start the converse.

Riding on crane platforms in the warehouses is a dangerous practice. Some of the men even try to go as far as to ride the hooks that hook onto the platform. I have rules put up forbidding any man to hang on these very dangerous places.

#### PLACING OF NEW MEN IS DIFFICULT

The placing of new men is also a very difficult task. You take men in who have probably never seen the inside of a paper mill and don't know anything about the working conditions of it. You have to manage to place him with a man who will teach him the safe way and who will be able to get along with the new man. We sometimes find that a man will not listen. He has been cautioned and warned and he is either a daredevil or a dangerous man. We had an accident happen about a year ago to a man by the name of Tony Horn. If I had warned him once I had warned him a hundred times to be careful, but he didn't seem to pay any heed. He got hurt once and twice, and the third time he was trying to ride the elevator gate. He had tried to ride up with it and then he tried to let himself drop, but didn't drop soon enough, and got a very nasty wound across the fingers of his hand. We don't like to do it very often, but a man like that has to be discharged.

We have from forty to sixty-five men working in the yards. Sometimes the freight gets bunched up and we have to manage to get the cars off in time to avoid demurrage. Then if work is slack we have to reduce our crew. This works as a sort of a training camp for these men. They come in and learn the safety way of working and are now ready to be shifted and transferred to some other department. I am only too glad when I can transfer a man and put him in the mill and say he is a safe and honest workman, although I don't like the idea of picking out our best men for other departments, but as I say, it would be an injustice to hold him down.

My department was once known as the worst department in the mill. Workmen were coming in by the dozens and going out by the dozens. There were sometimes as high as twenty in one day. But today it is different. The men have a sort of department pride. They have nice wash-rooms, bath-towels, lockers, they have games and spend the noon-hour playing basket ball and so forth. So you see the foreman can do a whole lot towards the happiness and safety movement by cautioning the men and it will not take long before he will have a lot of followers only too anxious to help co-operate and boost safety.

CHAIRMAN ALTMAN: Perhaps next to the point of view of the Man on the Job, that of the Foreman is the most important, and I am mighty glad, in fact all of us are glad to have had the opportunity of hearing Mr. Bongers cover in detail a part of the accident frequency which we call the two-thirds we ought to eliminate. We know that a certain amount of that can be covered by safety guards, but we also know that a greater portion of it is due entirely to carelessness on the part of employees and by employees I don't mean the man on the job only, but I include the foreman who is also an employee. If we can reach the foreman so that he will not allow carelessness to predominate there is no reason why we cannot eliminate a great amount of the two-thirds which we, as safety engineers have undertaken to eliminate.

Of course, without the superintendent, who is after all the head of all, neither the foreman nor the men on the job will be inspired to do safe work, and in order to get the safe employees, safe foremen, safe men on the jobs, it is up to the superintendent to be a safety enthusiast.

We will now hear from F. G. Wheeler, the General Superintendent, whose point of view should prove interesting and valuable.

#### THE SUPERINTENDENT

F. G. WHEELER

As you all know, the superintendent is usually responsible for the production and cost. When the safety movement first came in and we were told that it was Safety First, it led me to believe that Safety was ahead of production and cost. In other words that it was more important. After considering this and its application with regard to the machines in the mill I was sold to the idea to the extent that everything which came up and everything which was done should be considered first from the safety standpoint. Supposing, for instance, that there was a special job done and it was completed very quickly. My first thought was not how quickly the work was completed, but was any one hurt while it was being done? Looked at from this standpoint one always has in the back part of his head the question of safety and whether each job is absolutely safe not only from the material standpoint of having the machines guarded but from the attitude which the men themselves have toward safety.

With this in mind I started first deliberately to create in the minds of the foremen who were under me the idea that safety was really ahead of production. In doing that as I have said, one has to be sold to the idea absolutely because the studied phrase or the thought-out question will not convince a foreman nor will it convince the men, that you really mean that safety is ahead of production. It is the small unthought question which will produce the atmosphere of safety in a plant and the superintendent must produce that atmosphere. Not only will he work through his foremen but as our good friend, Mr. Corcoran has said, he will work with the men to the end that they will think and live safety.

In that matter the guarding of machines is the first point that we consider. The second point is that a man must not drive his men at a speed

which prevents safety. When a foreman is in a hurry to get out the work and he pushes the men for results it oftens happens that the men will not see the danger of an accident and in that respect the foreman must let up on his men to the degree that they will not hesitate to slow down a little bit if there is danger of an accident. That was brought out particularly by Mr. Bongers when he spoke about the nailing down of planks in unloading cars. The men must not be hurried to the point where they will not do that because they are in a hurry to get that car unloaded.

The next point to be considered is that the men must realize as Mr. Corcoran also brought out that they can protect their fellow-workmen. We all know that the human mind is so made that the imagination pictures to a man what his senses have given him, and the sense which is used the most in imagination is that of sight. In a man's imagination he will not see a danger which the other man will because he has never seen himself as he is working and to a great extent one man must be taught to protect the others.

There is a most noteworthy case in my mind in which a man was working near a pump. The piping had been disconnected, that is the piping which was above, and in that which led down there was caustic. As the man reached down to lift the pump, a fellow-workman, seeing the danger of the caustic, slipped a piece of wire felt over the other man's shoulder. Naturally the man who was lifting the pump did not see the danger, and it seems to me if that whole atmosphere can be conveyed through the foremen, we have one of the most potent forces that there is toward safety.

CHAIRMAN ALTMAN: Last but not least, the man who is held responsible for the safety not only of the Man on the Job, but the Foreman and the Superintendent—the Safety Director.

#### THE SAFETY DIRECTOR

M. G. HOYMAN

I wish to preface my few remarks by saying that the course outlined here as applying to this one particular mill is identical with that pursued in the six other mills of this Company in which I have charge of Safety.

A little over a year ago when I had the good fortune to become connected with the Kimberly-Clark Company as Safety Director, I brought with me the idea that the foreman is the biggest safety factor in the plant, and that if he were given the responsibility he would make good. Now, up to that time I had never seen that plan put into practical operation. I think quite a few were skeptical when, as we put it, the old Safety Committee was disbanded temporarily. I immediately put it up to the foremen in about this fashion: If an accident occurs in your department I am coming to you for the explanation; if you do not have accidents in your department you get the credit. I wish to say at this point that the members of our firm and the superintendents of the various departments co-operated most splendidly.

Immediately I started getting out posters showing especially the long no-accident runs of the different foremen. This developed later into what is now known as our weekly Bulletin. This bulletin, of which I have a few samples here, gives the foreman's name, the department in which he works, the number of men under him, and his record for the past week, and is posted on the Safety boards each Monday.

I made it my business to try and see the foremen at least once or twice a week at his work and talk over the safety situation with him. At the monthly foremen's meeting I or some one would give them a little talk on the progress we were making. Everything I could think of was done to assist him and get it home to him that we were not only depending upon him, but watching his records very closely. It soon became a known fact that these weekly bulletins got on the desks of the officials every Monday morning, and that they read them and were interested was proven by special letters of commendation for some particular long no-accident run.

With the old Safety Committee in force the foreman felt no responsibility for accidents. He reasoned somewhat like this: Safety is not my job, why should I worry, let the committee take care of that. On the other hand, the committee making their trips of inspection once a month were in no position to keep very close tab on affairs, and besides, after each one got out of the department he was working in, he was at sea in so far as understanding the hazards involved. On the other hand with the foreman as the safety man, he is on the job 24 hours a day, knows the men under him, the work they must do and all the various hazards involved. Consequently, when he understood that the safety of his department was up to him, I got some action.

I make systematic inspections of the entire mill as often as I can, but I am going to confess that most of the danger spots are called to my attention by one or the other of my safety workers, which includes in its list the entire personnel of the plant. This has been brought about, I believe, first by my earnestly asking every one to call my attention to anything that needed guarding or repairing. Second, the way I receive the suggestions. I am never too busy to listen or to go with a man and look at the particular spot he has in mind, without showing any impatience no matter how big a rush I am in. I always take him seriously, be the matter great or small. Usually, unless it is very apparent, I ask him how he would have it done, showing him that I value his opinion, leaving him with the assurance that I will have it repaired as soon as possible, and thanking him for calling my attention to it. I might say that many things along safety lines are taken care of by the foremen or superintendent without waiting for me to come around.

Next, we do endeavor to follow up suggestions by repairing or guarding, as the case may be, just as soon as possible; in fact, we stretch a point in this matter for both the superintendents and I realize that nothing will discourage a man so easily as to come to you bubbling over with a crack safety suggestion and then have things drag along for weeks and no action taken on the matter. Another thing, while I am talking about the men of our mill, I do not confine my interest solely to their safety. I

am interested in their homes, troubles, children, sports, and whatever is vital to them, and that I have become one of them is often proven by the conversations they hold in my presence. The same thing applies to the foremen—I know every one by name. I attend their meetings and mix with them on a regular man to man basis.

Our superintendents have a weekly meeting. I attend these and few go by that something pertaining to safety is not discussed.

We try to keep our plant so that it will be mechanically safe, following out the rules of the Industrial Commission as relating to guarding very closely. I do not believe we have had an accident due to lack of mechanical guards in any of our mills in the past year. Any new installation of machinery is guarded and we believe, well. For example, after a new paper machine in this plant was set up I talked with the superintendent about guarding the pulleys on the main floor. He said he believed the best guard was a solid sheet-iron guard completely enclosing the pulleys. The same being installed certainly makes a fine looking job and absolutely fool-proof.

The way I get the work done incidental to guarding is as follows: Whenever anything is brought to my attention, I try to determine first just what is needed and what will be necessary to make the place safe. Then I go to the superintendent of the department and if the job is of some moment I ask him to go with me and look it over. There we discuss the need, and ways and means of making the place safe. If I can convince him of the need he immediately takes steps to have the work done. Quite often on small jobs such as repairing broken railings or steps and the like, I ask the superintendent for a carpenter or millwright and show him just what I want done.

We have a regular form for making recommendations relative to guarding. This form is made out in triplicate and on it is written the specific recommendations covering the work I wish done. The superintendent signs all three. One copy he retains, one goes to the main office, and one is for myself. The superintendent also must write "yes" or "no" in regard to his intentions of doing the work. If he writes "yes" I need bother no further with the matter except to check up now and then and see that it is not forgotten; if the superintendent writes "no" on the recommendation, meaning that he does not think the work necessary, I can, if I feel he is mistaken, refer the matter directly to one of the directors of the company who will make the final decision. I have, however, used this method very little, probably for the reason that it is only necessary for me to bring to their attention any condition whereby the safety of the worker is not fully guarded to have their instant co-operation in eliminating the hazard, whatever it may be.

Construction work has its problems for the safety director. At best it is a hazardous line of work and requires much attention. Large jobs quite frequently are let out on contract; then again your own crew does the work. Whichever it may be, you will have many uneasy moments until it is finished unless you have a construction crew like the Kimberly Mill boasts of. This crew consists of 41 men and during the past year

has had three minor accidents, causing a total loss of 24 days. This, in spite of the fact that these men are probably given the most hazardous work we have. The explanation is simple—just the foreman who takes great pride in his record and sees to it that his men play doubly safe. He is proud of his record, so am I, and I have not made a secret of it either.

Then probably our next greatest risk is the new man. Volumes have been written on how to handle the difficult problem of getting him started in the right atmosphere, as you might say. In our plant he must first pass through the employment office, and here let me say, a mighty efficient one, too, as you no doubt concluded if you heard the first talk of this series. If he can pass the employment office he is turned over to his foreman, and the vital problem confronts us—who is going to train this man? A knocker? Or a booster? A man who is an expert and interested in his work or one whose interest is gone and who is only waiting for his check?

Supposing this new man has been hired to work on some machine, that the present operator has, for some reason, decided to quit and given his notice. Wouldn't it be the policy of a great many to place this new man alongside the old timer who was going to quit, to learn how to operate the machine and get acquainted? I do not know how extensively this practice is being used these times, but I can assure you it is a poor one.

The reason is this: When a man has made up his mind to quit, it matters not what the reason, his interest lags, and probably through some real or fancied grievance, he becomes a knocker; he shows the new man just enough so that he can get by with the work, failing to mention anything about the dangers that may accompany the work and, if a knocker, winds up his time telling the new man what a bum company he has signed up with. Under these circumstances would it be surprising if the new man got hurt within the first two weeks, as so many do, or could you blame him if he was rather slow in picking up plant spirit and loyalty?

In our plant, if the situation is such that the foreman cannot personally instruct the new man, he is placed with the best man in the department, insuring him expert training from an interested instructor, and one whose mind is not on so many more days or hours until he can get his check and be gone. Personally, I do not believe in keeping a man after he has signified his desire to leave the employ of the company, unless he desires to work his notice out, for, with few exceptions, you will get poor and indifferent service the balance of his stay. Before I pass on from the new man and his trainer I wish to say that I believe the trainer's make-up should embody these four indispensable characteristics, namely: patience, skill, safety, and loyalty.

I am now going to outline some of the more pronounced methods used to keep safety constantly before our men. First come the *Safety Bulletin Boards*. In the Kimberly Mill we have twenty-two, all painted a dark green with Safety Bulletins stenciled in white as a heading. These boards are painted often so as to keep them clean and are placed in the most prominent places in each department where they will not interfere with

the labor performed there and yet be readily accessible, both for reading the bulletins placed thereon and the replacing with fresh ones.

As to the bulletins used, our weekly bulletin referred to in the beginning of this paper is placed on these Safety Boards every Monday, then we use a great number of illustrated bulletins, some from the Mutual Liability Company of Warsaw, some from the Traveler Insurance Company, but our chief supply, by far, comes from the National Safety Council. These last-named bulletins are changed every week, and as consistently as I can, I change the size each week, first a large and then a small one, and so on, with the idea of making the change just as pronounced as possible, thus attracting attention. I am not very strong for bulletins with just reading matter on them, for very few men will take time to read them, whereas if accompanied by a good illustration they stop to look at the picture and then, if not too much, will read the printed matter.

Last year we tried for a NO ACCIDENT week, not but what we have lots of weeks without a single accident, but we, and not chance, wished to say when we would have that week. We failed last year largely through over-confidence, but I believe that sufficient interest was aroused through the failure to put it across this year, for of course we will try again. All our mills take part in NO ACCIDENT week.

Then, we have contests between mills, and have just finished one lately between the mill at Kimberly and the Niagara Mill. I will describe one of the methods used to keep the men informed as to the progress of the contest. I want to say here the most gratifying part of this contest to me was the fact that it originated through the foremen of one mill challenging the foremen of the other mill to a 24 day safety contest, which challenge was promptly accepted. In order to keep the progress before every one in a graphic manner I put it in the form of a horse race. I had built a straight race track of lumber, 24 feet long to correspond with the contest of 24 days, or a foot a day. I then had a chap who is rather handy, paint two very nice horses about 14 inches long by 10 or 11 inches high on one inch lumber. The horses were then carefully cut out, and were fitted into grooves in the race track one above the other; on the sides of the horses, which were painted brown and black respectively, were the names of the mill they represented. The horses were moved ahead each morning 12 inches if no accident occurred the previous day. If an accident did occur the horse belonging to that mill was retarded several inches as agreed upon before the contest. This horse race probably created more interest than anything in the way of prizes we might have offered; in other words it was a winner. I might add that this race track was placed out in front of the main entrance where the men could see it both going to and coming from the mill. The contest developed into a real neck and neck race clean to the finish. Who the winner was could be decided only through the fact that one mill had a few more employees than the other, the number of accidents being the same, three minor accidents each. The losers are now planning to challenge for a longer period of time.

Then I have a large monthly Safety board about 4 x 17 feet in size

and placed by the main entrance to the mill. On this board the record for each department is shown day by day for the entire month. This board is covered with white oil cloth upon which is painted in the first 3 feet in large letters, the following: "Help make your department safe by being a safe and careful workman." Then come the names of the various departments, the balance being laid out in little squares about 3 inches in diameter, one row of squares in line with each department. Along the top are placed figures corresponding with the squares up to 31. These are for the days of the month with a place for the name of the month. Then I have little round tin discs about 2½ inches in diameter with a small hole in the center for a tack. These discs are all painted on one side either a deep green or bright red. Each morning these discs are put up for the preceding day, a green disc for Safety, a red one for an Accident. This board is well lighted at night and any one can tell at a glance just how each department stands to date. The board is so large and the colors make such a contrast you can hardly help noticing it, and once you notice it, you will probably look to see how your department stands and how it compares with the others, entailing some thought of safety. It is just one more way to make sure it is not forgotten.

We have a plant publication called "Co-operation" issued once a month, and a good one, we all believe. Always one, and usually two pages are devoted to safety. Safety records, history, sayings, jokes, and some good articles written by our own men as well as some of the best gleaned from others find their way to these pages and make them well worth reading.

Then each Fall we have what is known as our Mass Safety meeting, where not only the workers but their families are invited. Last year we preceded this meeting, which is usually held on Sunday, by a Children's meeting which was held on Saturday afternoon. In this children's meeting, composed of about 1400 children, ages limited from seven to fourteen years, I think we got in some real Safety seeds. We had the City Fire Chief address them briefly on fire hazards around the home, the police chief on traffic hazards, a talk by Miss Edwards, a little demonstration by youngsters on how accidents happen, a safety movie picture, and songs. It sure was a dandy, and I know the homes they represented heard considerable about safety for some time. The adult mass meeting the following day was equally successful, free transportation coupled with a good program brought out a large crowd. We expect to hold another one in about a month, also to repeat the children's meeting. The children of today are the men and women of tomorrow, so it behooves us to get started early with them, and besides that is just one more way to reach the men.

This paper would not be complete without some mention of our First Aid Department. We have two very able and efficient nurses, one who acts in the capacity of visiting nurse, visiting the sick and injured, and getting them back on the job as soon as they are able. The other tends the office, caring for the injured or sick. There can be no doubt that we



are saved many days of lost time through their prompt and careful treatment of the smallest injury. On top of their efficiency they are two of my best safety boosters, taking as much pride in the mill safety record as I do. They keep an accurate record of all accidents, the cause, and kind so that I have at all times available for my information the trend of things. By that I mean the particular kind of injuries that happen the most frequently, and it is not infrequent that they bring to my attention some safety job that needs doing badly.

In concluding this paper I wish to leave with you these thoughts: To get Safety across we must keep everlastingly at it, presenting it in new garb, new stunts, but always keeping it before the men 365 days a year.

I have not tried to give in detail just what I do every day, but have simply presented a few of my ideas and stunts that have been successful in interesting the men and getting them to think, for when men think, accidents rarely happen. In the Kimberly Mill last year, accidents were reduced 41 per cent and days lost due to same, 47 per cent. The figures for our entire seven mills total 49 per cent reduction in accidents and 51 per cent in days lost.

This, I believe you will agree, is a nice reduction, bearing in mind that Safety is not a new thing with the Kimberly-Clark Company, but has been pressed vigorously for years.

I believe it simmers down to this: Every plant represented in this gathering has, without doubt, the material with which to build up a real live progressive Safety organization. Employment secretaries, workmen, foremen, and superintendents are to be found in almost every plant, each and every one having a vital and prominent part to play in the safety game, and the job of the Safety Director is to co-ordinate these Safety factors into a real active, working group.

CHAIRMAN ALTMAN: Conditions in various plants bring about different problems and we are ready for a discussion of these problems. Perhaps these people will be able to help you out with your particular problem.

#### DISCUSSION

MR. ROSEBUSH: I would like to ask the Safety Engineer one question, and that is if the millwrights who do the safety work are directly under his charge or if they do that work at his suggestion, but are in charge of the superintendent or foreman?

MR. HOYMAN: They are under the superintendent and foremen.

MR. D. P. KENNEDY (Pittsburgh Plate Glass Co.): I wanted to ask three questions. Do you have medical examinations, what percentage are turned away, and what sort of bulletins are posted every Monday?

MISS BAKER: The medical examination does not precede employment but we have medical examinations when we enter our man on our company's insurance, and if the medical examination shows the man has a defect that hasn't been mentioned, we have to transfer and replace him. The percentage turned away is very low.

We have no particular day for posting bulletins. We have a bulletin

board at the entrance of the mill and among other things we keep our safety records posted on it.

CHAIRMAN ALTMAN: I am going to ask if there is any one in the audience here who has a medical examination preceding employment?

DR. CARR (Richardson Co., Cincinnati.): We have a medical examination of every employee.

A. KROES (Empl. Mut. Lias. Ins., Wausau, Wis.): I would like to ask the doctor if they find these a success?

DR. CARR: Just what do you mean?

MR. KROES: Do the men object to the examination?

DR. CARR: When they make their first application for employment they are told that they must have a medical examination.

MR. KROES: Then I suppose you have a method whereby a man not fitted for one job is given another job?

DR. CARR: That is what we are trying to do.

CHAIRMAN ALTMAN: How long has this plan been in operation?

DR. CARR: Since February.

MR. SPEAR (Oxford Paper Co., Rumford, Me.): I would like to ask Mr. Bongers if when there is a fall in the yard his men are assimilated by the rest of the mill, and what he does when there is a sudden rush of work, how he increases his force in the yard.

MR. BONGERS: I have about sixty men and when my work slackens we try to give them a chance to work in some other department in the mill. Sometimes the other departments have a scarcity when we have an over-supply and we send our men to them. At other times the other departments are slow when we are rushed and they lend us some of their men. We find that works out very well.

CHAIRMAN ALTMAN: At the Marathon we have a similar system. We have what we call the "Chain Gang," that is a department that does the loading and unloading either of the raw material or the finished product and we use the same method when we have a congestion of freight. When there is a great deal of raw material we have a larger crew but as soon as the cars stop coming in so fast we put them off into different departments and give them a chance to learn something about those departments.

MR. BEAUDOIN (Robert Gair Co., Brooklyn, N. Y.): I would like to ask Mr. Bongers what per cent of foreign labor is used in his gang, what the nationality is, and the percentage of accidents in their particular department.

MR. BONGERS: I should judge that in my department the foreigners were about fifty per cent. Is that right Miss Baker?

MISS BAKER: Well fifty per cent can't speak English.

MR. BONGERS: They are mostly Dutch people. As to accidents that is one of the best departments we have just now. The accident percentage is very slight there.

MR. BEAUDOIN: That is encouraging because as a rule in that department there are a great many accidents.

CHAIRMAN ALTMAN: Unless we do have a safety man in charge, this

is the department that will need special attention on account of the continuous turn-over and on account of not being able to reach them educationally, and for the reason that there are so many methods used in doing the work.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

**CHAIRMAN ALTMAN:** I promised you a treat yesterday in the way of something which is to be very valuable and which will bring on, I know, a good, hearty and heavy discussion, and that is the result of the work that Mr. R. H. Guerrant, of the National Safety Council has done in the way of gathering data giving us comparative statistics on the frequency and severity rates in the Pulp and Paper Section of the National Safety Council. That isn't going to be the end of this work. As I explained in my report yesterday, we want to continue it for the coming year, and immediately following the reading of the paper we will be open for a discussion on ways and means of keeping the work up for the coming year so that we may have even more valuable data at the next Annual Congress.

#### PAPER MILL ACCIDENT RECORDS

R. H. GUERRANT, SAFETY ENGINEER, NATIONAL SAFETY COUNCIL, CHICAGO,

The officers of your Section, prompted no doubt by an article which appeared in the June issue of the NATIONAL SAFETY NEWS on the accident records reported from seventeen members of the Paper and Pulp Section, requested me to prepare a paper on the subject for this Congress. I undertook the preparation of such a paper mainly because there is quite a difference in the methods now followed by the members of the Paper and Pulp Section in keeping their accident records, and because it is very apparent that if the various mills will standardize one method it will be a distinct advantage to all.

The general method of collecting the data and keeping the accident records in your industry need differ but little from that used in any other industry. In fact the only difference is in the classification of accidents by causes and departments. While I have had but little experience in the Paper and Pulp industry and hardly feel competent to recommend a standard classification for paper mill accidents, I nevertheless have had several years' experience in this work in the steel industry, being for six years employed in the accident prevention department of a large steel corporation, four years of which I was assistant manager of the department. In that position I was responsible for the tabulation of from four to six thousand accidents each year and helped standardize the methods now in use by that company. I also had charge of the safety work and accident records for the United States Government arsenal at Rock Island, Ill., for about a year during the war, at which plant there

were between thirty and fifty accidents per day. My experience then has been enough to indicate that the general principles in all accident record work are the same.

#### PURPOSE FOR KEEPING ACCIDENT RECORDS

##### *Why are accident records kept?*

You no doubt have been in many plants where practically no record has been kept of the accidents to employees. I believe most of you will agree that in times gone by the principal reason for keeping accident records was to disprove and combat any fraudulent claims for damages on account of injuries to employees, and much to the discredit of a few employers, efforts were sometimes made to fight justifiable claims.

More recently however, and especially since the passage of compensation laws in the various states, the State Industrial Boards have required that records of all accidents be kept and reported. Many companies, even before the passage of compensation laws, kept complete records of accidents because these records helped to determine the causes of accidents in their plants and enabled them to concentrate their efforts toward remedying these conditions responsible for accidents.

Safety work has taught that another very good reason, if not the best reason, for keeping accident records is to impress upon the workmen and management the needless loss of time and money resulting every month from personal injuries. It will be found that the workmen themselves are as much interested in the effect of accidents on their pay envelopes, as is the management in the effect on the cost of production.

Accident records therefore should be kept and tabulated so that they may be used for showing the operating executives the need for continued activities toward accident elimination, and also for showing the workmen how much accidents mean to them, as well as for stimulating rivalry between the various departments or mills.

#### HOW TO KEEP ACCIDENT DATA

##### *Have you a satisfactory method for keeping accident records?*

About a year ago I prepared for the National Safety Council a Safe Practices pamphlet on "Accident Records—How to Compile them and how to use them" in which was outlined a uniform method for keeping accident records. That plan I believe, with possibly a few minor alterations here and there, can be used in any industry. Most of you are no doubt familiar with the plan outlined in that pamphlet; others doubtless have already established a satisfactory system for keeping your accident reports so that I need not dwell upon this further than simply to point out the five essentials which I consider necessary for any satisfactory method.

##### *1 See that injured men report promptly.*

Workmen should always be educated and encouraged to report at once whenever injured. If encouragement will not do then they should be compelled by their foreman to report.

**2 *Make a record of every man reporting for treatment.***

A daily record sheet of all men reporting for treatment is always advisable, even though as in the case of minor injuries, no further record of the accident is made. Such a daily record sheet may be kept in each plant hospital or first-aid station, or if there are two or more of those first-aid stations one record sheet should be maintained at each station. At the end of the week, or month, these record sheets should be collected and permanently filed. The record sheet used by the American Steel Foundries at each of their plants includes the check number and name of the injured man, the department in which injured, date injured, date reported, cause of injury, nature of injury, treatment given, and disposition (whether or not he returned to work or was sent home or to hospital). This sheet is kept as a permanent record and is of value should a workman appear at a later date with an infection and claim it was the result of a former injury. It is a simple matter to refer to the daily record chart and trace all injuries which were reported, as well as the treatment given. When men are given subsequent treatments, either at a first aid station, a hospital, or doctor's office, a record should always be kept showing the date, and nature of treatments. A day-book will serve the purpose in first-aid rooms.

**3 *Notify the proper departments.***

Whenever an injured man who will lose time reports for treatment, the medical department or first-aid station should at once make out a notice of injury slip, one copy of which should be sent to the Safety Department, one to the shop foreman, and one to the Employment Department. This will notify the several departments of the accident so that an investigation may be made, and the employment records properly kept.

**4 *Get all information for the accident report.***

The accident report for all accidents causing lost time is of much importance and should be made up with particular care. Many companies use the state form for this report. The employment record of all employees should be such that any information relative to the workman's past employment, his age, nationality, date of employment, and other such information is available.

**5 *Notify departments when man is able to resume work.***

Whenever a workman is able to resume work the Medical Department or plant dispensary should make out a "return to work" notice and copies should be sent to the foreman, employment department, and the safety department. Suggested forms for these several reports are shown in the National Safety Council's Safe Practices pamphlet No. 21.

**USE OF ACCIDENT DATA**

***What use should be made of the information on accident reports?***

Accurate accident experience data is of great value in preventing accidents. Simple effective charts will show at a glance the progress in safety work, the departments in which accidents occur, their cost as it relates to production, cost, etc. Such charts are useful for securing the co-operation of the executives, foremen, and men in safety work.

The forms suggested above if made out and carefully kept will contain all the information necessary for any kind of tabulated charts. Personally I do not believe it necessary or advisable to prepare many charts. Some companies go to the extreme in this particular. I have seen tabulations of plant accidents by age, nationality, color, length of service, hour of day, day of week, month of year, description of injury, etc., many of which were of questionable value. Some of this information of course may be interesting and have some value, such as a chart showing the hour of day at which accidents occur.

I recall that while with the American Steel Foundries I tabulated some five or six thousand "lost time" accidents extending over a period of four years, showing the hour of day, and day of week, on which all accidents occurred. Many other companies have prepared similar charts and they are of some value, such as for determining the effect of fatigue on employees, the value of good lighting, etc. So much data is already available in the National Safety Council's Library on many such questions that it seems needless for any company to go to the trouble at this time to prepare many tabulated records. Two or three charts will be found sufficient to answer most purposes. The most important are the classification by accident causes, and the classification by extent of disability.

#### CAUSES OF ACCIDENTS

It is highly important that all lost time accident be tabulated or classified by causes, for in this way only is it possible to determine what are the real causes of accidents in your plant. The Safe Practices pamphlet No. 21 gives a classification of accident causes which may be referred to for a general outline. This classification is, of course, not suitable for use in a Paper and Pulp mill as it stands, nevertheless any classification used should follow that general arrangement. I would suggest to this Section that a committee be appointed to prepare a standard classification of accident causes in the Paper and Pulp industry which all members and, in fact, all paper and pulp mills should be encouraged to use. There are many advantages to be derived from having such a standard classification. Many of the larger mills already have their own classification list. I have no doubt, however, that any and all companies will be glad to use whatever this Section adopts as standard. In the files of the National Safety Council are the reports of several companies in which classification lists are used; no two, however, are alike. This material is available for the use of your committee.

#### EXTENT OF DISABILITY

It is essential also to classify accidents according to the extent of the disability, for from such a table it is possible to determine the relative importance of accidents in various departments, and to know exactly what accidents cost in time and money. The standard method for classifying accidents by extent of disability is shown in table No. 3, Safe Practice pamphlet No. 21.

## THE FREQUENCY AND SEVERITY RATES

The frequency with which accidents occur, and their severity, is an exact measure of the accident hazard in any mill or industry. In order to compare the accident hazard of various mills and industries it is highly important that a standard method for computing these rates be used. The U. S. Bureau of Labor Statistics and the Association of Industrial Accident Boards and Commissions have decided upon a standard method for computing the frequency and severity rates of accidents in any and all industries. Formerly these rates were expressed in terms of a unit of measure, the "300 day worker", sometimes called the "full-time worker". Because of the variation in the number of hours worked per day and days worked per year in the various industries and localities it has been decided by the committee to abandon the "three-hundred day worker" as the unit.

In some plants it has been customary, and is still the practice especially in the mining industry, to express the severity of accidents on the basis of the number of days lost per 100 or 1000 shifts worked. The error which is unavoidable in such a system is that in one locality the shifts may be eight hours each whereas in another locality they may be ten, eleven, or twelve hours each. It is easily seen then that rates computed by this method are not properly comparable. For instance 1000 shifts of eight hours each present but two-thirds the number of hours worked in 1000 shifts of 12 hours each. As long as a man is working in the plant, mine, or mill, he is exposed to injury; the more hours worked, the longer is his exposure to injury. Therefore, the only logical and correct method is to base all accident rates on the actual number of hours exposure.

The adoption of 1000 hours exposure has been decided upon as a proper unit which is convenient in size and remains unaffected by changes in the length of the working day or variations in the working year. This unit of measure (1000 hours exposure) is a stable, scientific, and mathematical unit of measure which is what is needed for the measurement of accident rates. It has the additional advantage that rates measured by any other unit exposure may be readily expressed in terms of 1000 hour units and vice versa. For instance, all accident rates computed in units of the "300 day worker" may be converted into the rates of the 1000 hour exposure by dividing by three.

In order to determine the frequency and severity rates on the new basis of 1000 hours exposure it is of course essential that the total hours exposure be known. Where the "time" or "person" department keeps the total hours worked by each employee it is a comparatively simple matter to get the total hours worked by all men per week or per month. Where these figures are not available the approximate total hours exposure may be determined by taking the average number of hours worked (per week or month) by each employee and multiplying this number by the average number of employees for the period. Where there are two shifts, working a different number of hours, each shift must be figured separately and the total gives the desired time exposure. The frequency rate then is the number of lost time accidents which occur for

each, one million hours worked, and the severity rate is the number of days lost per 1000 hours worked.

This system of reasoning can be easily demonstrated by the following: Suppose that 150 automobiles pass a given point every two hours; then the frequency rate would be 75 per hour. Now suppose that these automobiles were loaded with five tons each; the severity rate (meaning by severity the weight of the load) would be  $(5 \times 75)$  375 tons per hour. In computing accident frequency and severity rates, however, a larger unit of measure is necessary and the unit best suited is 1,000,000 hours for frequency rates, and 1000 hours for severity rates. These different arbitrary units were established because by their use the frequency and severity rates are given in numbers of convenient size, ordinarily ranging from 1 to 100.

It is very essential that all plants should use this standard method for computing their accident frequency and severity rates. These rates represent the true accident hazard of the industry. Whenever used, the accident hazard of one industry is easily and correctly comparable with that of any other industry.

#### DAYS LOST BY INJURED EMPLOYEES

In computing the days lost on account of temporary disabilities the actual number of days lost during any month should be credited against that month. Where the injured employee does not return to work before the end of the month, all days lost in the following month should be charged to the month in which they are lost. This is advisable because at the time of an accident, it is difficult, if not impossible, to estimate the number of days which will be lost by the injured man. In order to keep a record of the days lost on account of accidents the form shown below is suggested. If at the end of a year it is desired to know the number of days lost on account of accidents occurring in each month, this may be easily determined from the several forms covering that year. This form has been successfully used by the American Steel Foundries for a number of years.

#### LOST TIME ACCIDENTS

| Month of.....19.....                                |                               |                               |                                   |                                      |
|-----------------------------------------------------|-------------------------------|-------------------------------|-----------------------------------|--------------------------------------|
| Report Number of<br>Accidents<br>of Prior<br>Months | Accidents<br>of This<br>Month | Date<br>Lost<br>Time<br>Began | Date<br>Able to<br>Resume<br>Work | Number<br>of Working<br>Days<br>Lost |

#### WEIGHTING OF PERMANENT INJURIES AND FATALITIES

One feature of computing accident severity rates sometimes not fully appreciated is that of expressing all fatalities and permanent injuries in terms of "days lost". This is necessary if permanent injuries and fatalities are to be considered as affecting the severity rate of a plant. The severity rate represents the true accident hazard of an industry. That industry having a large number of fatalities and permanent injuries each



year is, you will agree, much more hazardous than an industry in which serious accidents are of rare occurrence. There should be some way then to indicate the hazard of the industry by its severity rate. The only logical way is to reduce permanent injuries and deaths to a common basis, in other words to represent the serious injuries by arbitrary equivalents in days lost; the same equivalents being used in all industries. The U. S. Bureau of Standards and the Association of Industrial Accident Boards and Commissions have decided upon a standard table of equivalent days lost for all such injuries. (The table can be furnished by the National Safety Council.)

When given a little thought this method of computing the severity rates is as it should be. When your company makes an inventory of its equipment and stock, this inventory is expressed on the balance sheet in terms of dollars. It is of course necessary in making the inventory that all separate items be taken into account, but they are all converted into their dollar equivalents for statistical purposes. In a like manner, while it is necessary that a complete record of all permanent injuries and deaths be kept, for purposes of comparison these must be converted into terms of days lost in order to express the severity rates accurately.

The ratings of 45 mills who submitted their accident reports for the period January to June, 1920, inclusive, were printed in the September 27 issue of the NATIONAL SAFETY NEWS.

CHAIRMAN ALTMAN: This getting together on a standardized method of accident reporting and frequencies and severities has been one of my hobbies for the past year and while it is still in its infancy I think we could really get some good results by keeping this thing up.

To some of you perhaps Mr. Guerrant's methods were not plain. He is here now to answer any questions that may come up in regard to the work of the coming year. I recommend strongly that this be kept up next year. I hope that in this discussion we can get something that will be valuable for the industry as a whole.

#### DISCUSSION

MR. W. A. GLEASON (Hammermill Paper Co., Erie, Pa.): I would like to ask how you figure permanent injuries. On our list we had a man who was injured by having a thumb and one finger amputated. We figured the number of days lost and the number of days disability, but according to the permanent scale of injury I presume more is added on. I wonder if we should include the days of permanent injury lost in this report.

MR. GUERRANT: If you will kindly turn to page 11 of the NATIONAL SAFETY NEWS for September 27, we will be better able to discuss this matter. (Copies of this issue were distributed.)

Now in answer to your question, Mr. Gleason, no. In the case of permanent injury you only credit against that accident the number of days shown in the table. Do not add the number of days lost because one man may lose two months and another may lose six on the same kind of an

injury. In other words it is not fair to make it comparable with other industries by using any one number of days.

MR. BEAUDOIN: I would like to ask what he does in cases where the commission makes a special award in an accident. Often a man is awarded a third of a hand, another is sometimes given a part of a permanent disfigurement.

MR. GUERRANT: In case the commission makes a partial award, say a man has a broken leg but it remains stiff and the commission permits him two-fifths for the loss of a leg. For a leg say you have three thousand days. Put against that accident two-fifths of three thousand days. In case of any permanent disability of that nature, where the commission has given an award, always state the amount of the total that the commission granted.

MR. J. N. STEPHENSON (Gardenvale, Quebec): The Pulp and Paper Magazine, although it does not deal directly with accident work, is very much interested in it. Having followed out what Mr. Guerrant said, it occurred to me to remark that his table of accidents appears a bit incomplete. It appears that if a man loses time it is important to the mill to know how much time that man has lost, how long he has been absent from the work, and consequently how much wages he has lost on that account.

This is particularly important it seems to me, in connection with permanent injuries where the award by the commission would entitle him to a greater remuneration than his loss of time would represent.

If a man loses a finger on the fifteenth of September and he is out of work a month, his record would show that he began to lose time on the fifteenth of September and that he resumed work on the fifteenth of October. He didn't get any wages during that time in his normal way. He is entitled to certain compensation because of that, to the equivalent of a lost finger. Now if you want to have that record accurate you have to show how much he got from the accident because of his compensation, but your record has also got to show the fact that during a part of that time credited to his loss through accident, he is getting some wages because he has resumed work. It would seem then, that you should put in your records, the days lost in the current month due to all accidents whether coming in that month or carried over, and also the total days lost which would represent either the total days lost between the beginning of the accident and the results of the work, or the total days lost as calculated on the basis of equivalent hours because of permanent injury, and, in case there is a permanent injury, to show what that injury was. That then would give you your full information regarding that particular accident.

Another thing I would remark on is that three thousand hours divided by three hundred days does not give you a thousand-hour basis unless operating on a ten-hour shift. If you are operating on an eight-hour shift it doesn't come out right. You simply have to make a factor for each length of shift. It would also seem advisable that in connection with your accident work you have some means of keeping a record of time

lost due to sickness and in some cases, in some industries that sickness may be traceable to industrial conditions. But in order to keep a proper record of the men, what they are doing, and what their earning power is, it would seem advisable to have that record kept.

MR. GUERRANT: Of course I didn't touch on lost time in regard to sickness but I think it is highly important that one should keep such a record. I didn't include that in my paper because I was dealing only with accidents.

In reference to the first part of your remark, I believe that had reference to the form for the table I suggested. In regard to keeping the days actually lost by men permanently injured, the only way to tell the amount of money the man has lost is to keep the number of days he actually loses and use it in the plant accident record work. It is always advisable to keep the number of days actually lost by the workmen and use that record in computing the amount of money the accident costs the workman.

The method that I discussed principally had to do with the preparation of accident record charts for our industry as comparable with other plants and industries and the only way to make it comparable is to use the number of days lost for permanent injury.

For impressing upon the management what accidents are costing them it is better to use the amount of money it is costing the management, which is arrived at by the amount of compensation.

MR. T. F. SPEAR (Rumford, Me.): If a man were injured on September 15 and died from his injuries later, how much do they charge against the department for the year, how many lost days?

MR. GUERRANT: Of course when it is not known at the time of injury whether it is a fatality or not the only way to arrive at your monthly standard is to credit the number of days against your department, but at the end of the year the correction should be made and you should credit the plant with six thousand days attributed to death.

MR. C. K. BOYER (Wisconsin Rapids, Wis.): I would like to ask Mr. Guerrant as to the methods the various firms used in reporting lost-time accidents in Michigan. In Wisconsin, of course you know that there is a waiting period of seven days before you have to make a report of an accident to the Industrial Commission. But in making these reports to the National Safety Council I would like to ask on what basis the different firms represented in this table, are making their reports and what they consider, in making their reports, a lost time accident. There seems to be a confusion as to just what kind of an accident the different companies represented are reporting to the National Safety Council.

CHAIRMAN ALTMAN: That very question made us take this matter up so as to standardize the reporting method, and if Mr. Guerrant has anything in regard to it, we will be glad to hear it.

MR. GUERRANT: We ask for all accidents which necessitate the loss of time beyond the shift on which the man is working. I don't know how it was reported. I inferred that they sent it to the Commission. Some might have reported only those which they reported to the Industrial

Board and they of course lost every accident which we required as lost time accidents, that is we didn't get any of their accidents on which less than a week's time was lost.

The form the Council sent out asked plainly that all accidents should be reported together with the number of lost days. That is the only way to get accurate figures. If you do not report these you may have twenty men in a month who lost five days each totaling one hundred days lost on account of those five men, and you may have only one man who loses over seven days; that would show only one accident with a loss of ten days whereas as a matter of fact you have lost one hundred and ten days and have had twenty-one accidents.

CHAIRMAN ALTMAN: I have always been of the opinion that a man who was hurt on the shift, whether at the beginning or the end of the shift, should not have that time counted against the accident. The man in all probability has gone to the doctor if he had no doctor in the plant where he was employed, and so will not come back to work that day, and it wouldn't be worth while to have him come back. I think that even if he loses seven hours out of the eight none of those seven hours should be counted against the accident. In other words, the shift on which he was hurt is not to be counted as time lost on the accident. If he doesn't come back the next day on his regular shift then the time begins to count, but if he does come back the next day it would mean a no-lost-time accident, in my opinion, and I think in the opinion of the majority of those with whom I have been dealing.

MR. GUERRANT: I would like to say that that is the standard method adopted by the Council. A number of the States, however, require that the day in which the man was injured be counted as the first day. I would like to ask if there is any other industry in which they pay them for the full shift. If a man is injured at 7:15 in the morning, do you pay him for the full shift? We make a practice of paying the man for the balance of the day.

CHAIRMAN ALTMAN: We do the same thing. If a man is hurt at 5 o'clock in the morning we pay him for the balance of the day.

MR. STEPHENSON: I think that those interested in the production end will agree that the first day of the accident is the most serious day as it affects the production of the mill. It completely upsets the routine of the department in which the accident occurs and means a temporary and often hasty rearrangement of work in order to carry on that department at all. Setting aside for the moment the matter of compensation, as far as the mill is concerned the records should show the time lost on the day the accident occurs.

CHAIRMAN ALTMAN: We are figuring really on the comparative method and we have to standardize certain points in order that all may keep the same kind of records. If various mills pay and others do not, if some begin to count their time lost from the minute the man is hurt and others begin with the next shift, we would never get to a standardized method of doing this, and for that reason we have to adopt some standardized form to base our comparisons on.

**REPORT OF NOMINATING COMMITTEE**

The Nominating Committee has brought before us the name of Mr. F. S. Shattuck as Chairman for next year, Mr. F. P. Young as Vice Chairman, and Miss Mary Baker as Secretary. Mr. Shattuck, as you know, is with the Kimberly-Clark Company and so is Miss Baker, and Mr. Young is with the Interlake Pulp and Paper Company of Appleton, Wisconsin.

(The nominees were duly elected.)

CHAIRMAN ALTMAN: Our next paper is on "What is Being Done in the Pulp and Paper Industry to Bring Education within the Reach of Every Employee." We were very fortunate in being able to procure to discuss this question, Mr. J. N. Stephenson, the Editor of "Pulp and Paper Magazine of Canada," of Gardenvale, Quebec.

**WHAT THE PULP AND PAPER INDUSTRY IS DOING IN  
EDUCATIONAL WORK**

J. N. STEPHENSON, EDITOR, "PULP AND PAPER MAGAZINE OF CANADA,"  
GARDENVALE, QUEBEC

The need of some opportunity for young men to learn more about the business of paper making was impressed upon me about sixteen years ago when the frequent answer to my numerous questions asked of our Scotch machine tender was "Well now, Sliver, if I told you all I know you would know as much as I do."

Since that time a great deal has been learned about paper making, many improvements have been made in machinery and processes and many new inventions have made the work easier and more efficient. These machines and processes have been described more or less clearly in patent office records and occasionally a process or machine is the subject of an address at some meeting or a contribution to a trade periodical. Information on the equipment of the industry is therefore fragmentary and scattered and, although several very good books have been written, a comprehensive discussion and explanation of the fundamentals underlying the construction of machines and operation of processes is practically non-existent in convenient form in English. A movement instituted jointly by the technical men of the industry in Canada and the United States and financed by the manufacturers is now in progress which should go a long way toward the remedy of this condition.

**UNIVERSITY TRAINING**

In February, 1913, the first course in Pulp and Paper Making on this continent was conceived by Dr. R. H. McKee and offered by the University of Maine. This was given by Prof. A. G. Durgin, now with the Spanish River Pulp and Paper Mills, on the Manufacture of Pulp. In the fall of that year the speaker joined the staff, courses were organized in Paper Making and the University shortly had built up a department giving instruction in ten pulp and paper courses, four of which involved practical work in the laboratories which were equipped with pulp and paper making and testing apparatus.

The University of Michigan some time later began post-graduate work in pulp and paper. The University of Wisconsin is, of course, close by the Forest Products Laboratories, but we are not aware that under-graduate instruction has been given in pulp and paper subjects. The same situation is true with regard to McGill University and the Forest Products Laboratories of Canada, at Montreal. Several colleges include a few lectures on these subjects in the course in Industrial Chemistry. This fall the College of Forestry of New York State is offering for the first time, a consecutive course in Pulp and Paper Manufacture. This is based naturally on wood as raw material. Both the University of Maine and the New York State College of Forestry have attempted short courses especially for the man in the mill. They have not been entirely successful.

It will thus be seen, however, that the man who has the time, means, and ambition to prepare himself for the technical or engineering departments of the pulp and paper mill has fair opportunities for university training. The lack of schools devoted strictly to pulp and paper making is partly corrected by such means as prevail in Canada, where the Technical Section of the Pulp and Paper Association in co-operating with the universities so that students in Chemistry, Engineering, and Forestry are given opportunities to engage in the summer months in practical work with pulp and paper companies.

#### VOCATIONAL EDUCATION

The more difficult and the more interesting phase of the situation, however, relates to providing educational opportunities for the man in the mill or the young man in the schools who has a leaning toward this industry as a career. There are several distinct lines along which instruction may be given, some of which have already been followed up to some extent. At least there have been several night schools in operation and there is included in the International Correspondence Schools courses a few pages devoted to this enormous industry. Besides the night school and correspondence instruction there is the opportunity for part time instruction as advocated by the Federal Board for Vocational Education and there is also the lecture series. It seems that all of these methods can and should be made use of according to local conditions. The problem is largely a local one, and cannot be satisfactorily solved without the earnest attention and a good deal of energy from the men on the spot who have the knowledge of the industry.

As far as I am aware and certainly as far as Canada is concerned, the first distinct attempt to provide for the instruction of employees of the industry was the night school organized at Thorold, Ontario, by the co-operation of the local school authorities and the pulp and paper companies in Thorold, Merritton, and St. Catharines. Classes were organized in Chemistry, Electricity, and Mechanical Drawing. There was a very good attendance and great interest was shown by the students.

A similar school was organized at Hawkesbury, Ont., by the Technical Department of the Riordon Company. Here, again, the elementary subjects were taught and attendance and progress were reported as very

satisfactory. At Sault Ste. Marie, Ontario, classes were carried on by the Y. M. C. A. with the co-operation of the Spanish River Pulp and Paper Mills and the Algoma Steel Corporation. Here, too, the principal subjects were Arithmetic and Elementary Science. At the Spanish River Mills at Espanola classes were held for teaching English to the foreign population. This, I understand was directly in connection with the company's prominent activity in the cause of Safety First, it being realized that an essential factor in the success of the movement is the ability of the employee to understand the common language of the mill.

At Iroquois Falls, Ontario, which is the location of the Abitibi Power and Paper Company, and at Grand Mere, Quebec, where the Laurentide Company is situated, courses have been given consisting of a series of what might be called popular lectures on the principal departments of the pulp and paper mill. This is being extended this year by the Abitibi Company through the preparation of a special series of papers dealing with the fundamental processes. The papers have been appearing from week to week in the *Broke Hustler*, the paper on mill news and town topics published by the company. It should be mentioned also that the *Spanish River News*, the weekly paper published by the Spanish River Pulp and Paper Mills has also contained a series on the story of newsprint manufacture. It will be noticed that all of these places are centers of newsprint production although the vicinity of Thorold, that is, the Niagara Peninsula, produces perhaps as great a variety of papers as could be found anywhere in the same area.

A number of mills in the United States have undertaken somewhat similar work. The American Writing Paper Company went so far as to set aside one division of their organization for instruction purposes. This phase of the work of that company has not yet, however, been entirely organized. The Kimberly-Clark Company, has also, through its technical department, given instruction in certain phases of the work to groups of employees. The Champion Fibre Company at Canton, N. Car., are organizing their educational work for the coming winter and are planning a series of courses to be given by heads of departments in order to acquaint the men in each department, as far as his preliminary education will permit, in the fundamental principles underlying the processes and in the description of the various machines and their functions. There is much to be said in favor of carrying out the work as planned by this company. In the first place the men are listening to men they know and to men who are able to talk in their own language.

This type of instruction is likely to meet with some hitches because of the inexperience of the leaders in planning classroom work and in presenting their knowledge and their ideas to the student. This, however, is not by any means an insurmountable difficulty and with a little persistence, courage and patience and plenty of enthusiasm on the part of those who conduct these classes, there is bound to be a great deal of progress made both by the teacher and by the class.

You will have noted, perhaps, that, with rather few exceptions the emphasis in the educational work has been on preliminary instruction,

that is, the teaching of mathematics and elementary science. There are two reasons for this. In the first place many of the more ambitious men in the mill are the ones who have not had many educational opportunities and who find themselves handicapped in comparison with their fellows who have been through high school or even only through the eighth grade. The grown men who are now in the industry were not required to attend school to the age which is now fortunately becoming a respectable minimum for going out to work in the world. In the second place there cannot be satisfactory progress made in the study of the machinery and processes used in pulp and paper manufacture unless the student understands quite thoroughly the fundamental principles of mathematics and of science so that he may get a clear conception of the discussion of a process or the description of a machine.

#### TEXT-BOOKS IN PREPARATION

The Technical Section of the Canadian Pulp and Paper Association and the Technical Association of the Pulp and Paper Industry, formerly the Technical Section of the American Paper and Pulp Association have since their organization, which was almost simultaneous, each had a committee on education. Realizing the need for a text-book, a meeting was held at which all but one member of these two committees were present and a joint committee to proceed with the preparation of a suitable text-book was formed.

The material for Volume I is prepared and a large part of it is in type though not yet printed. This volume will include Elementary Arithmetic, Applied Arithmetic, Elementary Physics, How to Read Drawings, Mechanics and Hydraulics, Elementary Electricity, and Elementary Chemistry. The material is so prepared that it will be appropriate for either class room or correspondence instruction or for reference purposes. The provision for correspondence instruction is, of course, a feature of the whole work and is expected to be of particular benefit where a man cannot conveniently attend a class or would be embarrassed in younger company.

Volume II includes a very brief chapter on Logging; the Principal Properties of Pulpwoods; the Preparation of Wood; Mechanical Pulp; Sulphite Pulp; Soda Pulp; Sulphate Pulp; Treatment of Pulp; Bleaching Pulp; Analysis and Testing of Pulp and Raw Materials.

Volume III takes up the Manufacture of Paper and begins with a very brief discussion of the materials used and the history of paper making and a concise outline of the process. The following sections are then included: Preparation of Rag and Other Fibres; Treatment of Waste Papers; Beating and Mixing; Loading; Sizing; Coloring; Handmade Papers, and the Paper Machine.

In Volume IV the Manufacture of Paper is continued and includes: Tub-sized Papers, Finishing Operations, Special Papers and Boards, Paper Testing, General Mill Equipment and an Appendix including various tables and other miscellaneous but useful material relating to paper.

It is anticipated that this work, when completed, will form the basis



for many study groups and for much individual study as well as being a valuable work of reference. In order to facilitate the arrangement of what might be called a curriculum for the various classes of mills it is intended to publish the work both as bound volumes and in pamphlet form. The pamphlets are susceptible of arrangement by grouping so that, for instance, a man working in a sulphite mill, who would naturally not be directly interested in either groundwood or soda pulp, can study the pamphlets relating to Properties of Wood, Preparation of Wood, Manufacture of Sulphite Pulp, Treatment of Pulp and Bleaching.

#### ACCOMMODATION OF THREE SHIFTS A PROBLEM

One of the difficulties in connection with organizing night classes or outside classes of any kind for paper makers, is that the majority of the men in the mill work on three shifts so that it is not possible to have a time for the class which meets the convenience of all the men in the mill. This could be overcome by having an afternoon class early in the afternoon, for those who go to work at 3 or 4 o'clock, and another session in the evening.

One of the great advantages to be derived from this study of the industry by the men employed in it will be a greater knowledge of machinery and processes and consequently a decrease in accidents due to the lack of this knowledge.

CHAIRMAN ALTMAN: Now we can have a few minutes for discussion on any points that Mr. Stephenson made. Are there any questions?

#### DISCUSSION

MR. STEPHENSON: It might be made a bit of experience for some others, if those who have done, are doing, or are planning to do safety work, would briefly state what progress they have made, or what their plans are.

CHAIRMAN ALTMAN: I noticed that in your paper you mentioned the Champion people of Canton, North Carolina. Mr. Phillips is here and I was wondering if he had anything to add to that.

G. W. PHILLIPS: I will be better able to make a report on our venture later. We are just beginning the work. With the first week of October, and continuing for a period of six months, two lessons each week are given. We have a comprehensive program on vocational education. There are eleven classes including, if I can name them all, steam plant operation, applied electricity, chemistry, pulp making, tannic acid manufacture, carpentry, bricklaying, and so forth.

In outlining our program we decided it would be better to have practical men rather than technical men to teach these courses. We feel that the man who is able to do the work himself can perhaps teach others better than a technically trained man, so we have selected superintendents and general foremen to teach these courses.

Of course we realize that it is a big undertaking because each teacher has to outline his particular course of study, but we are hoping, and we believe also, that we are going to accomplish some good results. Just what those results will be we are unable to tell at this time.

CHAIRMAN ALTMAN: Is there any one else?

A. P. COSTIGANE (Toronto, Ont.): I would like to ask in what form those books will come out.

MR. STEPHENSON: The committee intends that the books shall be available in two forms. For study they will be available by groups of pamphlets relating to the department in which the man is working. At the same time they will be available in a complete set of four volumes which will cover the entire industry. The pamphlets will be better for correspondence instructions, so as not to discourage a man by handing him too big a mouthful at once.

MR. SPEAR: We started an experiment last year, and I really shouldn't report on it but I think it is different. We are taking the boys in the local high school who are interested in pulp and paper making. We started with last year's freshman class and they spent three afternoons a week in the mill under the instruction of a man who has had a college training and is also connected with the mill work, and this year those who desire will continue the work, and so on up until their senior year, so that they will get a four-year course in paper and pulp making. We are going to try to expand that educational work this year to include some of the employees in the mill, along the lines you speak of.

CHAIRMAN ALTMAN: Mr. Spear, do you find any trouble in going up against any State laws, or are the boys in the freshman year above sixteen years?

MR. SPEAR: We are working in conjunction with the State and Federal authorities.

#### U. S. BUREAU OF VOCATIONAL EDUCATION

MR. STEPHENSON: I might suggest here that the Bureau of Vocational Education in Washington, D. C., is very anxious indeed to co-operate to the fullest extent with any one that is interested in educational work. They have a good deal of data and considerable material which is immediately available and some experience that they can put at the service of those who want to make the most of this great opportunity for helping the young people of our country.

They are also anxious that the country make some use of the considerable fund that is being provided and it can be so worked that a company can get a good deal of contribution from the Federal and State governments by understanding just how to go about it. This Federal Bureau will be glad to assist them in getting all the outside contributions they can turn their way.

#### SOME ECONOMIC ASPECTS OF WELFARE WORK

H. P. CARRUTH, GENERAL MANAGER, MEAD PAPER AND PULP COMPANY,  
CHILLICOTHE, OHIO

Welfare work has been somewhat criticized of late as smacking too much of paternalism in these days of rampant democracy. It associates itself with "scientific management", "efficiency" and other words and

phrases that have been overused or misused until one hardly dares use them at all for fear of creating an unfavorable effect upon our audience.

To clear the air, therefore, let me say at once that I believe in welfare work, not as it has been practiced very frequently as a sort of general specific for all the industrial ills, but as part of a general industrial policy which is in line with the trend of the times and in sympathy with the modern idea that workmen are regular human beings, thinking and reacting like the normal man in any walk of life.

Under proper conditions efforts to improve the living and working conditions of men and women employed in industrial plants are a proper activity for manufacturing plants to consider because they can show a profit on the years' operations which is the legitimate field of industry.

You will notice that I said "under proper conditions". The importance of this cannot be over emphasized. All of the welfare work conceivable will be a most dismal failure if the general conditions of the plant are not sound before such work is begun. The employer who uses welfare work as a substitute for proper wages or working conditions is inviting trouble.

Assuming that conditions are sound—which means good wages (not only in the sight of the employee, but so admitted by the organization as a whole), a clean and well-kept plant, foremen who are fair and straightforward in dealing with their men, a sound business policy, and efficient management which protects its men against unemployment to the maximum degree, and a generous dash of the Golden Rule—we have then the foundation upon which profitable welfare work can be built.

It is almost inconceivable that a plant which conforms to the above specification could be doing no welfare work, but frequently it is quite unorganized, and when unorganized it is likely to be unfair and unjust. To illustrate; two men become incapacitated by serious illness. The first man has lived up to his income, the second is more thrifty and has laid by a bit against the rainy day. Our first man and his family soon become in abject need and sooner or later help is forthcoming, either from his fellow workmen or as a loan or gift from the company. The second man is known to be able to stand the strain for a while so no help is given. In other words, the man who has been thrifty is given less consideration than his less valuable fellow workman, assuming that thrifty workmen are better and more valuable in our mills than the shiftless. This is not a square deal.

My illustration might be given to show that unorganized benevolence to employees tends to create the exact opposite of the spirit which is desired, and of necessity it must be of the most paternal character except perhaps in very small organizations.

On the other hand organized benevolence in industry is likely to be a cold-blooded matter of fact thing which has no advantage to the company and very little to the employee.

The proper basis seems to me to be to put all such efforts squarely before the men as co-operative methods which repay the man and the company mutually, although perhaps, not in the same coin. The average

workman is suspicious of his employer and if you do not show him what gain you expect to make he will be likely to suspect a sinister reason.

To sell safety ideas to workmen you must convince them that care is a sound investment which they should make for themselves and their families and also show the advantages to the company. Don't try to force rules and regulations down their throats by means of signs and threats of discharge or punishment. Such means are no longer effective if, in fact, they ever were really of value.

To sell recreation to workmen it should be frankly stated that good health is an asset not only to the man himself, but to his employer because a healthy man is a better and more efficient member of the organization.

To sell insurance, whether it be wholly or partly paid for by the company, should be shown to be worth while to the company because it helps the men to stop worrying and so adds to their effectiveness on the job.

The same ideas hold in regard to all types of welfare work, such as free medical and dental attention, visiting nurses, restaurants, etc. You cannot fool your men on these matters and you know you wouldn't do it if it didn't pay. At least you wouldn't do it except as individuals rather than as a company policy.

Now let us see just how these various types of welfare work do pay the employer. Like any other investment it is quite easy to put in more money than can be taken out. Unfortunately, when dealing with the human machine, it is very difficult to place exact figures on the improvements which result from any policy and again these values are constantly varying with location, with time, and with general conditions. They are very different in different industries and change with the seasons. Nevertheless, every employer has a distinct idea what such factors as labor turnover, good morale, health, quick learning, care, etc., have in his own business and can best interpret values for his especial conditions.

Sport organized by industry is perhaps the most widely-used type of welfare work. This may be handled in many different ways, but has its chief value to the employer in its effect on morale and secondarily on health. In most plants the health factor is of small importance as relatively a small per cent of employees take active part in such activities, the effect on morale is much greater but varies much in degree. Some companies strive to get results by producing a winning team at all costs, even to the hiring of professionals, while others bring into play the idea of true sportsmanship. The first idea is dangerous because in any league there can be but one winner and the losing teams may have a bad effect on the organizations from which they are chosen. On the whole, in my opinion, sport is one of the least profitable forms of welfare work.

Safety probably comes next in general use. The effect on profits of safety work is fairly clear. First, we have the direct losses when men are hurt which must be paid in insurance premiums which such work eliminates to a greater or less extent. Second, we find that safety work is frequently one of the best contact points between management and men out of which grow various benefits to the bank account. Then again, it has its effect on labor turnover and general morale.

Insurance in various kinds, whether life, accident, or health, is valuable in its effect on turnover and helps to secure good men to fill vacancies. Its appeal is quite as much to the wife at home as to the man on the job. It also keeps the force as a whole in a proper mental condition by minimizing worry, and is especially valuable when a man returns from a siege of illness or incapacity due to injury.

Vacations are very highly regarded by the men, perhaps more highly than any other one thing. We all like to sit by the fire and plan our little outings for the coming summer and the workman is no exception to the rule. Idleness is a goal which always attracts in prospect, although seldom justifying itself in the present. For these reasons vacations are a very powerful stimulus to hold men to their work if used as a special reward for continuous service. The value lies in their effect on turnover which is considerable, especially with employees of long service, and on general morale, they also have an undoubted effect on health, although this is more mental than physical.

Outings are of little value in developing morale, although frequently used for that purpose. When morale is already good they may be a stimulus, however, but it is doubtful if they are worth the cost which they frequently run into unless engineered by the employees themselves.

Free medical and dental service has a very definite effect on morale, turnover, and production. Its value is naturally greater in those industries particularly liable to occupational disease, but is considerable in all cases. Many men will consult a company doctor, who makes no charge, long before they would spend the money to see their regular physician. This means the checking of contagion and in extreme cases might save a shut down.

House organs are almost a necessity in a well run plant as a means of selling the ideas of the management and increasing morale and loyalty. They form a connecting link between the plant and the homes of the men which is of the greatest value. They should, however, be something more than collections of trite phrases or collected sermons to make them a profitable investment.

Co-operative purchasing is frequently a worth-while addition to the best of welfare activities, but should only be undertaken after due consideration as there are many pitfalls for the unwary.

Housing is more often a necessary adjustment to operation than a real welfare effort. When necessary to consider, it should, however, be placed upon such a basis that it is something more than an expedient.

The above are only a few of the great number of activities possible to the welfare department. All are good, all are potentially profitable but only as conditions warrant. The field for such efforts will vary with your own conditions as stated earlier. Look over your own problems, talk to your men and the profitable series of activity will not be hard to find.

In closing let me add one word which, although not on welfare or safety work, still lies at the root of all such work.

It is my firm conviction that a workman reacts to the same influence

as any other human being. This "psychology of the workman" of which we hear is a myth except as it is the psychology of human nature. Most of our mistakes in the past have been due to a tendency to think of workmen as a class or species differing from ourselves in important respects. This I believe to be an error which has been very costly to industry and to civilization.

Assuming that your employees are just normal human beings and that you yourself are normal, then it becomes very easy to predict what reaction will result from any labor policy for by projecting yourself into the position of the workman your own reaction to the surrounding conditions may be expected to be the same as that of the great majority of your employees. There will be differences in degree, but not in kind. In brief, the Golden Rule is a practical and workable business policy.

CHAIRMAN ALTMAN: In the two-day program I am positive we all received a lot of good, especially so on this last paper, where Mr. Carruth covered a number of questions that have always come up before me and, I suppose, before quite a number of you. This question of paternalism: I have wondered how far we could go and have always been rather skittish when doing work that may be placed under that head. He has answered my question and I am sure he will be more than glad to answer any questions any one of you may ask.

Perhaps if I state the question that was settled so far as I am concerned, that may lead on to the discussion.

We have a group policy covering the sickness, health, and death of our employees, which is entirely paid for by the management and on two or three occasions when I mentioned the fact, I was covered with a wet blanket by people who told me that it is paternalistic. They say if we want to do that, to form our Mutual Benefit Association where the men will partly or wholly pay for the insurance which they get. I would like to hear any statement that some of you may make relative to this question of what is and what is not paternalistic.

#### DISCUSSION

MR. CARRUTH: We do exactly the same as you say you do. We do not have, at the present time, any life benefits directly, we take care of that through a stock-purchasing scheme, but we do have health and non-occupation accident group insurance.

At the time we first began thinking about putting into effect some such insurance, we started with the idea of having it a mutual plan, but upon investigating I found that it was going to cost, on the basis which we had first discussed, which was fifty per cent paid by the employees and fifty per cent by the company with the clerical work done in our plant, which isn't so very large—it was going to cost, as I said before, practically as much to pay half of the benefits and clerical fees, as it would to pay outright for the whole policy and have it taken care of by the insurance company, as they were willing to do. Therefore it seemed that it would be a waste of money to handle it in such a way that it took, for instance, a dollar and a quarter to do a dollar's worth of good.

In our plant I think we are especially fortunate in our working conditions and in the type of employees we have. This place we have is absolutely one hundred per cent an American organization and that is in itself a big point. We can get across ideas with our men that I know would be difficult, perhaps impossible in a great many other plants, some plants with which I have previously been more or less associated. We can tell our men the facts just as I have given them to you and that this is simply a co-operative effort, and the men will accept that.

On other things, our restaurant, for instance, is entirely paid for by the men. It is conducted in such a way that it even shows a little profit. It started out and ran into debt a bit and the company assumed the burden of the debt. Then we made an adjustment of the prices and the debt is gradually being eliminated and is now down to a very small figure.

We have a Mill Council and that has taken it upon itself to attend to the restaurant. They are organizing it and are going to enlarge its activities and have a meeting room feature, and whatever they say in matters of that kind is usually done, because we find that the men when seriously looking after a matter of management through the Mill Council, without exception have been willing to look at the thing in a fair, square, honest way, and no suggestion has as yet been made by that Mill Council that has not been of a nature that the management wasn't glad to adopt. You can get the democratic idea across, at the same time doing some things which perhaps would smack of paternalism in some other plants, but the conditions in the individual plant vary so widely that you have got to consider them carefully in determining what you can and cannot do.

CHAIRMAN ALTMAN: Yet your claim that it is one hundred per cent American seems to me just the point that is always the stumbling block, because if there is going to be a complaint it will come from the American side of it. I have seldom, in my experience, found any of the foreigners complaining of paternalism when the company is trying to do something for them. You have the extreme from which you could get the complaints and yet, as you say, no such complaints are forthcoming, so that in many cases, "paternalism" is nothing but a bugbear.

MR. CARRUTH: I think I can answer that in a couple of words. It is all in the way it is done. If you say to the men, "Here is your little present," and tell them if they will be good they will be happy, you will get that reaction every time, surely. But if you take the attitude which we try to have, and which I think we have, that we are all working together, we are all one family, that the management and the employee individually and collectively are friends, and get everybody working on that basis, then you don't have any trouble with that at all. You can discuss any matter at all, bring it up in any way you want to, and talk as freely with a lot of employees as with the directors of the company and get the ideas over in exactly the same way. In other words it refers back to my last paragraph, that the psychology of workmen is the psychology of everybody else and if you approach them in a matter-of-fact way you don't have any difficulty, but if you talk down to them and set yourself up above them, you are going to have a bad reaction.

Mr. W. E. HOWARD (Rumford, Me.): We insure every employee from the general manager, down, who has worked for the company six months continuously. The company pays the entire cost of this insurance. At first it was turned over to see what there was underneath, and this continued until first one and then another began to reap the benefits of the thing. Now I think it has been accepted whole-heartedly by the men.

Another thing I want to say is that this insurance increases fifty dollars. We have two classes of insurance, A and B. When a man works six months he is entitled to the full benefit of the insurance in his class. That increases fifty dollars each year.

This insurance automatically ceases when a man has severed his connection with the company, unless he wants to pay the premium on it himself.

About a year ago we issued a health certificate for each man and that is effective whenever he becomes diseased or incapacitated. This is also taken care of by the company.

Of course it was all looked at very carefully by the workmen. But, when a few of them got the benefits from it they accepted it in the spirit in which it was given and it has been beneficial in many ways, particularly in reducing the turnover of our organization.

CHAIRMAN ALTMAN: Before we go on with any further discussion of this topic we have the great honor of having with us for a few minutes one who has done a great deal toward getting at the origin and striking at the safety head in the way of educational work. He is going to talk to us for a few minutes and try to convince you that it is up to you to do something. Dr. E. George Payne, of St. Louis.

(Dr. E. George Payne, Principal Teachers' College, St. Louis, explained the method adopted in St. Louis for teaching accident prevention to children. Statistics and charts were shown to illustrate the remarkable results accomplished in reduction of accidents to children while in school, on the streets, or in the homes. For full report of Dr. Payne's address, see Education Section, page 200, and also Public Safety Section, page 377.)

CHAIRMAN ALTMAN: Is there anything that any of you have to bring up in regard to any of the papers read? If not we are ready to close our session and I want to thank you all very much for the part you have played in making these sessions successful.

I think that as a section we ought to give a rising vote of thanks to the Kimberly-Clark Company for the splendid program they gave us yesterday, and to Mr. Guerrant, Mr. Stephenson, and Mr. Carruth who gave us a splendid series of talks today.

ADJOURNMENT.



## Public Utilities Section

September 28 and 29, 1920

**WILLS MACLACHLAN**, Chairman  
Electrical Engineer, Toronto, Ontario, Can.

**CHARLES E. MORRISON**, Vice-Chairman  
Utilities Mutual Insurance Company, New York City

**H. B. HARMER**, Secretary  
Philadelphia Electric Company, Philadelphia, Pa.

### TUESDAY MORNING SESSION

**T**HE meeting convened at 9:45 a. m., Chairman Wills MacLachlan presiding.

**CHAIRMAN MACLACHLAN:** I notice that the first item on the program is the report of the Chairman, but I think that that can be easily included in the report of the Secretary. I will ask Mr. H. B. Harmer, our Secretary, to make his report.

#### REPORT OF SECRETARY

Several meetings of your committee were held in New York City and one in Chicago during the past year.

The National Safety Council delegated Mr. F. M. Rosseland, Safety Engineer, of the Council headquarters staff, to attend these meetings, so that more intimate relationship could be maintained between your section and national headquarters.

It was deemed advisable that the number of bulletins relative to Public Utilities be increased if possible so that at least one bulletin be issued weekly covering sectional problems.

National headquarters was requested to prepare various Safe Practices pamphlets for use of the member companies, selected subjects being transmitted to the headquarters staff.

The value of holding membership in the National Safety Council, was a subject of much importance and with the view of increasing the section membership, the National Electric Light Association, American Gas Institute, and similar organizations were asked to address a letter to their members pointing out the advantages of such affiliations. National headquarters were requested to supply a list of available speakers to cover the subject of the advantages of "section membership" particularly.

The total membership of the section at present is 223 member companies. There were 26 new members and 15 cancellations during the current year.

As much interest is evidenced in various phases of industrial relations work, and it being an important factor, it was planned to compile a digest of available information for the benefit of members of the section. An attempt was made to gather information on the following subjects: Insurance, service, employment, training, annuities, profit sharing plans, employees' benefit associations, employees' representation.

The information desired concerned only the public utility companies, no attempt being made to cover the entire field.

We also wish to express our appreciation to Mr. C. W. Price, General Manager, Mr. Rosseland, Safety Engineer, and the staff at national headquarters for their co-operation.

CHAIRMAN MACLACHLAN: Mr. Niesz will present a report for the membership committee and tell us something that was done in getting new members for the section.

MR. H. E. NIESZ (Commonwealth Edison Company, Chicago): The membership committee has no formal report to make. We have been reasonably successful in retaining the memberships and securing a slight increase, although it did not seem opportune to make an extensive campaign for new members. We believed that a conservative growth was better during the times of stress for public utilities than the launching of an extensive membership campaign.

CHAIRMAN MACLACHLAN: I will now call upon Mr. Lueck to present his paper on "Accident Hazards in Laying Conduit Underground."

### ACCIDENT HAZARDS IN LAYING CONDUIT UNDERGROUND

H. W. LUECK, COMMONWEALTH EDISON COMPANY, CHICAGO

The laying of conduit underground if not properly supervised has almost as many hazards in connection therewith as any other mechanical work. In reality conduit laid underground can properly be compared with wires strung overhead. The conduit line represents the line wires; manholes, the poles, where transformers are installed and taps for service taken off.

Employees have suffered injuries caused by unforeseen hazards and a few public accidents have been noted, where curiosity more than any other reason was the cause. Before proceeding further into the reason for accidents, let us know definitely what conduit is and how it is laid.

There are several different types of conduit used by Public Service Companies, such as fibre, tile, and concrete. As the kind of conduit used does not have any material bearing upon this discussion, we will select that made of concrete. Concrete conduit is a cylindrical pipe, having an inside diameter of three and one-half inches and from three and one-half to six feet in length. This tube is made of a fine grade of concrete and molded to shape. Where the ends butt together a small sheet-iron collar

is placed to hold the alignment and prevent cement from getting on the inside of the tube. When one layer of conduit has been laid, fine crushed limestone and cement called "grout" is placed between each line. Special care is taken that the entire group of conduit is properly "grouted in" to make it a solid homogeneous mass, this to prevent the line from sagging and the communication of electric trouble from one cable to another in adjoining ducts. The conduit line is laid with a gradual drop toward the manhole for drainage purposes, and is never run through manholes, where the cables are encased in cement for protection from external and internal causes.

#### HAZARDS IN BREAKING CONCRETE

Hazards are present at all times during the laying of underground conduit, both to the employees and to the public. Most of the streets in cities are paved with asphalt, brick, or macadam. In any case a six or eight-inch foundation is necessary to support this road surface. As most conduit is laid in the street, it is necessary to break out this concrete which forms the greatest hazard to the employee and the public. The most important protection to the man doing any concrete breaking is the eye shield or goggle. Goggles should be worn by all men when breaking concrete. Secondly, properly designed bull point chisels, asphalt cutters and handles should be provided. A bull point chisel is a tool which is used for breaking concrete and must be held by one man while two or three others strike it with sledges. A properly designed bull point will penetrate and break concrete and throw few chips, while a poorly designed one will create a real hazard in this respect.

The asphalt cutter is a tool with a cutting edge of about six inches, a large head and a long handle and is used in the same manner as a bull point with the exception that it is used to cut asphalt. Bull points and asphalt cutters may be a hazard to the workman by the head becoming "mushroomed" from continual striking of a sledge. The burrs or chips which break off these tools have caused many painful and serious injuries. Properly designed handles for these tools are necessary to prevent workman being hit on the hands or head with the sledge. At this point it may be well to state that only by close supervision on the part of the foreman can such accidents be prevented. There should be frequent and regular inspection of all tools and those found defective should be sent to the shop for repairs. The Commonwealth Edison Company employs a blacksmith whose sole duty is to keep these tools in the pink of condition.

#### DANGEROUS TOOLS

After the hard concrete has been broken out, it is often necessary to use picks to break up the earth beneath the concrete. This tool also offers many hazards to workman, if allowed to become defective. Picks should never be allowed to become round on the end, as this retards progress and also causes accidents by slipping off and striking the man on the foot or shins. If pick is allowed to become short, and consequently unbalanced, it is hard for the workman to exert enough pressure to break

out a chunk of earth or concrete. Picks should be wedge shaped on the end. When men are working with them, the men should not be closer than six feet from each other. Men should at all times be warned when working near conduit lines containing power or telephone cables, water and gas mains on account of the danger of driving the pick into them.

As the digging of the trench progresses the excavated dirt must be thrown on the sides. This should be so piled that wooden or chain barriers can be planted thereon, to prevent children and others from accidentally falling into this trench. At night these trenches should be indicated by red lights, at regular intervals, so as not to confuse drivers of automobiles and other vehicles. A watchman should be at hand to keep lights burning and also direct traffic when necessary.

Sometimes large excavations are made at crossings for manholes. Many times these manholes are from eight to ten feet deep. Special precaution should be taken to place barriers around them, also have a watchman at hand while work is going on to warn children and others of the danger. Large excavations should be covered, barricaded or fenced at night. If the hole is of exceptional depth, a platform should be built in them to assist the men in throwing the dirt to the surface and the uppermost platform can be boarded up at night, which will materially decrease the depth of the hole during the period that the men are not working. Manholes at line intersections are usually located so as to avoid city water, telephone, and other mains which are usually laid underground. This is necessary as many times transformer installations and disconnecting devices must be installed in manholes and these must be operated from time to time. The elimination of other conductors and pipes is desirable so as to make the operation safe.

#### CONDUIT MUST BE PILED SAFELY

When the conduit arrives it should be placed on the ground nearest the point it is to be laid. It can be piled pyramidically, not over four feet high. By no means should conduit be leaned against convenient fences, sheds, or buildings. This is the cause of accidents when falling over, also damaging the conduit. Picks, shovels, bull points, and other tools should be placed in the tool wagon when not in use. They must not be thrown about at any time, as they cause stumbling hazards as well as make an unsightly appearance.

The actual laying of the conduit does not involve many hazards, as by the time this is done, most of the hazardous work has been completed. Just previous to the laying of the conduit the tubes are placed along the trench, so all that is necessary is to hand the length down to the brick layer who lays them in place. The laying of heavy tile nine conductor telephone ducts does not necessarily create any more hazards than the single conductor cement tube. The former is lowered into the trench by means of pick handles stuck in upper tube at either end and which make an excellent and safe method for lowering this large multiple conductor conduit into the trench.

The Commonwealth Edison Company in recent years has laid consider-

able conduit in parkways. This is the space between the curb and the sidewalk. When this can be done it is not necessary to break through concrete and other hard substances. This has reduced the number of accidents to both workman and public. When excavating in parkways the excavated dirt itself forms a barrier to prevent people from falling into trench and it can be seen that vehicle accidents are entirely eliminated.

#### PROTECTING THE HEALTH OF WORKERS

The mixing of concrete which always has been hard and back-straining work has found its solution by the use of a gasoline motor-operated portable concrete mixer. This can be moved from place to place as necessity requires. It does away with hand mixing, expedites the work, and thereby saves considerable hard labor and long hauls by wheelbarrow. Water sometimes seeps into trenches and manholes, which hinder the progress of the work. Gasoline motor-driven centrifugal pumps are used to remove the water, doing away with cumbersome hand operating diaphragm pumps. I mention these various tools because I feel that they materially reduced the number of accidents as well as doing many of the unpleasant and back-breaking tasks, heretofore done by the workman.

All men working in wet trenches and manholes should be supplied with rubber boots and coats to guard their health. The tool cart should be equipped with a first-aid box containing sufficient supplies to take care of any first-aid emergency.

In summarizing the accidents which occur in the laying of conduit underground, this work has contributed a small per cent of the total accidents occurring in the entire Commonwealth Edison Company. There are few public accidents which can be attributed to the laying of the conduit. This remarkable record no doubt was attained through the ceaseless efforts of the foreman by observing all safety rules, exercising constant supervision and keeping all tools in first-class condition, as well as making proper use of all safety guards and appliances.

The subject of this paper has been treated literally. Following the laying of conduit comes the pulling of cable and hazards in connection with such subsequent work have not been touched upon. The hazards in connection with the pulling of cables provides a special subject which has not been here considered.

CHAIRMAN MACLACHLAN: I will ask Mr. Rosseland to open the discussion on this paper. I want a very free discussion on the different papers—don't let us waste any time.

MR. F. M. ROSSELAND (National Safety Council, Chicago): I want to call attention, first, to the fact that the Commonwealth Edison Company has long been engaged in safety work and has its safety organization in a more nearly perfect stage, at least the educational work, than have other public utility companies.

That is not said to the discouragement of others, but simply because they haven't been carrying on their work as long. The result is that the low accident records you have heard do not reflect truly the accident hazard.

In using some of the machines that Mr. Lueck speaks of, that have contributed so much to reducing the hazards, some of our good friends have installed them in industrial plants with the result that some of the heavier parts of the machine have come down and injured workers.

Some of them haven't thought so much about the accident hazard to the public, with the result that they have left piles of dirt in conduit work, in some places, brick, where they are building the manholes, and other material of that kind, in such a way that they form a very tempting place for children to play, and even though the watchmen chase the children away before they are injured, they may disturb the condition of the pile so that someone else is injured later. I don't recall any serious accidents in that connection, but I do have a distinct recollection that in the operation of some companies, accidents have not been as few as Mr. Lueck reports.

MR. W. H. MULLIGAN (Hydro-Electric Power Company of Toronto): I think Mr. Lueck's paper is instructive, but I imagine that in certain sections of the country they must run into rock. What process is used to protect the public and the employees in the blasting of rock in the thickly populated sections of the country?

Another thing—a man would no doubt run into a certain amount of gas, and what course is taken at a time such as that?

I would also like to know if, when the men are holding the drills in breaking concrete, they use holding tongs.

MR. LUECK: We don't blast rock. We contract for that work and we have very little of it. I can recall only two instances where blasting was done.

In regard to gas, our trenches are not of such depth that we encounter gas. We force fresh air into the manholes, if that will answer your question. We force the air in rather than suck the gas out. We find that by forcing the air in, we back up the gas.

In the matter of tongs, we use handles which are permanently attached to the cutter, with ring handles, and these ring handles must be loose so that the jar is not on the man's hand.

MR. H. A. MOTT (Chicago Telephone Company, Chicago): In regard to blasting, I might answer that question. In small towns such as New York and Chicago, where it happens to occur, it is usually done with a canvas placed over it, no matter how small the blasting job may be.

CHAIRMAN MACLACHLAN: I will call now on Mr. Reid to present Mr. Fisher's paper on "Hazards in Line Construction—Handling Poles, Erecting Poles, and Reconstruction of Old and Antiquated Lines".

### HAZARDS IN LINE CONSTRUCTION, HANDLING POLES, ERECTING POLES, AND RECONSTRUCTION OF OLD AND ANTIQUATED LINES

FREDERICK W. FISHER, EMPLOYMENT AND SAFETY MANAGER, THE ROCHESTER  
GAS AND ELECTRIC CORPORATION, ROCHESTER, NEW YORK

Experience has proven that many accidents ordinarily occurring in line work can be prevented. This result is accomplished through an intelli-

gent conception of the risks involved, the employment of physically and mentally high grade men, and the use of first class equipment, safe methods, and the right amount and kind of accident prevention education.

Line gangs as a rule are made up of a superior type of workmen. They are physically hardy, accustomed to danger, have positive convictions and are especially keen to detect and resent insincerity, inexperience, and canoufrage. To a greater extent than in any other occupation linemen respect their foremen and seniors. Line foremen in general are of large mental calibre, are poised and deliberate, and secure discipline, efficiency, and safety through character and by example. Line gangs in general understand very thoroughly the risks of their occupation, and, consequently, since the great majority of accidents are due to the personal equation, an analysis of the accident problem relative to them should be exceedingly practical.

Linemen must be trained in the school of experience, and regardless of professed previous training, experience, or other qualifications, must be tried out in the subordinate positions of helper and groundman under the eyes of the foreman, before being allowed to work on poles or live apparatus.

Linemen are subject to two major risks, i. e., falls and electric shocks. Their work, however, has many serious incidental risks which in some degree are shared by workmen in other fields. Accidents due to the use of tools and materials are numerically the largest, but the electric current and falls constitute a very much greater hazard from the monetary and humanitarian point of view. The latter accidents, although comparatively infrequent, are generally very serious. Under various subheadings the hazards will now be considered.

#### TRUCKING HAZARDS

Trucks should be of adequate capacity and kept in first class condition. Accidents are caused by overloading and improper loading, by defective truck mechanism due to design, age, or wear, by defective pavements resulting in broken springs, steering gears, knuckle joints, etc., and by fast and careless driving. Automobile driving is daily becoming more dangerous, requiring chauffeurs who are experienced men and who drive carefully and slowly, so as to avoid the accidents named, and avoid jolting the linemen from the truck or causing accidents to pedestrians and other vehicles. It is essential that drivers be furnished with copies of the State and local traffic laws and ordinances, and strict compliance with the same must be enforced. Accidents will be avoided by the observance of the ordinary courtesies of the road which have not as yet been formulated into law or ordinance, drivers being instructed not to stand on their legal rights but to watch out for careless driving on the part of others. The loading of trucks should be orderly, all tools being kept in proper places, and all line material properly piled or lashed in place. Serious accidents have been caused by material being

jolted from trucks due to improper loading or to rapid driving over poor pavements.

Ladders projecting forward may cause accidents by tripping the chauffeur when leaving the driver's seat and a danger flag or red lantern is required on ladders projecting in the rear. Ladders hung on the side of the truck should be placed in substantial brackets at a height easily reached and with the spur end in front out of the way. The truck equipment includes gloves, shields, rubber boots, rubber coats, climbers, insulated hand tools and a first aid kit.

The ordinary first aid kits on the market have not proved satisfactory for the work of the Rochester Gas and Electric Corporation. A special kit has been developed consisting of a substantial hard wood box, the interior of which is divided up into compartments of suitable size to contain bandages, adhesive tape, tubes of burn ointment, etc. Bottles containing liquids such as iodine, boric acid, etc., are held in spring clips inside the cover of the box. The box cover is fastened to the body of the automobile. The box opens down and being held in a horizontal position by a chain forms a working shelf.

#### HANDLING POLES

In unloading and piling wooden poles either in the yard or on the job, hazards are created by piling the poles too high and through the improper use of blocking. Unexpected rolling must be carefully prevented. Poles must not be piled against fences or back stops of light construction. Bruises and broken bones may result when moving poles with cant hooks, as crooked poles are unwieldy and roll in unexpected ways. Poles left on the job require guards unless rolled well beyond the street line, as pedestrians and trucks are apt to run into them. New poles are subject to dry rot and should always be tested before erection.

When trailers are used for trucking long poles, great care is necessary in turning corners, and linemen must not be permitted to ride on the pole or trailer.

In unloading poles from cars they must be taken in logical order to avoid rolling or dropping other poles than the one being removed from the car. Sometimes due to shifting in transit poles are wedged and require extra care in handling.

Many companies now make their own concrete poles and many manufacturing risks are involved, among which are those due to the machinery used, such as concrete mixers, cranes, and hand tools. Proper machinery guards are necessary in all cases, and manufacturing methods should be employed which will reduce as much as possible abrasions and bruises from handling forms, reinforcing metal and stay wires. Care must be exercised that the design is sound and that the concrete is well mixed. Green poles must not be used.

#### ERECTING POLES

In erecting poles it is necessary to have good team-work in the gang so that the men will reinforce each other and prevent hernia and strain



due to excessive lifting. Serious accidents have occurred through the pole jennys or dead-men being pushed beyond the center of gravity of the pole, causing the top to tip to the ground when the pikes were removed for a fresh hold. Derricks, wagons, gin poles, pike poles, etc., must be in good condition and carefully used.

Pole gangs should be of adequate size. While it is possible for four men to erect wooden poles in emergency, a larger force adds a very necessary element of safety in the work, especially when poles are erected through wires or branches of trees, in fence corners, near building, or under any other restricted working conditions.

In erecting concrete poles a minimum force of 8 men is necessary and great care is required in piking the poles that the pike does not slip off the surface of the pole. To prevent side tipping the pole hole should be dug with an entering trench about the width of the pole and two feet deep, through which the pole slides into the hole easily. Substantial and easy running rollers assist materially in handling poles near the holes, reduce the risk of bruises, and the danger of hernia from heavy lifting.

Removing poles is considerably more dangerous than erecting poles, as the ground offers a resistance difficult to anticipate. Danger occurs through the grounding of pikes while stones are dislodged in the hole, as a sudden shift of the pole renders it impossible to release the pike. Jacks are used to raise the pole from the hole and bruises are caused by the jack or chain slipping, and by careless manipulation of the jack lever.

A bad tripping hazard is created by the careless dropping of tools on the ground during work on poles. It is of course not practical to keep all tools, ropes, etc., out of the way as their use is intermittent. It is possible, however, to use some system in this work and to return tools to the line truck as soon as the men have definitely finished with their use.

#### DIGGING POLE HOLES

In digging holes all stones over which workmen could stumble should be removed before work is begun, and the stones taken from the hole thrown well out on one side. Dynamite should not be exploded by the use of dry batteries when digging holes in rock. There is danger when dry batteries are used of carrying batteries, caps, and dynamite together and short circuiting the batteries through the cap wires. A magneto machine, while somewhat more costly, is very much safer.

#### ERECTING CROSS ARMS AND WIRES

In putting up cross arms and wiring the use of first-class equipment is absolutely essential, especially ladders, belts, and climbers. Material and tools should be raised and lowered by suitable hand lines and bags. Ladders must be kept in good condition, be equipped with spurs and carefully placed. In pulling up lines, care should be taken that the ladder has sufficient top support to compensate for the side pull. This is especially necessary in making house service connections where the

ladder leans against the house. Belts should be worn while working on poles and while trimming trees. Great care is necessary that tree branches do not fall on other lines or fellow workmen. Slack transmission and guy wires sag and create both a Company and a public hazard.

#### ERECTING TRANSFORMERS

Transformers of large size are often erected on pole platforms and special care is required in passing up the lumber for the platform, and in all other work done. Platforms must be substantial and have suitable guard rails. All the tackle and rigging used must be of adequate strength and kept in first-class condition. Transformers fastened to cross arms must be carefully bolted in place.

#### WORK ON LIVE LINES

Work on live lines is necessary at times, and special care must be exercised in the use of gloves. Gloves require testing in the laboratory periodically, and before use in each case by rolling up from the wrist toward the finger tips. The confined air is thus put under pressure and will in escaping show up holes. A medium weight rubber glove inside a buckskin glove is the safest and most satisfactory combination, the buckskin glove protecting the rubber glove from abrasion. Insulation must never be trusted even when new, and all live wires in the immediate vicinity of the linemen at work must be carefully covered with shields to avoid accidental contact. In the eastern states it is considered dangerous to work on circuits of more than 2200 volts alive, except changes which do not involve splices.

The erection of new circuits adjacent to live lines has a bad accidental contact hazard, and in putting up the new line the men should wear rubber gloves whenever there is a possibility of the new line becoming alive by accidental contact. This is especially true where a new line is dragged across a cross arm supporting a live circuit.

The safe rule is of course not to work on live circuits, except when it is absolutely necessary to do so, and in such cases to use every precaution which has been developed. Many companies by the use of special rods and other appliances do change insulators and do other work on very high-tension lines with comparative safety. Men must be carefully coached for this work and thoroughly supervised. The equipment must be of the highest grade and kept in absolutely first-class condition.

The use of a grounding chain on high-tension circuits which are being worked dead is absolutely necessary, and this should be made up of round links of either brass or copper, as iron chains rust and make poor electrical contact. This chain should be grounded in all cases.

#### OLD LINES

In the re-construction of old and antiquated lines, special attention must be given to testing poles for rotten butts and poles of doubtful strength must be securely guyed before the supporting wires are cut.

Safety belts must never be fastened to cross arms and braces, but around the pole itself. The lag screws supporting cross arms and braces are apt to pull out of old poles. The use of belts on concrete poles shortens their life due to abrasion, and they require more frequent inspection and repairs. It is especially necessary when working on old lines to avoid contact with guy wires, cross arms, braces and other metal, as serious burns and fatal accidents have resulted from leaking current.

✓ Poles with rotten butts, poor ground support or few supporting wires should be steadied by three pike poles placed against the pole at an angle of about 45° and forced to a good bearing in the ground. The linemen can do their work quicker and easier and an additional factor of safety to prevent the pole falling is secured.

With concrete poles special attention is necessary that the pole is fully set, as the removal of supporting earth due to grading will not be as obvious as with a wooden pole. Concrete poles should have a prominent ground line mark cast in them when made.

In changing over lines, either on new poles, cross arms or insulators the wires must be carefully moved so that they will not swing into contact between the poles and short circuit the line.

#### DESIGN ELEMENTS

Many elements of design minimize risk, especially adequate clearance between wires. In some cases it is almost impossible for the linemen to go up through a series of circuits on a pole containing buckarms without coming in contact with some of the wires. Ground and fire alarm wires and cables should be covered; cables, transformers, switches, etc. should all be either on the front or back of the pole as a standard practice. Phases should be labelled especially at cut-outs. Telephone boxes on high-tension lines must be well insulated and an insulated platform on which a man must stand when telephoning must be provided, to avoid shock from grounds, static, or lightning.

In many cases poles are used jointly by power, telegraph, and telephone companies, and standards for the work of each must be agreed upon in advance and carefully lived up to. The question of responsibility for repairs should not be side-stepped.

#### RESPONSIBILITY OF STATION OPERATORS

The responsibility of station operators in preventing line accidents is very great and an adequate system for reporting trouble, killing circuits and making circuits alive must be lived up to. When a line is killed both the switchboard and the jack switches should be pulled.

#### STEEL TOWER LINES

The erection of steel tower lines is essentially an iron worker's job, and has the customary iron worker's hazards such as falls, bruises, strains, etc. The erecting equipment must be carefully inspected for

wear, and must be adequate for the work required. This work involves particularly stumbling and lifting hazards, and increases trucking hazards due to the inaccessibility of many of the tower sites. In the erection of large towers constructed of heavy members, the use of steel cable rather than rope on the erecting equipment is advisable.

#### SAFE PRACTICES

All wires whether insulated or not are to be treated as alive. Insulation exposed to the weather soon loses its insulating properties and becomes valueless.

In pulling disconnecting switches, especially the expulsion type fuse boxes, and in fusing as a test for burned-out transformers, goggles and gloves are necessary to protect the eyes and hands from flashes or contact.

Grounds are a common cause of accident both on grounded and ungrounded systems, and are especially to be avoided. In case of burned out transformers on a non-grounded system, there is great danger of full primary voltage on the neutral.

Accidents increase through fatigue and hence foot strain which may result in flat foot must be avoided by the use of shoes with a heavy in-step. Men often become unreasonably tired through standing on climbers. Fatigue also results in lessening of attention, and a failure to use safe methods which require extra effort. The spurs of climbers must be kept sharp and of proper length. Sharpening should be done by filing on the inside of the spur point. When points are worn down it is better to buy new climbers than to fit in new spur points.

Work in stormy winter weather adds other hazards as broken wires usually are alive, many times at high tension. This applies to telephone and telegraph wires as well as power wires. Patrol work also has its dangers, particularly in time of storm. Two men should constitute a patrol gang on windy nights, as one man is required to hold a heavy extension ladder in the wind. It is more difficult to work in heavy clothing and when one is cold, consequently frost bite and colds due to exposure are more common in cold weather, and the danger of falling due to numbness of the body greater.

Cable reel lagging when removed from the reel almost always contains nails which are dangerous for linemen, pedestrians or others who may be near the reel. When reels are stored they should be securely blocked so they cannot be rolled around by mischievous boys.

Pole steps create falling and other hazards. If the steps are placed low enough to the ground to be reached without a ladder, inquisitive boys are encouraged to climb the poles. When placed sufficiently high to be out of the reach of boys, the linemen must necessarily get up on the pole either by ladder or by the use of climbers. Many men have been injured by using a fence or box to reach the lower step. Steps sometimes break and hence this possibility must be kept in mind when climbing poles equipped with steps.

Some transmission line work is especially heavy and done in the vicinity of railroad crossings, harbors, and improved highways. This introduces additional public hazards caused by dropped tools, loose wires and wires sagging between poles. Special attention must be given these causes of accident to prevent children or other interested by-standers from becoming injured.

#### GENERAL CONCLUSIONS

In all line work there is naturally a right and wrong way to do everything. Simple illustrations of the wrong way are pulling a cant hook in such a manner that if the pole suddenly rolls the workman will be thrown to the ground, walking backward when paying out wire and increasing the stumbling hazard, melting solder and doing other work directly beneath other workmen on the pole where a dropping tool or part would fall, wearing climbers when traveling from job to job, etc. These unsafe practices must be discountenanced upon every occasion. The regular inspection of belts, gloves, climbers, and other equipment is one of the essential safe practices which must be rightly observed.

As in other lines of work it is the unexpected that happens. We know in a general way the major causes of accidents to linemen, but each accident case is usually a little different from any other case in the contributing causes or combination of circumstances. The solution seems to be a more thorough spread of the Safety spirit which stimulates workmen to anticipate trouble and possible sources of accident or injury. This spirit can be cultivated only by a policy of absolute frankness and by a willingness on the part of any management to spend money for good tools, equipment, and the necessary safeguards. One of the best methods of keeping up interest in safety is through a frank discussion with the linemen of a paper similar to this one.

The newest method of stimulating interest in accident prevention in the Rochester Gas and Electric Corporation is through a statistical analysis of accident costs, whereby departments are rated on the same basis. In brief the accident as taken from the insurance reserves is equalized for size of department, character of work done, and type of workmen involved by dividing by the departmental payroll. This furnishes a pure premium which is equalized for risk by dividing by the insurance rate. The resulting figure provides a standard of comparison indicating to some extent where concentrated safety work is necessary. Costs based upon production units are scrutinized with much interest by many of the members of the various departments for which such figures can be given. The cumulative rating of the Electric Distribution Department of this Corporation for the period January 1, to August 1, 1920 is 2.43 in comparison to a perfect score of 0 achieved by several of the power houses and the worst score of 45.84 for the office employees having outside work.

Nearly all of the hazards enumerated, together with their remedies have been well understood for years. Many closely related subjects have

not been considered as they already have been adequately treated by others and may be referred to in the published records of the National Safety Council, the National Electric Light Association, and elsewhere. Among these are standard methods of testing rubber gloves, resuscitation, the recognized machinery for accident prevention education, statistical data, etc.

Acknowledgement is here due to other writers and especially to the Line Department of the Rochester Gas and Electric Corporation, the members of which have freely criticized the original paper and furnished many supplementary suggestions of great value.

CHAIRMAN MACLACHLAN: When we appointed Mr. Fisher to write this paper, we knew exactly the type we would get, and I think we are perfectly satisfied with the results.

I will ask Mr. Foster of the Philadelphia Electric Company to open the discussion on this paper.

#### DISCUSSION

MR. WILLIAM FOSTER (Philadelphia Electric Company, Philadelphia): There is one question that has not been touched upon—the question of men being hurt on the wagons because of riding on the tailboard and being shaken off, or by sitting on protruding ladders and being shaken off. I find also that men have been hurt in unloading wagons, where the wagons were stopped on a sliding grade with small blocks, with the result that when they took off some ropes or something else, the reels rolled off. The question of transformers, particularly in wagons, is a very serious one. They are very heavy and hard to handle. We have tried to solve the problem, and I think with a great deal of success, by the installation of a traveling crane, which permits us to put the transformers up on the wagons and instead of the men skinning their knuckles and upsetting these heavy objects on their feet, etc., they merely take a small chain, raise the transformers up, and shoot them on to the wagons.

In the question of raising and lowering the tools, it has been the habit for years, as you all probably know, to tie the tools on the hand lines with a half-hitch and slip insulators in, and all that sort of thing, and if the fellow hadn't hitched them right, they came crashing down. That has been solved by the use of canvas bag which is used for its insulating features. I have seen some use metal containers for raising tools, but I don't think that is very safe.

The question of the first aid kit is one that I do not believe we have given enough attention. We feel satisfied in having equipped our wagons with the kits, but the thought arises in my mind as to what we have done in instructing men in the proper application of the various things in the first aid kits, the bandaging of wounds, etc. These are important topics.

In connection with the unloading of poles on highways, in order to prevent them from rolling over from curbs and hitting pedestrians, that is somewhat overcome by the use of a couple of blocks which will prevent them from rolling too far. At night a red lantern should be placed on each

end of the pole rather than in the center. In the transportation of poles on trucks, we have found it to be a good thing to place a red flag on the back end.

#### OTHER SAFE PRACTICES IN LINE CONSTRUCTION

In erecting concrete poles, we found it to be a good thing to place boards one inch thick, securely fastened to the side of the poles, so that our pike does not slip off the surface of the pole. Thus, we can erect concrete poles with about the same facilities as are used for wooden poles.

We use a butting board in all our holes where it should be used. That prevents the cutting out of the side with the butt, or the enlargement of the butt on rock, if you are in rock ground.

The question of using dynamite is an important one. It is always important that the storage of dynamite be designated at night time. We store dynamite by digging another hole in the ground about three or four feet deep, placing our dynamite in that hole, taking a chance on whether it gets wet or not.

In trimming trees, we have our tree gang in the trees and send two linemen along with them. The linemen are stationed at adjoining poles for the purpose of cutting the wires if they find the wire is becoming entangled, or if there is danger of the wires breaking.

In the question of rubber gloves, I believe that in addition to rubber gloves we should supply the men with talcum. I know that a great many men hesitate about putting on rubber gloves on a hot day, when their hands are warm and the gloves are hard to get off. I think if you will let the man have talcum it will be more of an incentive for him to put on his rubber gloves, because it is easier for him to get them off.

In stripping old poles, it should be mandatory to place pikes against the old poles. Those pikes should not be the smallest pike we can get on the highest pole. Judgment should be used there.

The question of supporting poles can be solved to a great extent by the use of extension arms rather than the buck arm. Extension arms can be made just as strong and are a great deal safer.

The question of dropping tools is one that is being experimented with now and the inverted tent is being tried out. This is a piece of canvas tied around the pole, the four ends of it being shot out at an angle of 45 degrees and supported by pikes.

It is a good idea to let your men know how much it is costing for accidents. It is just as good an idea, I think, to divide your crews up into classes and hold out a prize for a certain class; give your men a record of the class they are in and acquaint them with the conditions and statistics each month and pit one against the other.

MR. CHARLES B. SCOTT (Bureau of Safety, Chicago): I feel such an interest in this subject that I want to take up your time for a few minutes' discussion.

To my mind there are two points with reference to the safety of line work that need to be emphasized. I think one of them is stated in the paper that was read, contrary to my own opinion of the subject. As I remember it, Mr. Fisher says that in the line department there is a

greater appreciation of supervision and discipline than is usually found in other departments. I take issue with Mr. Fisher on that—my observation has been that there is a greater laxity of supervision and less enforcement of rules in the line department than in any other department of this business.

I believe that a great many of us are having a large number of line accidents which are nearly always serious, and which constitute a very large part of our accident costs, because we have no fixed, definite, written, enforced, and obeyed rules in the line department, and if any of you want my idea as to how you can best bring results about in your line department, I recommend that you have fixed, definite rules, and I also recommend that you see to it that those rules are enforced and obeyed. Until you do that, until you get within your line organization a proper appreciation of what correct supervision, what close supervision is, and what the enforcement of rules of the company means, you cannot do much in carrying out the splendid details that are suggested by Mr. Fisher.

One more point: The first is rules; the second is safety appliances. I believe that 90 per cent of the accidents in the line department are due to the failure to use the safety appliances provided. I was glad that Mr. Foster said that it was not sufficient to give a man a pair of gloves—it isn't sufficient to give a man a pair of gloves and to write in the rule book that that man must wear the gloves. You have only done your full duty and protected yourselves when you know that you have a foreman who sees to it that the man does wear his gloves. I believe that if there are any two things more than anything else that will reduce the fatalities, the accident costs, and solve the accident problems of the power and distribution companies, they are embodied in these two suggestions: First, that you have real rules, that you have your supervisory force enforce them, and that you have your men obey them; second, that you not only provide safety appliances, but see to it that they are used.

MR. E. C. CARPENTER (Northern Ohio Traction & Light Company, Akron, Ohio): The suggestions offered in Mr. Fisher's paper, and those offered by Mr. Scott, are quite practical, but there is one very vital proposition that to my mind has not been suggested, and that is how to get the employee to do the things that you want him to do. We formulate rules, we make requirements, and we tell the foreman to do so and so, but will the employees do it?

Just as an illustration: Within the week I have had sitting across from my desk a man who has had more than fifteen years' experience as a lineman, and who was considered a reasonably safe employee. He has been up poles, has helped to take down men apparently dead from electric shock and has helped to resuscitate them; and yet, later on this man, himself, failed to do the thing that he has told others to do, and that he has been told to do, and he gets grounded with a 2300-volt circuit with the result that he now has hooked hands and fingers that are practically useless.

How will you get instructions to the men so that they will obey them? That, to my mind, is a very important proposition, and one to which we should give attention. Rules are all right, but if they are not enforced,



we are going to have these hooked fingers and hooked hands and dead men to take care of.

MR. C. H. STEWART (Laclede Gas Light Co., St. Louis, Mo.): The same question has arisen in my mind. We have had two fatal cases within the last year and a half, both with men who failed to wear their gloves. In one case, the men were changing cross arms on the corner pole, a heavy pole, carrying an enormous lot of wires—not only the wires of our company but of other companies, telephone wires, and city wires. They were changing the 5000-volt line. Double cross pole men working in pairs untied the line, hooked it up on a block of cable, insulated, and it ran in front of this man. A dead alley circuit that was grounded—it did not belong to us—was there, and this man, within five or six seconds after untying this line, took his gloves off and was dead. All we knew was that he was badly burned on both hands, and it happened so quickly that nobody on the pole with him could give an accurate description of just what occurred.

In this particular case the men used metal blocks to raise up the line on account of being in close quarters. I would like to hear some discussion on the question of all metal blocks as compared with the combination of wood and metal blocks.

I have talked to our superintendent of construction and he advocated metal blocks in this particular location on account of the confined space the men had to work in, and because in snubbing up, they could snub closer.

We felt that the man who was killed was absolutely negligent in taking off his gloves and that if he hadn't taken them off he would have been alive today. This man had had ten or twelve years' experience, like the employee referred to by the previous speaker.

In the other case, a man handling a 2400-volt line took his position on the pole with his climber almost piercing a ground line carried down to the ground with a cable. This man had no gloves on at all. He had gone several pole lengths away from the wagon (they were stringing up a new line, taking down an old line, and putting a new cross arm up on this pole) when they heard the sizzle and flash and looked up to see the man hanging from the wires, practically dead. We found this man's gloves in his tool kit in the truck.

We felt that both of these cases were cases of negligence, but I would like to hear the experience of others on this question of enforcing rules. You can make rules until you are black in the face and you may have foremen who try to enforce these rules, but the foremen can not be standing with every man all of the time.

MR. HERMANN SPOEHRER (Union Electric Light & Power Company, St. Louis, Missouri): I want to say, in answer to Mr. Scott regarding the enforcement of rules, that we found on analysis of some of our accidents that invariably the foreman was busily engaged in writing a report of some kind and wasn't supervising the gang. We have now relieved the foreman of some of that clerical work and amended our bonus scheme so that each gang is affected financially by such an accident in that gang.

Among themselves, the men will not tolerate an infringement or infraction on those rules.

MR. J. C. MARTIN (Western Editor, Electrical World, Chicago): There is one thing that I believe the men do not pay enough attention to, and that is the design of transformer mountings on your poles. At best, clearances are small and too often it is left to the lineman to say how it should be done, and usually you find that he messes it up and doesn't give it near the study that can be given it.

I know from experience, that on transformer poles at least twice the space that is usually found can be given if the design is properly studied.

MR. W. C. BERRY (Commonwealth Edison Company, Chicago): There is one point that has not been brought out and that is the hazard to the public. We have a number of places where circuits are grounded and boys have ascertained that there is a leak there, possibly only 60 volts, and have attached wires to it and horses passing through the alleys have been killed. A clay foundation seems to form a slight insulation around the ground rod and this makes a permanent hazard to the public.

MR. CHARLES B. SCOTT: There are companies that have enforcement and obedience of rules; there are many companies that believe it is impossible to have enforcement and obedience of rules. The companies that have rules enforced and obeyed are the companies whose executives make safety a matter of co-operation. They are the companies where the manager gives the superintendents and foremen to understand that these rules must be obeyed, and where the foremen and superintendents know that if they are not enforced they lose their positions. The men who obey those rules are the men who come in contact with superintendents and foremen that make safety a part of their supervision, who really and truly are safety men and good superintendents and foremen, and who fire the men who do not obey the rules. The whole question of the enforcement of rules resolves itself into the spirit of the organization, and it begins with the man who has the biggest title on the problem.

CHAIRMAN MACLACHLAN: I am sorry to have to stop this discussion.

One matter that I haven't taken up yet is the appointment of a nominating committee. I am going to appoint a personal friend of mine as chairman of that committee—not because he is a friend of mine but because I think he knows the situation a little bit better than any other man in this section does—and I am going to ask Mr. Charles B. Scott of Chicago to act as chairman, and name with him Mr. Mitchell, representing the gas interests, and Mr. Mott, representing the telephone interests, so that we may have the power, gas, and telephone interests represented on our nominating committee, and our officers for the ensuing year fully represent the public utilities.

There is one question that has not been placed on the program, and that is the question of resuscitation from electric shock, gas poisoning, and drowning. I am going to take up a few minutes of your time for consideration of this question and I shall be pleased if Mr. Reid will open the discussion.

## THE PRONE PRESSURE METHOD OF RESUSCITATION

S. H. REID, BUREAU OF SAFETY, CHICAGO

The question of resuscitation has been presented to this body a number of times. I think it has been demonstrated at some of the meetings.

You will recall that the National Electric Light Association, through a resuscitation commission, studied this subject very thoroughly, and no doubt most of you have read the final report of that commission. Those who have read it will recall that the commission recommended what we now call it "prone pressure" method of resuscitation, and recommended that any mechanical devices which may be on the market either be sent to the scrap heap or confined to the use that they might be put to, in hospitals, or in the hands of trained operators. And if I understand the spirit of that report and the recommendation that was made, it means this—that no electric light company should have in its possession, around its power houses or anywhere on its property, any mechanical device for the purpose of resuscitating men who have received an electric shock. Now, there are many reasons for that, and I shall mention two or three.

In the first place, if the mechanical device does everything that is claimed for it, it has the disadvantage of being away off somewhere else at the time when it is needed when the emergency arises. That is one very serious objection to it.

Another is that if the mechanical device is in sight the men do not practice the manual method, but they depend upon the mechanical device, and, therefore, they are not equipped to meet an emergency which may arise because of an electric shock.

I know of one case which happened a short time ago, where a man received an electric shock and inside of less than a minute the linemen had that man down on the ground. They knew their business and immediately went to work, but before they got very far somebody came along with a mechanical device, and they lost about ten minutes in getting that thing adjusted. Part of the apparatus was out of order and it would not work. I shall always believe that that life was lost because they stopped for ten or twelve minutes and tried to resuscitate him with a mechanical device.

### MECHANICAL DEVICES FREQUENTLY OUT OF ORDER

That is another good reason why we should not depend upon a mechanical device. It is stored away somewhere and nobody is put in charge of it or takes care of it to see that it is kept in proper shape to meet the emergency when it arises, with the result that when the emergency does arise, the device is brought out and a piece of hose is gone or something else is wrong with it and another life is lost.

Now, the only thing for the people in this business to do is to see to it that every employee is versed in the manual method of resuscitation. Employees should not only be well equipped to handle such emergencies, but they should also be taught not to get out of the way and give up their time for any mechanical device somebody will bring along.

Sometimes those mechanical devices are kept in the fire departments

and they rush up, and then the fellow who is not a doctor but a lineman is pretty apt to give way to the fellow who knows less about it than he does. That is another thing that should be taught to the lineman—that he is not to give way for anybody.

I know of a case where a man went to work—he was alone—on a man who had had an electric shock. In about five minutes two doctors came along, and unfortunately (not casting any reflection on the medical fraternity) they did not know what this man was doing, but all they could see was the froth coming out of the patient's mouth and they said, "Get off of that fellow, or you'll kill him," but the man kept right on working. Then one of the doctors reached down and again told him to get off or the fellow would be killed. The lineman stopped just long enough to take off his coat, used some language that I do not want to repeat in the presence of ladies, and said, "I have charge of this patient and when I get through with him, you can have him." The company physician, however, saw that the lineman was doing everything he could, and inside of thirty minutes the patient was breathing, and when I saw him he was none the worse for the experience.

I know of another case where men depended upon a mechanical device and the thing was out of order. These are two cases I positively know of where the mechanical device was out of order. So, the only thing to do is to train your employees in manual resuscitation.

It's a big job to train four or five thousand men, as the Commonwealth Edison Company does, but for the most companies it means the training of from fifteen to fifty men, and that is not too big a job if you want to save the lives of the men who come in contact with the wires.

There is just one remedy that I would prescribe and that is to train all of your men so that they will be competent to deal with the emergency when it arises.

#### DISCUSSION

CHAIRMAN MACLACHLAN: You have heard the side presented by Mr. Reid of the advantage of the manual method. I would like to hear somebody speak of the advantages of the mechanical method.

(No response.)

CHAIRMAN MACLACHLAN: That is about the answer I expected.

I was told, when I presented this matter to the Executive Committee that it was a personal opinion. I knew the feeling of the public utility men of the United States and Canada and I think that our position ought to be placed before the Executive Committee this afternoon in the form of a resolution, so that they can be aware of what they are doing. I don't think they are aware of it at the present time.

MR. CHARLES B. SCOTT: I offer the following resolution:

"RESOLVED, That the Public Utilities Section of the National Safety Council in session assembled, express as their undivided opinion that the prone pressure method of resuscitation is the most effective method of resuscitation in electric shock, gas poisoning, and drowning;

"That the use of mechanical devices should not only be discouraged but should be prohibited;

"That all companies having the electric, gas, or drowning hazards should train their employees in the prone pressure method."

(This resolution was seconded and adopted unanimously.)

MR. J. J. O'CONNOR (Peoples Gas Light & Coke Co., Chicago): I might say at the present time that the managers of public utilities have an excellent opportunity to take advantage of the training that their young men who have now returned from the Service received in the army. All those young men (and about 50 per cent of your employees, at least, have been in the army) have had hammered into them, two or three times a week, first aid training and resuscitation. If you take advantage of the opportunity to use those young men as a nucleus in your training, I think the lessons that Uncle Sam has taught them will be of benefit to the public utility business.

CHAIRMAN MACLACHLAN: The next paper we have is by R. S. Carter of the Malden and Melrose Gas Light Company, on "Accident Hazards in Laying Gas Mains."

#### ACCIDENT HAZARDS WHEN LAYING GAS MAINS

R. S. CARTER, SUPERINTENDENT, MALDEN AND MELROSE GAS LIGHT COMPANY, MALDEN, MASS.

Accidents when laying gas mains may result in injury to employees, or to members of the public. These accidents can be largely prevented by consistent and systematic instruction and education on the subject of accident prevention.

Carelessness, the cause of many accidents, seems to be an inborn trait in all men engaged in hazardous occupations, and many times it reaches a point where familiarity with the risk causes a sort of scorn and contempt that many times results disastrously. Probably you have in mind a case where an employee has witnessed a serious accident to another, and maybe he has gone through the pain and inconvenience of one brought about by his own carelessness, but has not profited by the experience.

It has been estimated that from 30 to 50 per cent of industrial accidents can be prevented. The greatest preventive is *carefulness*. It brings its own reward in a marked decrease in the number, and in a reduction of the seriousness of the accidents not altogether to be avoided.

Certain industries include operations from which danger can never be entirely eliminated, and I think the work of laying gas mains comes in this class.

#### DANGER OF GAS POISONING

One of the greatest hazards when men are laying gas mains is the possibility of gas poisoning; and while the percentage of accidents from this cause is small, it is always before us, and must be carefully guarded against. Accidents of this nature occur when connecting new work to existing live gas mains.

To guard against gas poisoning, we use respirators that can be worn with comfort when men are obliged to work in the presence of gas. It has been our experience that equipment of this sort must be carefully

investigated before it is turned over to workmen for use. If a man has no confidence in the respirator or mask he is told to use when going into a gas filled trench, it is next to impossible to impress upon him the necessity for wearing the safeguard, and it is not unusual to find him "taking a chance", with the odds against him when working in a most hazardous place.



ILLUSTRATING THE USE OF THE RESPIRATOR  
THE EMPLOYEE IS ABOUT TO REMOVE A GAS MAIN STOPPER SECURELY WEDGED  
IN A 10-INCH PIPE

Also if an employee is exposed to a danger of this sort, a life belt and rope should be buckled around his waist with a man holding the rope so that in the event of an emergency, it would be possible to pull him out of the trench.

In all cases of accidents, the suffering, inconvenience, and interference with a man's regular line of work is so great that when an analysis is made of the cause, many could be avoided by following instructions and precautions. The results furnish a strong argument in favor of practicing care and caution in the performance of our daily work.

Preventive measures when furnished should be used. They make first-aid treatment unnecessary.

#### USING THE GAS MAIN STOPPER

In the illustration above I referred to a gas main "stopper". This piece of equipment is used to stop temporarily the flow of gas while con-

nections are being made. When working on small size mains, a rubber bag is used to stop the flow of gas, and as an extra precaution, when laying large mains, say from 10 inches to 30 inches in diameter, a canvas-covered bag is used together with a stopper. Cloth or canvas-covered bags retard the solvent action of oily water found in some mains which is very detrimental to rubber.

It can be readily appreciated if a bag or stopper should collapse from any cause when the main is open, a most serious and dangerous situation would immediately develop.

Handling this part of gas main construction work is particularly hazardous, and invariably we find men who believe they are immune from gas poisoning, and expose themselves unnecessarily to the action of the fumes.

When service pipes are installed, it is necessary to tap the main pipe preparatory to inserting the screwed fitting from which the service pipe will run. Many times the threads on service fittings and pipe are defective, and do not readily "make up". The gas will escape during the time the man is trying to screw the service fitting into the main pipe. If he remains too long at this task with the gas leaking around the fitting, he is running a great risk of being overcome. All threaded fittings should be examined before they are used, to determine the condition of the threads.

#### WHAT TO DO IN CASE OF GAS POISONING

When an employee is overcome by gas, it is important that his foreman and fellow employees on the job should know what to do, and how to handle the victim. To this end, frequent instruction in the prone pressure method of resuscitation should be given. Mechanical apparatus designed to assist respiration has its place, and when used by parties familiar with its operation, will do effective work. It is our belief, however, if all our employees are familiar with the prone pressure method of resuscitation, they are always prepared to meet an emergency, and render first-aid until medical assistance can be called.

Other accident hazards that exist when laying gas mains may be enumerated as—caving in of trench, defective tools, pouring hot lead in pipe joints, blasting, flying particles of iron when cutting pipe, tripping over loose material lying around, lack of, or poorly constructed barricades for enclosing street openings, and the absence of danger signs and lanterns.

The caving in of trenches occurs frequently in sandy and wet soil. This hazard can be overcome by close-sheathing both sides of the trench and firmly bracing it with strong timbers running lengthwise and crosswise of the cut.

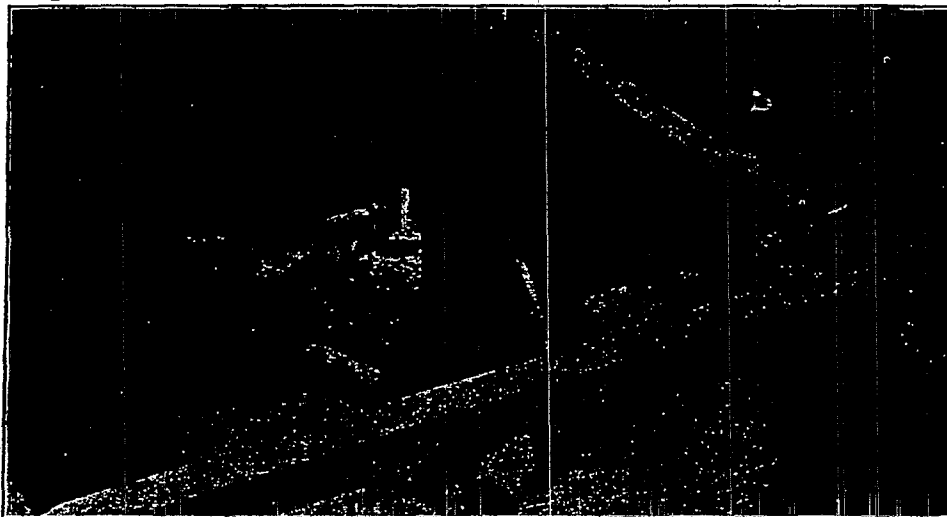
It is better to close-sheath an excavation than risk the possibility of a cave-in.

Both sides of the trench are close-sheathed with boards braced with heavy timbers. The possibility of an accident from a cave-in is reduced to a minimum in this case.

Defective tools contribute liberally to painful and serious accidents.

A cold-iron chisel used when cutting cast-iron pipe if badly mushroomed on the striking head is a most dangerous hazard, not only to the parties using the chisel, but to persons near-by. The possibility of the handle breaking, permitting the chisel to fly and do injury is made even worse by the presence of the mushroomed head. It is from tools of this kind that pieces of steel break off, causing serious eye injuries. When men are cutting pipe by means of striking hammers and cold-iron chisels we provide goggles, and this simple, inexpensive preventive against eye injuries has worked wonders.

Explosions of hot lead when poured into pipe joints, particularly if



A 36-INCH PIPE LAID IN SHIFTING SOIL

they are wet, must be guarded against; and the danger of flying pieces of stone when blasting ledge must be carefully watched.

The tripping hazard is always present in all classes of work where loose material is left lying around. Its remedy is obvious and simple.

Frequently it becomes necessary to dig down to gas mains during the winter months when there may be from three to four feet of frost in the ground. When digging out frozen ground, great care should be taken not to strike sparks where gas is leaking; also when "barring" for gas leaks along the line of main, the "barring holes" should never under any circumstances be lighted off. Leaking gas is a serious hazard at best; it becomes a greater hazard when men attempt to find the leak with a lighted match.

The seriousness of searching for gas leaks with open flames is well expressed in a recent bulletin issued by the National Safety Council, which reads as follows:



**GAS MEN**

Looking for gas leaks with a match, lighted candle or other open flame is an old stunt, but—it's still being done.

**USE A FLASHLIGHT TO LIGHT THE WAY AND YOUR NOSE TO FIND THE LEAK.**

If the open end of a live gas main should take fire from any cause, it is practically useless to try to extinguish it with water. The flame must be smothered, and this can be done with wet blankets, sand, or dirt. Pouring water into an open end gas main on fire, might cause trouble in other parts of the system by stopping or "sealing off" the supply. If this occurs, a greater hazard than the fire itself will be present.

The fire hazard is also introduced by the curious non-thinking person who may be smoking in the vicinity of escaping gas. This danger is usually controlled by a watchman stationed on the job to keep a check on conditions of this kind.

**PROTECTION FOR THE PUBLIC**

Protecting the public from injury when laying gas mains is essential. This is accomplished by providing substantial bridges with adequate handrails over trenches at crosswalks. All openings in the streets must, of course, be properly guarded with danger flags and barricades so that pedestrians and vehicles will keep away. Distinctive colors, visible a long distance away, are used when painting the cross-bars of the barricades. Black and white bands arranged diagonally across the bar have been extensively used.

Summarizing, it has been said "Accident Prevention Saves Misery and Money." Until recent years, this two-fold saving has not been much appreciated, and in striving to put through work at low costs, the avoidance of accidents has been overlooked as one of the big factors in reducing the cost. This applies to laying gas mains just the same as it does when manufacturing staple articles.

Accidents to employees in all departments are costly to the employer. The injured man's services are lost and they must be replaced, temporarily at least, with a man lacking in experience and qualifications that made the injured man valuable.

It must be the constant endeavor on the part of all employees and executives in industry to keep the subject of accident prevention always in the front. It is our practice to set aside accident prevention and first-aid days at which time all employees of the company are brought together for the purpose of receiving instructions of how to avoid accidents, and how to render effective first-aid when they occur.

CHAIRMAN MACLACHLAN: I will ask Mr. Moroney to open the discussion.

## DISCUSSION

MR. W. L. MORONEY (Peoples' Gas Light & Coke Company, Chicago): What kind of a life belt does Mr. Carter use? We have had considerable experience with life belts. We had one some years ago that we thought was a dandy and I put it on myself to see how it would act and after a little while it was choking me. After that test, I got to thinking that we did not want a life belt that would slip and almost strangle a man. We immediately got together and now we have one that goes beyond the knee and is harnessed, which prevents its slipping. The ordinary belt we find is no good.

I would also like to ask Mr. Carter if he has any method of protecting the public. We have what we call a "chip screen," that is, a canvas mounted on a frame, used for large and small jobs. We find that chips broken away with a large point are liable to knock a person's eye out or go through a plate glass window.

I would also like to ask Mr. Carter what is the best method of bagging off. We find that by first inserting our stops in the main that if the stops should happen to slip, our vent will take care of the ventilation and gas without dislocating the vein.

MR. J. B. DOUGLAS (United Gas & Improvement Company, Philadelphia, Pa.): I heard only part of Mr. Carter's paper, but in his reference to hunting for leaks, there was mention made of using the flash light and the nose. I want to say that we have been quite successful in using soap and water on pipes—the result being that the escaping gas simply blows a little bubble.

I would like to say that one of the most experienced gas engineers of my acquaintance, Mr. Frank Schower, of the Philadelphia Company, Pittsburgh, is with us this morning. I am sure he can give us valuable information on this subject.

MR. FRANK SCHOWER (Philadelphia Company, Pittsburgh, Pa.): Use a rubber expansion plug or a wooden plug when you have your ends open. In bagging off a main it is very good practice to use a bag with a vent pipe between, but if you carry a rubber expansion plug or wooden plug, the main is protected if your stopper slips out.

In pouring hot lead, of course a man should always wear his goggles.

My experience within the last twelve or fifteen years has been principally with natural gas, which has very little odor, so in looking for leaks we use a safety lantern with a cup on it. We put a half inch pipe into the bare hole and put a safety lantern on it and if it puts the light out right away, there is gas there; if it takes a long time to put it out, there is very little gas there. After a while, the men become quite proficient in detecting gas.

ADJOURNMENT.

WEDNESDAY MORNING SESSION

**T**HE meeting convened at 9:45 a. m., Chairman Wills MacLachlan presiding.

CHAIRMAN, MACLACHLAN: Yesterday morning when the last paper was about to be given, competition was set up by the band outside, and we had to stop. I will ask Mr. Mulligan to present his paper now and after the discussion we will have the other papers.

HAZARDS IN BUILDING ADDITIONS TO POWER PLANTS  
—PROTECTING OPERATORS AND EQUIPMENT

W. H. MULLIGAN, HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO,  
TORONTO, ONT.

The report of the Investigating Committee reads:

"The accident was preventable and was caused by man failure".

Yes, this is true but who was the man who failed—the poor unfortunate victim of the accident or some one higher up? We may blame the foreman for not having properly instructed the workman, or for not having seen that precautions were taken. But is he the man wholly to blame? Look over the situation. Try to place yourself in the workman's position. He has done the best he could with the conditions under which he was working. Too often the cause has been poor design. There may have been lack of foresight in the original design of the station or power house; or good safe design has been sacrificed to cost, but how often are we not met with the problem of trying to have work constructed in a station, the capacity of which has been doubled and the equipment crowded into the original space and then too, at a much higher voltage? Such conditions have even sometimes existed whereby it not only requires extreme care but considerable ingenuity to fit the apparatus into place.

The new Engineering Section of the Council has a great field ahead of it and efforts should be made by that Section toward the education of designing engineers, and placing the hazards clearly before them. Show them the necessity for ample working space around all apparatus and especially around circuit conductors and disconnecting switches; also teach them to consider maintenance men and construction men who have to do work in stations which are in operation, and the importance of providing space for them to work in safety.

In all construction work, accidents, which are common to all industries and classified under: handling tools, handling material, slipping, tripping and falling, stepping on nails, eye injuries, etc., and will not be dealt with here in detail.

LIGHTING

Good lighting is essential. This can usually be provided as in the case of reconstruction or an extension electricity is available. The wiring must not be makeshift but good material used and installed under proper supervision. In damp places, nothing but the best reinforced portable

cords and weatherproof sockets used. It should be the specific duty of some one person to see that all electrical equipment is in first-class condition.

#### LADDERS

On all building construction, ladders are in constant use and as a rule all types may be found. Every workman on the job feels that he has the inviolate right to take two pieces of wood, nail some cross pieces on them and use the results of his labor as a ladder. This must not be countenanced and only ladders properly constructed by a competent workman allowed. No ladder reinforced longitudinally with metal should be allowed on the premises. I cannot impress this too strongly: No ladder no matter to whom it belongs, that is reinforced longitudinally with metal has any place on any works which at some time will be used for electrical operation.

Ladders should be equipped with some form of non-slip footing. For outside use a spiked type has proven the most satisfactory and for inside use any type that will not damage the floor or allow the ladder to slip on a smooth floor on which there is oil.

#### SCAFFOLDS

The standards for scaffolds as given in Safe Practice pamphlet No. 12 should be adhered to as consistently as possible; that is, all scaffolds should be equipped with a railing 42 inches high and a toeboard. Particular attention must be paid to toeboards especially where a scaffold passes over equipment that may be alive.

On construction work too little attention is, as a rule, paid to scaffolds. They are only for temporary use and as they will be shortly removed, whatever material is handy is used. The scaffolds must be designed for the loads they have to carry.

Scaffolds which are substantially constructed are often entirely lacking in safeguards—no railings, no toeboards, and the platform obstructed. It is conditions such as this, we must try to guard against. The foreman must be held strictly accountable for the condition of all scaffolds and ladders on the works.

#### VENTILATION

Pure air must be supplied to the workman and fans if necessary should be installed. Care must be taken, especially when acetylene welding apparatus is used.

If salamanders are used in winter for drying purposes, the air consumed and the gases given off, must be considered.

#### GENERAL

Drills and hammer heads must be kept dressed, and when holding drills, tongs used and goggles worn. Care must be taken that the jaws of wrenches are in first-class condition; no defective tools should be used as a failure or a slip will result in, not only the ordinary hazard which would arise, but an extra hazard exists if live equipment is present.

If work is located below a cliff, scaling operations must be carefully and continually carried out.

Cranes, hoists, elevators, permanent stairways and ladders should be constructed as soon as possible.

If it is necessary to operate a railway, a proper set of operating rules and signals should be placed in effect and all men who operate the trains should receive the standard eye and ear tests.

In hydraulic work, when a diver is working, a telephone has been found to have been of valuable assistance, as by its means the operator is not wholly dependent on signals.

As on a large construction job, every hazard from the operation of a railroad to the digging of a ditch is included, I will not go into any details, but will confine myself particularly to the electrical hazards which construction men meet when enlarging existing layouts or installing new equipment in plants already in operation.

All work in a power house or substation that is in operation must be under the direct control of a man who has a definite set of construction rules for his guide. The operator in charge of the station should have the necessary authority to hold up any work which he feels is going to endanger life or apparatus and must work in close conjunction with the man in charge of the construction work.

#### DANGER SIGNS

For the protection of the workman and his guidance, danger signs should be installed. A proper sign must display the universal danger emblem accompanied by such wording, that the nature and location of the danger is apparent. On construction work there is the foreign element. To meet this requirement, we use a sign bearing the danger emblem with "Whenever you see the above sign it means danger—keep away!" in four languages. This sign is placed in all bunk houses and at tool wickets. For general use we have two signs both bearing the danger emblem: one reads "Dangerous electrical apparatus here—Admission by authority only—Keep out"; the other reads "Danger—High Voltage" and is made up both in enameled steel and cardboard, and placed on apparatus which is alive.

During construction, in order that operation may not be unnecessarily interrupted, certain pieces of apparatus are alive one day and dead the next. To reduce the possibility of a mistake, we use a sign bearing the danger emblem with "Danger—High Voltage—Safe Working Distance — Feet. H. E. P. C. Construction Department." The foreman assumes the responsibility for this tag and locates it on the apparatus which has just been turned over to the Operating Department, either for temporary or permanent use; he marks the voltage and safe working distance.

When we were adopting the universal danger emblem we used, with it the skull and cross bones with the word "Danger". The standard signs, such as are used at elevators, emery wheels, cranes, explosive storehouses and railway crossings, should all be used depending on the nature of the work in hand.

All equipment not yet turned over to the Operating Department, or which has been released by the Operating Department, should be tagged with a special tag for construction purposes; and when apparatus or equipment is so tagged, it must be wholly under the control of the construction foreman.

#### SAFE WORKING DISTANCES

The safe working distances as laid down by the Hydro-Electric Power Commission of Ontario, for their various operating voltages are as below:

|                                     |       |
|-------------------------------------|-------|
| 110,000 volt line or apparatus..... | 5 ft. |
| 46,000 volt line or apparatus.....  | 4 ft. |
| 26,000 volt line or apparatus.....  | 3 ft. |
| 13,000 volt line or apparatus.....  | 2 ft. |
| 6,600 volt line or apparatus.....   | 2 ft. |
| 2,200 volt line or apparatus.....   | 2 ft. |

These distances are truly only a minimum and should always be considered as such, and as much clearance as possible should be obtained.

If general work is being carried on in the vicinity of live apparatus it must be screened in such a way that it will be impossible to make accidental contact. There are times when it may be necessary to work within the foregoing minimum distances. No workman should be allowed to use his own judgment in this matter, but special permission must be obtained for each individual case and then only granted when it is impracticable to carry on the work in any other manner. At such a time, two men must always be present.

If work must be performed above live equipment, a scaffold must be built over the live section in such a manner that it will be impossible for tools or material in falling to cause an arc.

In all work of this nature, the operating man must not be forgotten when work has been finished for the day. Aisles must be left reasonably free from obstruction, any gallery rails that have been removed, replaced or the opening protected, and if any extra hazardous condition exists, which might interfere with operation, it must be pointed out to the operator.

#### FIRE

Care must be taken to leave no excelsior or packing around the switch rooms as such material is an added fire risk in the case of an oil explosion. Gasoline must be stored in minimum quantities and stored in safety cans.

Fire equipment must not be removed nor access to it blocked; and adequate supply of extinguishers distributed over the work—in the camps, storehouses, and offices.

#### RESUSCITATION

I would not be a true Public Utility Accident Preventionist if I did not say a few words re resuscitation. It will be impossible to get every man in a large construction camp to practice resuscitation, but a certain few men in each group should be trained and in your electrical construction gang every man must know and must practice resuscitation.

CHAIRMAN MACLACHLAN: I have had the opportunity of reading this paper before it was presented, and I know the experience that Mr. Mulligan has had covering a very large system, extending over some four or five hundred miles in length, and operating two or three hundred substations and a number of power houses. Some of them are under construction at the present time. These details are brought out from the standpoint of accidents that have happened and the methods to prevent them from happening again. Some of the details that were discussed in connection with scaling apparatus and the handling of chips pertain to the development that is now being made on Niagara Falls, where a power plant of 300,000 K. V. A. is being built.

#### DISCUSSION.

MR. HERMAN SPOEHRER: It is a fact that our construction organizations haven't become educated up to the same standpoint as our operating forces, and that applies as well to outside construction work.

The contractors have made an effort recently to interest the various contracting concerns and they are finally taking hold. Too frequently one shift of a construction gang will put a very light tackle up to hoist some material for immediate needs and use a light lashing, and they tackle it with a light rigging. The next crew comes along and without investigating the strength of it, tries to handle larger things than the tackle was intended for.

MR. H. A. MOTT: I should say that any crew which comes along and uses a sling put up by another crew without ascertaining anything about it is a pretty poor gang.

MR. J. C. MARTIN: Mr. Spoehrer has spoken of the lack of safety education among construction crews. I think you will find that the construction crews are usually more or less temporary. The men are up for a job and when there happens to be no work, the larger portion of the men are let go.

In making rules for safety work, or for any other work, that is the factor that has to be given very careful consideration, and special care should be taken to train new crews. I think that is really the reason why construction crews are not as well educated as the operating crew. The operating crews are on the job year after year.

MR. WILLIAM FOSTER: We invariably spend years planning construction and at the eleventh hour we get the order to go ahead with the work and try to complete it in the twelfth hour. That seems to be the great difficulty in construction work. I feel that if we devoted the same amount of time and care to designing safety plans that we do in designing construction plans, we could eliminate this danger to a great extent.

G. R. RINK (Utilities Mutual Insurance Company): I wish to call particular attention to the painters. They are hired for only a short space of time, usually, and experience has shown that apparently they do not realize the danger in working back of the switchboard or on other electrical equipment.

MR. C. B. HARDIN (United Railways Company of St. Louis): Who is

the man we are to charge with the direct responsibility of seeing that the men are properly instructed? In other words, when the accident happens, shall we charge it to the foreman, or shall we go to the man who is in charge of the job, or to the contractor, or shall we go to someone else? To whom shall we go for either the failure to have the necessary safeguards, the necessary safety apparatus there, or the failure to properly instruct the men of the presence of danger?

**MR. HERMAN SPOEHRER:** I think I answered that question yesterday in the case of our own organization. In our permanent organization we have written safety into all of our various bonus schemes so that if a man is lax in the enforcement of safety rules, his own gang suffers and the men won't tolerate any negligence because it affects their income. In the case of an outside contractor, I think that is a matter that should be written into the specifications.

**MR. J. C. MARTIN:** To get back to what was said yesterday about the executives, you have to charge your executives with the responsibility for seeing that the men under them are properly impressed with their duty. If your executives are not on the job and encouraging the men under them to carry out these measures, they will never be enforced.

**CHAIRMAN MACLACHLAN:** Mr. Mulligan, will you close the discussion?

**MR. W. H. MULLIGAN:** In reply to Mr. Hardin, I would say that with the Commission in Ontario it is my unfortunate duty to hold official investigations into every serious or fatal accident to any of our employees. This investigation is taken by a stenographer and I question everybody from the superintendent down to any workingmen on the job who know anything regarding the causes leading up to the accident or regarding the accident itself.

From this investigation I make up my report and I find that in every case within the last year and a half, the accident has been wholly up to the man himself. I have yet to find a case where the responsibility should be placed on the foreman. The foremen are there to instruct them—we have those rules—but the foremen cannot be everywhere on a large job at one time.

But from these investigations we very often find things which we did not know existed before, and we are able to make recommendations to the chief engineer, and through him to the Commission, whereby we can prevent the same accident happening the next time without a direct disobedience of the rules.

**CHAIRMAN MACLACHLAN:** I understand the nominating committee is prepared to make its report. In the absence of the chairman, Mr. H. A. Mott will make the report.

**MR. H. A. MOTT:** Your committee reports the following nominees:

Charles E. Morrison, Chairman  
 J. F. Naylor, Vice Chairman  
 J. J. O'Connor, Secretary  
 H. Spoehrer, Membership Committee Chairman  
 William Foster, Bulletin Committee Chairman  
 E. Vinet, Program Committee Chairman



(On motion duly made and seconded, the gentlemen named were elected.)

CHAIRMAN MACLACHLAN: I will call on Dr. C. H. Lemon to present his paper on "Medical Service in Public Utilities".

### MEDICAL SERVICE IN PUBLIC UTILITIES

DR. C. H. LEMON, CHIEF SURGEON, THE MILWAUKEE ELECTRIC LIGHT AND RAILWAY COMPANY, MILWAUKEE, WIS.

While public utilities in a general way do not differ from other large corporations in their internal relations, they do have a personal contact with people and things outside of themselves that many of the larger corporations do not get. As public utilities they are dealing with the public itself and this relation is reflected in the character of the employees, and in most instances the character of the utility itself may be judged by the character of the men who are employed in it. Perhaps it is easier for a public utility to have a medical service than an ordinary industry, for the reason, that as a rule a public utility has a medical department, or at least a medical officer, who responds to calls for services where the public in one manner or another suffers personal injury through the operation of the utility itself. All public utilities in their operation are more or less hazardous and accidents to employees are not uncommon, as well as accidents to the public; either on the streets or in houses or manufacturing plants, where these utilities are to be found.

Unless a public utility has an organized medical department and utilizes the skill of its medical men for the benefit of its employees, a medical service in the full sense is an impossibility. It is necessary to employ medical men of known skill and these are usually on a salary basis; and usually are found willing and anxious to do something in a definite way for the employees with whom they are necessarily brought in close contact.

As an illustration of the extent to which this personal relation may be extended, I would point out that perhaps the best known industrial surgeon today, is one who is the physician to a large mail-order house, where it is almost impossible to visualize an accident or a disease, arising out of the industry; and yet, because of the personal interest of the doctor employed, he has made the most of his opportunities and has practically built up a national reputation based upon a minimum of real opportunity, as compared with other large industries. What he might have accomplished in an industry such as I represent it is difficult to imagine.

It is this personal service by men who are enthusiastic in their specialty, that will count in the long run and produce results for the betterment of the employee, whether it is a mail-order house in an office building in a large city, or, whether it is a large manufacturing plant

spaced over many acres, or a public utility of the first order having its great shops and its larger contact with the general public.

#### ONLY HIGH GRADE MEDICAL SERVICE WILL SUCCEED

It is important for those desirous of instituting a service of this kind in their own industry, to recognize the fact, that without the presence of a surgeon of repute as the head of the organization, under pay by the corporation itself, and not by an employees' mutual benefit association, that nothing can be accomplished. Joint mutual benefit associations, particularly in the iron and steel industry, are by no means a recent development. For thirty or more years these mutual benefit associations have been in existence and the reason they have not developed beyond very restricted lines, is that their medical service was selected either by competitive bids from the doctors themselves, or none but men of mediocre ability could be persuaded to interest themselves in this work, because of the low salary or fees that it was possible to pay out of the funds of the organization.

A half-hearted medical service is in my opinion worse than no medical service at all. Those who are engaged in labor, do not always employ mediocre physicians or surgeons. Among laborers there are discriminating thinking minds, and those who are capable of thinking for themselves are just as apt to differentiate between medical men as are their employers. In fact, it has been my experience that many employers of labor show less discrimination as between the skilled and the unskilled in the medical profession, when seeking medical counsel for themselves, than do those whom they employ.

What I would seek to bring home to you, is the thought at the beginning, that if there is to be a medical service in a public utility, that the public utilities themselves must be ready to spend a liberal sum of money each year, in order that men of the first ability, men of standing in the locality in which the utility is operating, may be interested to give their time and services for the benefit of the employees and their families.

The day has long since gone by when you can treat medically the employee and lose sight of his family. The two are so intertwined and dependent the one on the other, that either they must be treated as a unit or not treated at all. The health and happiness of the bread winner who is the public utility employee, is dependent to a large extent upon the welfare of those who are dependent upon him; and his efficiency at all times is increased or diminished by worry, incident to sickness or chronic ill health of his dependents, unrelieved by medical or surgical treatment, which in the past many of these employees have not been able to provide.

#### INCREASES EFFICIENCY OF EMPLOYEE

The employee himself who has free access, at convenient places and times, to medical service will be more efficient than another who is denied this service. This is not an arbitrary statement but is based

upon statistics, which the company I have the honor to represent, has for the past eight years reported annually. It has been the good fortune of The Milwaukee Electric Railway and Light Company, during the past twenty-five years to have as its presidents and general managers, or both, men of broad vision, who so far as I am able to learn have been and still are pioneers and progressive thinkers along these lines.

To those who have not experienced the personal contact that arises out of a well directed employees mutual benefit association, in which employer and employee are so amalgamated that the thought of differentiating the two never occurs to one, it is impossible to convey an intelligent idea of what that relationship is. You must know it and feel it and live it in the most intimate personal contact, in order to, in any measure, appreciate what it is.

The medical service is the first intimate contact between the employing agency and the employee. The man seeking employment is examined before he is employed. Only desirable risks are admitted to the close relationship. The commonwealth by its workmen's compensation laws and regulations has provided for the employee injured on duty. The medical service on the other hand takes care of the employee injured off duty or taken sick, either on or off duty and reaches out its beneficent work to include in the benefits the dependents of the employee under eighteen years of age.

The man who steps into the employment in which this service is provided, whether it is a public utility or a private corporation, is certainly receiving something that the vast number of employees in our industries in general know nothing about.

As the physicians and surgeons employed by a utility must for economic reasons be on a salary basis, the so-called "free choice of physician" which has been the stumbling block in all organized movements of this kind, is obviously an impossibility. It is a fair presumption that a large corporation would employ none but men of known ability and good standing in their community. No one who may receive these medical benefits, is obliged to avail himself of them. They are his for the asking. Should he prefer to exercise his "free choice of physician" he may do so, but he must pay for the special service himself. It is our experience after eight or nine years, that seldom do we find a mind so prejudiced that it desires to exclude the regularly appointed medical man of the association and substitute one or more of his own choice.

It is of course highly desirable for the economic administration of this work, that the membership as a whole should be satisfied with the service offered. A consultation is always possible between the particular man whose duty it is to respond to a call and the Chief Surgeon or one of his associates. This service is included free of charge, as are the laboratory facilities of the Company.

In case of accident under the workmen's compensation law there is no free choice, the regularly appointed surgeon of the Company takes care of the man under the compensation laws; and in Wisconsin the

Commission by its regulation, provides that the employing company shall provide medical service.

I merely cite this fact because in the inception of these mutual benefit associations, there is apt to be more or less organized opposition on the part of physicians in the community, to the formation of these mutual benefit associations, because of a fear that they may infringe upon their personal rights, as they construe them.

#### SERVICE SHOULD BE COMPREHENSIVE

I have suggested, that the service should be as comprehensive as possible, for the reason that when an employee comes for medical advice he should find a surgeon who is competent to take care of him. He may be a new man in the employ and a stranger in the community and when he seeks advice as a member of the association, it may be a question of life or death with him; therefore the service that is offered him should be so comprehensive, that if an emergency exists that service will protect him and see him through until he has recovered.

Of what possible value to a new man on the job and a stranger in the City is a diagnosis only, made in the company's offices of acute appendicitis, when the service that is to be rendered must stop there? Under many forms of medical relief this is all a man gets. He is advised to consult a surgeon and without knowing who is competent to treat him and with an acute abdominal pain, he goes home and calls in some local doctor who may be without the slightest experience, but who is willing to tackle the job at the expense of the man's life.

The only medical service worth taking up or worth considering for a moment is the medical service which makes the diagnosis of an acute appendicitis, immediately places the man in an ambulance, sends him to a hospital, follows him up, operates upon him, relieves him of his dangerous symptoms and within two hours at the most, places him safely on the road to recovery.

This is an extreme example, I know, but illustrates the point. I have no patience whatever with this semi-annual examination of employees by experts or others, which we are told will unearth latent diseases of which the man is not conscious. We know that beyond forty years of age, most men have some defects and many of them show these defects much earlier.

In a large organization the ordinary daily medical service afforded these men freely, will bring to light these conditions and they should be treated by the men who make the diagnosis, and these medical men should be regularly employed, either by the corporation or through a mutual benefit association, back of which stands the corporation as its financial backer. In no other way can you ever build up a successful medical organization. The relation between the employee and the doctor representing the employees' association, should be as intimate, as confidential, as personal and as thorough as the relation that should exist between any patient and any reputable doctor, whom he may consult.

## MEDICAL SERVICE OF A LARGE PUBLIC UTILITY

I have been asked many times just what this medical service is that The Milwaukee Electric Railway and Light Company and its Employees' Mutual Benefit Association furnishes. We furnish to the employee, his wife and his dependents under eighteen years of age, everything that he needs in a medical way, excepting the services of specialists in medicine, such as skin specialists, eye and ear specialists, etc. We confine his wife and we take care of the baby. If she needs a surgical operation, we remove her to the hospital and operate on her. The only charge to be met is the hospital service, which the employee must pay for himself.

We do not furnish medicines to the wives or dependents under eighteen years of age. We do furnish medicines to the employee who is a member of the Employees' Mutual Benefit Association. We furnish the medicines to the employee because we are anxious to keep him on the job and because we know that where preventive measures are taken in a beginning illness, that in a large percentage of the cases the illness or disease will be promptly arrested.

In order that these services shall be rendered to the fullest extent and with the least possible loss of working time to the members, we place a doctor at some convenient hour in each one of our car stations, our car shops, and our central office building, where they may be freely consulted. At the Chief Surgeon's office in the central office building, we have laboratories, X-ray and chemical, where examinations of special character can be made. The doctors forming our personnel have been selected because of special training along definite lines and to them are referred cases in which their training makes them experts. All doubtful cases that can do so, are sent to the central office building for consultation.

The City of Milwaukee is divided into districts and each district has its own medical man. We do not permit the calling of a physician in a district other than the one in which the patient resides, except for special reasons. Outside the City of Milwaukee where the Company has large activities, we again adopt the district system, and in remote places the member selects his own physician, pays his bill, presents it to the Mutual Benefit Association and he is reimbursed for the expenditure. We do not pay hospital fees. Experience has shown that working people frequently are extravagant in the selection of accommodations in hospitals and the hospitals only too frequently encourage them in this extravagance. The only way that a corporation could offer hospital service to its employees is for the corporation to run the hospital and assign to the employee quarters which in the opinion of the attending surgeon are ample and proper for the service to be performed. Many of the large railroads have such hospitals.

## MEMBERS OF EMPLOYEES' FAMILIES TREATED GRATIS

The medical and surgical service rendered is so comprehensive that nothing which would endanger life is omitted from that service. Acute

as well as chronic ailments are treated to the fullest extent, whether medical or surgical. For this service no charge whatever is made and so far as the surgical service is concerned, it is not furnished by the Mutual Benefit Association, but is furnished by the Company itself.

The wife of the employee, who may have suffered injury at the time of her confinement, is restored to health by appropriate surgery. The baby that is born is cared for by our visiting nurses and everything pertaining to its welfare is taught to the young mother. If need be it is circumcised; later on its tonsils and adenoids are removed and the many and perplexing diseases of childhood are cared for by our medical service. When the child becomes eighteen years of age, we render no further services.

The many accidents that befall children and require surgical attention are cared for by our medical service up to the age of eighteen. Our X-ray laboratories and our surgical service are available at all times. We have visiting nurses who are graduates of reputable hospitals, who go from house to house as they are invited. We have a trained surgical nurse in our central office building where we have a well equipped operating room, which is available for the treatment of minor surgical emergencies.

#### BENEFITS TO EMPLOYEES

The employee injured off duty is likewise covered by all these facilities, for which no charge whatever is made to the employee or his dependents. We do not go into the homes of our members unless we are invited. We propose and offer to them nothing but the best medical and surgical service we are able to procure in our community and if a study were made of our annual report, it would be seen that practically every known operation is performed in the course of a year on this large clientele, which at the present writing, including the members and its dependents, numbers 12,000 souls.

The medical service thus rendered is not only curative in its nature, but in the higher sense preventive, and many ills that befall those who cannot avail themselves of such a service and that incapacitate them for service, are in a large measure prevented in our own groups by this intensive service. The man is kept on the job. Our statistics show a consistent reduction year by year of the average disability of nine days per man per year lost time, to a little over four days per man per year, notwithstanding various epidemics that in recent years have resulted in such great morbidity.

By improving the general health through this medical service, we keep the man contented with his work: his family life is very greatly improved; his average expense for medical service is reduced to the minimum and his efficiency is so greatly improved that he may be in his daily work compared with the well-trained soldier, whose hygienic life and welfare from the moment of his enlistment, is equally safeguarded, by the well-trained medical service provided by his Government.

**CHAIRMAN MACLACHLAN:** This section is to be congratulated upon having such a paper presented to it. Many of us have investigated various medical services, but I have yet to hear of one that will compare to that under Dr. Lemon's charge. This is a subject that I think the Public Utilities Section has not investigated as thoroughly as it should, and for that reason we haven't reaped the benefits of medical service in public utilities.

**DISCUSSION**

**MR. C. B. HARDIN:** I should like to ask Dr. Lemon a question. Are you as chief surgeon and all of your assistants paid by the company or by the mutual benefit association?

**DR. C. H. LEMON:** The chief surgeon and two of his assistants are paid by the company; all of the other payments are made by the mutual benefit association.

**MR. C. B. HARDIN:** Do you render assistance to those employees of your company who are not members of the mutual benefit association?

Do you allow the members of your association to call the division doctor direct, or do they have to communicate with their superintendents before the doctor is sent to their houses?

Is there any objection on the part of your employees to your sending nurses into their homes?

**MR. WILLIAM FOSTER:** I understood the doctor to say that the service has taken care of 12,000 people. I would like to know the number of physicians carried and I would also like to know if the doctor has any record of labor turnover since the introduction of this medical service department.

**MR. J. F. NAYLON** (New York Telephone Co., Newark, N. J.): The doctor spoke of his disbelief in the semi-annual examination of his employees. That is a subject that I think might well be discussed for the reason that our company has greatly improved the physical being of the employees with the semi-annual examination and have found a great many diseases that probably would not have been found in any other way.

Where does the money come from to keep up this splendid, comprehensive service that they give? It must cost a tremendous amount of money and I wonder where it comes from. A public utility usually doesn't have much money.

**MR. J. C. MARTIN:** In the construction camp work, particularly where camp conditions are likely to be bad at times, my experience is that if the physician does nothing more than maintain proper sanitary conditions in the camp, he is worthy of his cost. I have known cases where, without proper camp sanitation, the construction gang has gone to pieces.

**CHAIRMAN MACLACHLAN:** Dr. Lemon, will you close the discussion?

**DR. C. H. LEMON:** In answer to the question about services being rendered to employees who are not members of the association, that suggestion is a little bit of a joke. With us the Employees' Mutual Benefit Association is the employment agency of the company. We have a closed

shop from the inside out. The Employees' Mutual Benefit Association does not hire anybody who isn't going to be a member and, therefore, we have no non-members of the association.

In answering the question, "Do we allow the members to call the doctor or must the order come through the superintendent?" the order is that it must come through the superintendent, but we do allow them to call the doctor direct in cases of emergency. The employees learn to know the doctors pretty well, and if we would allow them to call the doctor direct, such calls would become the doctor's private practice. The rule is that the call must come through the superintendent.

Another reason for the rule is that I anticipated that some of the members of the association who paid fifty cents a month might feel that they had the doctor under their thumb, and no matter what time of the night they were sick, they would feel at liberty to call him out of bed. So we established the rule that all calls made before noon must be made before nine o'clock in the morning and that all calls made in the evening must be in before five o'clock in the evening, and no calls would be made after seven o'clock except in cases of emergency.

Do we find objection to nurses being sent to the home? No, because we don't send them into the homes, nor do we send the doctor, unless they are invited.

How many employees have we and what is the labor turnover? Four thousand employees; with their dependents, 12,000. The labor turnover has been as low, or lower here than almost any other place in the country.

This mutual benefit association has other things besides medical service. It has the building and loan association and many other activities.

As to the semi-annual examinations, I put that in my paper because I knew somebody would say something about it. There are a lot of places where they cannot afford to have a doctor all the year around and, perhaps, in such plants the semi-annual examination is desirable. But, if a doctor is on the job, and the man is coming month after month, I don't think it will be very long before the doctor gets a line on him. We find that these hidden diseases are unearthed months before they would be by this semi-annual examination. If you can't have the weekly or even monthly examination, then the semi-annual plan is a good thing, but the man who keeps coming and does not feel just right will be steered up against that X-ray machine, or one of these experts we have in our organization, and we are able to tell the man promptly what the trouble is and suggest the remedy.

To illustrate that, one of the heads of a department, a most valuable man, had not been feeling well for some time, and one evening he dropped in along about five o'clock and said, "Doctor, you know I have to sit in my office for half an hour after the business is over to pull myself together so that I can get strength enough to go home." I looked at him and I saw that this man's eyes were very bloodshot and sitting out of his head somewhat and he certainly looked the part he described.

"Good deal out of order?" "Yes!" "Sweet taste in the mouth?" "Yes!"



"Don't sleep well nights?" "No!" And I examined his urine and found that it contained 6 per cent sugar.

Supposing this man had to wait six months for that expert to come around? Where would he be? I laid down the plan that he was to follow, and from that day to this—six months—we have examined him frequently and he has never had one particle of sugar in his urine.

It's simply the persistent medical service with the man who is willing to co-operate with you that brings results. Now, if this man had not had that service and if he had waited for the semi-annual examination, he would have disclosed a badly developed case.

CHAIRMAN MACLACHLAN: I want to thank you very much for giving this paper. I think it's a thing we should study and I know it will be of great value to the Public Utilities Section.

I will now call on Dr. E. George Payne to give his paper on "Utility Accidents to the Public Prevented Through School Safety Education".

#### UTILITY ACCIDENTS TO THE PUBLIC PREVENTED THROUGH SCHOOL SAFETY INSTRUCTION

DR. E. GEORGE PAYNE, PRINCIPAL, HARRIS TEACHERS' COLLEGE, ST LOUIS.

The newness of the plan for the reduction of accidents through school instruction requires a careful study of its methods and results in order to make a case for or against the plan. There is no better way to do this than to submit to careful scrutiny the methods and results in so far as public utility accidents are concerned.

The problem of utility accidents is subordinate to that of public accidents and therefore submits to the same kind of treatment. Both problems appear upon examination comparatively simple.

There are only a limited number of situations in which accidents happen to the public, perhaps thirty in all. The situations in which accidents are possible from public utilities are much more limited.

Of the one hundred thirty-seven children, five to sixteen years, of elementary school age in St. Louis in the years 1917, 1918, and 1919, that were killed in public accidents, forty of the deaths were caused by public utilities; that is, railroads, street cars, and electric lighting and power companies. The remarkable thing about these forty deaths and perhaps a thousand accidents from the same causes not resulting fatally during this period is that there are only four situations in which they occurred as follows: first, from stealing rides on street cars; second, from running into the streets while playing and being struck by street cars; third, from contact with live wires, generally from grasping dangling wires; fourth, from playing on railroad tracks. The accidents not resulting fatally were due to the same causes.

Note now, the conditions under which these accidents occurred. In the case of every accident, more than one thousand in all, including the forty which resulted in death, the children were out of the direct control of all those who are accustomed to exercise authority over them

in the city; that is, teachers, parents, and policemen. Furthermore, these accidents occurred under conditions when it would have been impossible for control to have been exercised directly. The accidents occurred while children were running errands, going to or from school, or playing in the streets in congested districts where play space is not available.

#### AN EDUCATIONAL PROBLEM

From this foregoing presentation, it is evident that the problem is an educational one and very simple. It is educational because the controls of the behavior of children must be exercised by forces within themselves, and the development of these is always a matter of education. Stated specifically, it is the development of habits, knowledge, and attitudes toward four specific situations, so that children will possess as a result of this education controls within themselves that will protect them against the dangers to which they are exposed. The significant point of the whole matter is that the control has to be developed within the child and that is an educational problem, whether the education is carried on by the teacher, parent, policemen, or other children. It is really a matter of self control, and self control is a matter of education in the final analysis.

The problem of interest to every one concerned with public accidents, and this particular group with utility accidents, is to determine how controls in children may be developed with reference to these situations. I am leaving out of account at this point the accidents that happened to adults, because that is a totally different problem that time will not permit me to discuss here, except to say that thorough knowledge, adequate points of view, and specific habits in children with reference to the situations in question are conveyed economically and effectively to the parents in the home. There is no more successful way of getting parents to observe safety rules than to arouse the interest and enthusiasm of children in safety. But our point here is how we may develop controls in children themselves, for if the children are taken care of at the present, it is only a matter of a short time until the whole population will be educated, for the children themselves are becoming very rapidly the adults of society.

#### SCHOOLS SHOULD INSTRUCT CHILDREN IN SAFETY

The development of controls, moreover, is primarily the function of school education. To be sure, it has been the practice in the past for parents to give the instruction to children concerning safety, but the machinery of present-day society has become so complex that the average parent does not know what is necessary for safety. Every person who has looked into the matter of street accidents, for instance, is perfectly aware of the danger of crossing in the middle of the streets or at other places than at designated crossings. Every person who has studied the problem of accident prevention knows how necessary it is to look in both directions in crossing the street, but one needs only to present these points of view to the average citizen to see how completely ignorant he

is of the danger of doing these very things which are recognized by the tutored as so seriously dangerous. The average citizen will tell you that it is nonsense to walk one hundred yards to cross at a designated point when you can go directly across the street and save time.

With this attitude of mind on the part of parents, it is obvious that they would not be effective teachers of children in the observance of safety methods. Furthermore, every one is quite aware of the inability of policemen to patrol the streets in any adequate fashion or to teach children to cross at crossings. It is, therefore, necessary for the teacher and school to perform this very important work if it is to be done.

Then the question we have before us is how the teacher may develop in children the controls necessary for their safety, virtually with reference to the four situations mentioned above. In answer to this question, we need but to look at the controls exercised in society to get our answer. When you come to analyze the behavior of individuals, you see how their conduct is shaped at every turn by social forces which lie outside of themselves, or rather by the individual's attitude toward his fellows and toward the community of which he is a part. It is the community opinion and one's sensitiveness to it that counts in the development of controls in the individual. This is just as true among school children as it is in an adult community.

Having in mind the method of social control, the problem of educating children against these four dangerous situations in which utility accidents occur is exceedingly simple. First, the children themselves must become conscious of the dangerous situations and ways of avoiding them, and second, there must be developed a community spirit with reference to accidents themselves. The method by which these results are achieved are exactly the methods used constantly in schoolroom instruction, and I do not need to dwell here upon this point.

#### HOW TO TEACH CHILDREN SAFETY

However, it would be well to recall just what the process is. First, it is a matter of direct instruction. This is done most effectively in connection with the regular subjects rather than as a specific task in addition to the curriculum. Second, dramatization. There is no field that lends itself more effectively to dramatization than that of accident prevention. There is scarcely an accident situation that does not give opportunity for dramatization and that does not make a direct appeal to the instinctive tendencies and acquired experiences of the child. The fundamental point is that accidents are directly connected with a group of instincts which tend toward the preservation of the life of the individual, and when you touch these instincts, you come in contact with the most fundamental nature of the child. Therefore, there is never a question of intense interest, there is never difficulty in securing motive, and there is no possibility of unreality. In the second place, accident situations are within the experiences of the child.

The most serious difficulty in school instruction is to find material that comes within the child's experiences. It really requires an artist as a

teacher to bring the subject matter of the curriculum to the child in such a way that it will touch his experiences so that the material of instruction will be comprehensible. Accident situations afford invaluable help in this respect because the accidents occur upon the streets and in the home, and the child is familiar with them. This is particularly true of utility accidents. In addition to this, the literature dealing with accidents is genuinely real. It consists of vivid posters, drawings, and newspaper and magazine descriptions. This material is not only within reach of the child, but it is the most real and vital to him because it is the kind of reading matter with which he has come into contact since his earliest childhood. Therefore, dramatization may not only be used and used effectively, but it serves to give reality and point to instruction in the various subjects of the curriculum, a matter that cannot be over emphasized from the school point of view. Fortunately, the interest of the school and the teacher in this respect coincides with the interests of business men and the community generally.

The third respect in which the children may become conscious of accident situations and of their relationship to the problem of accident prevention is through the school organization. This is a means that we have long neglected in our school keeping.

#### CHILDREN'S SAFETY COMMITTEES

For the past two and one-half years, I have been meeting each week with the executive committee of the Mississippi Valley Division of the National Safety Council, and for nearly that time, I have been meeting monthly with the public division of this committee. There are perhaps twenty other persons who have been as faithful as I have in sticking to this one problem during the period. These meetings have all been in the interest of the conservation of human life. This fact is not unusual and may be duplicated in almost any community with numerous social groups.

It does not, however, seem to have occurred to school people that children might be more or less permanently interested in the same type of problems to which these adults have given so much time and attention, at great sacrifice and expense. It is a fact, nevertheless, that they are interested, and when children once organize under school direction to deal with the problems of accidents, they are approaching a very natural social group and the functions of this social group are not unlike those with which adults deal. It is no wonder then that children will meet from week to week, plan ways of preventing accidents in the schools and in the community environment and then go out and rigidly carry out the decisions agreed upon in these meetings. Furthermore, it is not surprising that the children, like adults, enter enthusiastically and wholeheartedly into the work of making their school and community safe from accidents.

I have in mind an incident that illustrates vividly what I have just said. In one of the schools composed almost entirely of foreigners, the principals and teachers formed, last year, a school safety organization. The

children organized themselves to carry on the work of accident prevention in their community. They determined what was necessary to secure the safety of the school population, assigned members to perform the various duties in connection with its safety, and then each member fulfilled the office to which he was assigned.

As the children were guarding the streets when the school was dismissed, a young Greek child of eight years crossed in the middle of the street at a dangerous point. The pupil in charge apprehended him and tried to explain why he should not cross in the middle of the street. The little Greek boy, not able to understand, fought the pupil for interfering. The safety boy, not deterred from his purpose, led the other back to his teacher only to find that the Greek boy understood English very little. The teacher sent for a larger boy who spoke Greek. He explained to the youngster the purpose of the organization, and the Greek boy asked to be put upon the safety committee and became one of the best boosters, not only in the school, but throughout the community among the adult and child population. Why? Simply because children, as well as adults, are interested in the conservation of human life, and when they are once faced with the problem of accident prevention, they are perfectly capable of organizing and carrying out the work effectively.

From the educational point of view, an important value of this function must not be overlooked and that is the value that comes to children from becoming interested and participating in such an important activity as the saving of human life. Furthermore, it is true that the interest of children is also one of the most effective means of converting adults, fathers and mothers of the children, to the ideals of safety. I could not pass over this part of the discussion without noting the practical outcome of this instruction so far as it has gone in St. Louis.

#### RESULTS ACCOMPLISHED IN ST. LOUIS

There has been in St. Louis about an average of fifty deaths among school children between five and sixteen years each year for some time, with a constantly increasing number from year to year. The work of safety was begun in St. Louis schools the latter part of 1919. In the first eight months of the year 1920, we had sixteen deaths among children between five and sixteen years as opposed to thirty-five for the corresponding period of last year. This result was achieved in spite of the fact that the conditions for accidents have increased and become more complex. Of these sixteen deaths, our Superintendent stated a few days ago that if no other result had been achieved during these eight months of school than to save nineteen lives, the effort would have been worth the cost of carrying on the schools for the year.

It is interesting in this connection to note that we have had only one death from a public utility, a street railway accident, in the first eight months of 1920 as opposed to twelve for the whole year of 1919, and nine for the first eight months of that year. This, moreover, is the first decline in utility accidents to children over a number of years.

I have sketched the problem, method, and results of accident preven-

tion through the schools, but it is equally significant to note here the preliminary work that is necessary in any city to the successful reduction of utility accidents through school instruction. The preliminary work necessary is an adequate analysis of accident statistics. This analysis has been made of all the accidents occurring to school children from the time they leave home in the morning until they reach home again in the afternoon. Time will not permit a presentation of the complete data. A few conclusions are however pertinent. First, the accidents tend to center in certain districts, reaching as high as one per cent of the school population in one school community, with forty-eight of the school districts with no accident in them. Second, there is no relation between the accident opportunity—that is, dangers to be avoided—and the accident frequency. The fact is the largest number of accidents occurred in the high school most favorably situated and with fewest dangers. Third, while no fatalities to children occurred during the school day, the fatalities to children outside of school center themselves just as do non-fatal accidents. Fourth, the cause of accidents is an unfavorable attitude of mind, that is carelessness. Fifth, this attitude of mind is common to the community, as well as to the school children, for the high per cent of accident in the school corresponds to that outside of school. Sixth, the cure for carelessness is education, for that is the only means of changing mental attitudes. What school education can do has already been pointed out in statistics presented.

CHAIRMAN MACLACHLAN: You have heard this admirable paper of Dr. Payne's. We have all heard him before and look forward to the time when we may hear him again, particularly with relation to public utility accidents. We have very little time to give to the discussion of this important question but I think Dr. Payne possibly has answered most of the questions in presenting his paper. It is a subject we are all interested in, and we always look forward to hearing the doctor at these various national congresses.

#### DISCUSSION

Mr. J. B. DOUGLAS: Knowing something of the success of accident prevention weeks, I would suggest that the Public Utilities Section conduct such a drive among its members and other public utilities annually in the month of May.

CHAIRMAN MACLACHLAN: I would say that the suggestion can be carried out by our Section advantageously to all public utilities, and I shall be glad to refer the matter to the incoming administration of our Section.

I will now call on Mr. Foster of the Philadelphia Electric Company to present his paper on "Fixing the Responsibility and Penalizing Those Responsible for Accidents and Awarding Those Showing Meritorious Action in Time of Accident". You will remember that this paper was prepared particularly for this section, due to the instructions of a resolution passed last year to have a paper prepared and presented on the subject, so you could discuss it.

**FIXING THE RESPONSIBILITY AND PENALIZING THOSE  
RESPONSIBLE FOR ACCIDENTS AND REWARDING  
THOSE SHOWING ACTIVITY IN TIME OF  
ACCIDENTS**

**WILLIAM FOSTER, PHILADELPHIA ELECTRIC COMPANY, PHILADELPHIA, PA.**

In investigating the causes of accidents and fixing the responsibility therefor, many problems of a complex nature present themselves to the investigator, and it is his duty to weigh each factor separately and impartially and amalgamate them in a decision which will be based solely on the facts.

That accidents do occur, and with too great frequency, none will deny, and that some one is responsible for them there can be no question. It may be the individual who performs the work, or it may be the foreman who has immediate charge of the individual, or it may be the management who has charge of the foreman. Some one is responsible, and that responsibility should be definite.

In these days of scientific and efficient management, accidents should be on the decrease. But are they? Statistics compiled by the various state authorities indicate that they are not decreasing as rapidly as they should when one considers the effort spent by organizations of this type and the amount of money spent in accident prevention and welfare work throughout the country.

It is true that our industrial progress is marked by the increasing substitution of mechanical for manual labor, and it is well that progress continues along this line. This will not result as some have shortsightedly concluded in the elimination of man as the most important factor in industry, for that can never be, the mission of the machine is rather the multiplication of man's productive powers and the elimination only of the drudgery in work, and the more men that are required in connection with machines, the greater is the necessity for securing their full effort.

**SPECIALIZING IN MEN**

You can buy a man's perfunctory service, but his full-hearted co-operation in your business you must win. You must make him feel that his best welfare is your genuine concern. You must, in short, specialize in men as well as in products if you would achieve success in the management of men and business. It is this specializing in men to which we want to devote our attention for a moment. In these days when safety first is so firmly established, none will gainsay that consideration of human welfare requires that working conditions be as safe and healthful as possible. Yet, until the advent of compensatory legislation and country-wide agitation in behalf of organized safety work, accidents were quite generally regarded as a necessary part of industry, and the risk chiefly of the employed.

Now that the burden has been placed where it rightly belongs, on the industry itself, the interesting discovery has been made: That not only

are most accidents preventable, but that systematic prevention work is highly profitable; in fact is proving to be the handmaid of efficiency and the accident record is becoming a good index of managerial ability.

After a management has expended large sums of money for safety education and appliances, it has a right to demand from its employees a full and hearty co-operation in accident prevention. The adoption of a policy fixing the responsibility for accidents and penalizing those responsible, and rewarding those performing meritorious safety work is of primary importance in securing this co-operation.

The simplest and most practical application of human effort is a military organization. The units are selected on a basis of physical and mental characteristics and are taught, to a high degree, co-ordination of effort. The army that co-ordinates the largest number of units is invariably the most successful because the most efficient. The question of authority, and obviously responsibility, is however definitely determined by the very nature of its organization and admits of no question among those invested with it.

#### PURPOSE OF DISCIPLINE

Modern industrial organizations are probably more complex than military organizations. Manufactories devoted to a single line of products exhibit the best efficiency and are the least difficult to operate, those manufacturing diversified lines presenting problems peculiar to themselves; but the necessity of perfection of organization is ever present and as every one knows the basis of all military organizations is discipline, so discipline should enter very largely into our commercial and industrial life.

"Discipline," said Miss Ida Tarbell in one of her addresses, "is nothing else but training yourself and others to do in the best possible way the thing you have to do, to learn what that thing is and *then to hold yourself to that*" or as another well known writer has defined it: "A complete elimination of personal preferences, prejudices, and opinions and a complete co-operation with authority."

Americans do not like discipline. The laborer doesn't like it. The manager doesn't like it. The proprietor doesn't like it. They think it interferes with individuality. I personally believe we are beginning to realize that we pay too great a price for the individuality which we prize so highly and which is not true individuality after all.

In a commercial organization discipline arises from the fact that every man unconsciously feels there is an eye on him, not necessarily an unfriendly, unkindly eye, but just an attentive look in his direction. It may contain a smile, it may contain a reproof, a glare, but it must be an eye, an all-seeing eye, that is felt in all parts.

The part that discipline plays in an efficiently conducted business is educative. It educates the employee to do the work safely and without waste. It develops power from strength as the trained athlete is made from a clod-hopper. It makes clear thinking from muddy dreaming. Good discipline does not rest on any frail foundation of lip service, but depends



on two things which managers of men must gain and foster and which no subordinate can give unless he has them: viz., enthusiasm for the cause and confidence in those in authority.

#### TWO KINDS OF DISCIPLINE

As I know it there are two classes of discipline adaptable to our commercial and productive business life:

First. Discipline by indirection.

Second. Discipline by deflection.

Discipline by indirection is illustrated by placing a man in an atmosphere where he can do his work only in the right way because it will be the easiest way to do it. It is like placing a recruit in the middle of a veteran company in close formation. If he does not keep step, the man behind him is going to walk on his heels, the man along-side will jostle him and he will walk on the heels of the man in front. Necessarily he will keep in step.

Discipline by deflection is best shown by the following example, where every effort had been made to reduce accidents to a negligible quantity:

Instructions had been issued, discipline by indirection had been tried and yet to no avail, and finally the group of men were divided into teams of 5 men each. A large blackboard was put up at the end of a room where all could plainly see it, on which appeared the names of the men comprising the crews and each morning an inspector listed the score each crew had made the day before. At the end of 3 or 4 weeks, promotions were awarded and increases of pay given to those who showed satisfactory improvement. In a short time over 40 per cent of the accidents had been cut out.

Suppose the discipline by deflection fails because the person deliberately decided to take a by path: an "I'll do as I please path," knowing all the while it was against the rules, wishes, and even good of the organization. Place before that man the error to which his road is leading him: show him what others are getting by taking the right path, and what he will get by going the path he is pursuing. This will require that you have in facts and figures what the results are. Place before him for comparison what he accomplishes and what those who are following the better road are accomplishing, and if necessary, show him the inevitable end of the pursuit of his policy—separation of himself from the position he occupies. Self-interest will invariably bring him into the right road.

In too many organizations good results are taken as a matter of course, only inferior service is given special attention. Both should receive attention and the meritorious service should be conspicuously enlarged upon so that every one may know of it.

#### PROPER DISCIPLINE BUILDS INITIATIVE

We have learned that it is far more productive of good results to call men up than to call them down. It is more profitable to prevent accidents than to correct them.

It is being realized more and more every day that there is a duty of the superior to instruct the inferior as well as a duty of suggestion to the superior by the inferior. In accident prevention work it is realized that this duty of the superior to the inferior is very much larger, both in scope and quality, tension and social value, than the duty of the inferior to the superior. It is certainly vastly easier to instill loyalty to the cause of Safety First when we indicate to the inferior that the rules of discipline laid down for him are for his benefit and this benefit appears as soon as the spiritual, physical, and mental powers are increased.

Discipline, however, that drives out the desire to make good and reduces the employee to an automatic machine warns us that ignorance is in the saddle. Such discipline is productive of much harm and should have no place in the body economic. There are four factors which prevent the development of discipline in a force or an individuality:

1. Failure to set an example of observance of the rules of Safety.
2. Failure to make it physically easy to do the work expected.
3. Failure to see the end from the beginning of the rules you make.
4. Failure to capitalize the enthusiasm which you arouse in your organization.

A wise philosopher once said: "Under any given condition, that thing is right for the individual to do which would be right if everybody did it." That is a good thought and has a right place in safety work.

If you cannot tell a man what to do and how to do it, tell him how he can find out. If you can't tell him how he can find out, ask somebody inside or outside the organization, who can give you the information.

The disciplined mind says: "Do it, no condition will thwart me." And such a mind naturally proceeds to find out because it never occurs to disciplined intelligence to consider a thing hopeless unless it knows it to be.

Discipline is the heart and soul of efficiency. If a man would be free in his work to do the best thing that can be done, he must have a sense of responsibility. He must be responsible for the amount of work produced, the character of work, and for the safety of those under his jurisdiction. He must have the sense of co-operation for no man can do effective safety work alone.

#### FOUR TYPES OF ACCIDENTS

In safety work, as in every other line of human endeavor, the frailties of human nature are ever present and these frailties, together with the taking of unnecessary chances, are responsible for a very large number of avoidable accidents. The accidents occurring in a Public Utility Company, such as the writer is connected with, can be classified under four general headings:

- Accidents to Employees
- Accidents to Non-Employees
- Accidents to Company's Property
- Accidents to Public Property

All accidents are reported in full at the time or immediately after occurring and are fully investigated, statements being obtained from all witnesses present, or those having any knowledge of the details. Responsibility can then be placed where it belongs.

The investigating of an accident to an employee is made by the head of the department or division to which he belongs, assisted by the safety engineer or his representative, and consists, as mentioned above, of obtaining statements of fellow employees and from the injured person, together with the report of the foreman in charge.

The investigation of an accident to a non-employee is along the same general lines as above indicated, except that all statements made by the injured party are obtained by the Claim Department and copies forwarded to the division head for comparison with statements obtained by him.

The investigation of accidents to company property, as well as public property, takes the form of a full report by the foreman, personal statements of all witnesses, their names and addresses obtained and forwarded to the Claim Department.

All modern safety guards should be submitted to the foreman responsible for their use and those approved should be furnished to employees and the foremen held responsible for their being kept in good condition and being used when necessary.

There is a decided tendency on the part of some employees, either through a desire to show off to their fellow-workmen or lack of interest in safety work in general, to avoid the use of safety appliances and this is where the foreman should step in and either insist on the appliance being used or penalize the man refusing to use it. Foolhardiness on the part of workmen should not be tolerated.

For instance, there have been cases where men working on live wires refused to use rubber gloves because they made their hands perspire in warm weather or made their fingers cold in cold weather and took chances using a pair of cheap cotton gloves without any insulating value. Such foolish chance-taking workers are in every industry and the chance taken not only jeopardizes the worker's own life but the lives of others. The day is fast approaching when there will be no room for such indifference for safety in our industrial life, as science has reached a point where things can be determined with such exactness that chance-taking with men's lives and limbs is absolutely unnecessary.

#### SELECTING SAFE EMPLOYEES

At the present time when a man is employed, his word is usually taken as to his ability. If he appears to be competent, he usually secures work, but to place a man properly the following factors should be considered:

First. What has been the Environment of the applicant

Second. What has been the Training of the applicant

Third. What are the applicant's ideals, ambitions, and expectations

The first, in order to obtain some information of his early life and associates together with his method of spending his spare time.

Second, in order to determine his fitness for the occupation he seeks;

his aptitude for the work, his dexterity in the handling of tools required in the position to which he aspires.

Third, this is a factor which will determine very largely his future when employed and will indicate the lines along which he should be encouraged.

The task of getting the right man for the right place is the most important employment problem confronting us today and it can only be solved by close application to the task. It is failure of this very important function that constitutes one of the causes of so many accidents today and it is an endeavor to correct it that has prompted the necessity for using not only corrective but punitive measures in accident prevention.

Should a man who has been provided with proper safeguards and neglected to use them be permitted to continue in an organization that is striving for safety perfection, or should such a man be punished or dismissed for his neglect that it may stand out as a warning to others and through this warning tend to prevent similar accidents by other employees? The writer believes that the time has arrived, or is rapidly approaching, when a man's productive record will read "Safe Productive Record" and he will be valued by this record as much if not more than by the productive record only.

If accidents are a tax on production and all scientific management is based on economy of production, we should give as much consideration to the tax as we do to the production.

Man is more or less a creature of environment and requires discipline of some form whether it be by moral, social, or religious laws.

#### NO SAFETY PERFECTION WITHOUT DISCIPLINE

In industry we require discipline, be it in the form of prevention, correction or punitive action, and we cannot hope to obtain safety perfection without such discipline.

Rules should be fair, clear, and well meaning and enforced. Too often we see boards thrown around store yard with nails protruding upward, articles placed on stairways that should be kept clear, ladders being used when they should be in the repair shop and many other accident producers and yet when an accident occurs and an investigation is made, no one can be found who is directly responsible for such infraction of safety rules.

Such conditions indicate a lack of discipline, for had discipline been well enforced, no man would lay a board down with the nails protruding upward or would have placed articles on a stairway for his fellow workmen to trip over for fear of the disciplinary measures his act would bring forth.

Temporizing with conditions of this kind will bring its harvest of indifference toward safety work on the part of workmen and this we cannot and should not tolerate.

"Accidents can be prevented and will be prevented" is a slogan adopted by one of our men (although not officially approved) who proceeded to

give one of his fellow employees a severe thrashing for violating one of our safety rules.

In fixing the responsibility for accidents and penalizing those responsible, we have been forced from time to time to resort to measures that have resulted in demotions, sometimes for periods extending for a year or more with the understanding that if during the period of demotion the man produces a clear record, he would be restored to his former position when a vacancy occurred and in all cases the result has justified the action.

Where an Employees' Beneficial Association is maintained to take care of accidents, an effective method of penalizing an employee who has become indifferent to safety is to notify him that he is too great a risk for the Association and that his membership has been cancelled and that he cannot be reinstated until he shows active interest in safety promotion.

#### PENALTIES FOR NEGLIGENCE

In some cases we have been obliged to punish foremen when their negligence was very evident by obliging them to lose a period of time equal to the time the injured person was under compensation.

It is true we have lost to our employ a few men through punishment of this kind, but the news of what happened has had a salutary effect on those remaining and it was immediately disseminated among new men.

We are quite well aware that there are those who will not agree with us that a policy of penalizing is justifiable, but this method exists in all military and naval services and those who are responsible for accidents and failure to perform duty know well that they must appear before a Court of Inquiry when the fixing of blame and the penalizing of the person responsible under the rules of the service is effected. Penalties vary with the degree of carelessness and the damage wrought and it extends from a mild form of reprimand to dishonorable discharge from the service.

Why should there be any difference in the administering of the safe operation policies of industry when the same life and property losses are involved?

In rewarding men showing special activity in time of accident, in every case a personal letter of commendation is forwarded to the man and a copy forwarded each crew foreman who is instructed to read it to the men comprising his crew when they assemble at starting time or assemble for lunch. It is also good practice, in addition to the personal letter referred to, to recognize with some material token such employees as have rendered special service in rescue work. This token or reward should be of value in proportion to the importance of the service rendered. Recognition of this character serves as an incentive for men to familiarize themselves thoroughly with safety methods and to be constantly on the alert and become generally interested in the subject of accident prevention.

This method can be elaborated upon by giving a wide circulation to the

facts through a company organ if they have one or by posting a notice in a conspicuous place in the building.

#### REWARDS FOR MERITORIOUS ACTION

Right or wrong, men work for and appreciate rewards. That reward may lie in the honor of being called the best man in the organization. It may be in the satisfaction of an inner ideal, when a man knows he is listed as a hero. It may be for the purpose of obtaining a well filled purse or the hope of promotion to a higher position, but the hope of reward is generally there. I do not mean to infer that men will not rise to great occasions unless the hope of reward is dangled before their eyes like the proverbial "handful of hay before the nose of the donkey", but I do believe that the hope of reward is a great incentive toward heroic action in time of accident and if the hope does not arise beforehand, there is always a certain expectancy of it afterward. In these days of compensation awards and beneficial association payments, both of which are admirable and should be highly appreciated by all; yet in order to win the advantage they hold out, one must become a victim of circumstances. Whereas the efficient careful worker who is not a drain on the resources of a business but distinctly an asset, receives nothing but his wages as his reward.

Of course no man injures himself intentionally, but a great many do so needlessly and it is these we are most anxious to correct. Just as every industry has its own problem of management so it has its own problem of fixing the responsibility and rewarding those showing activity in time of accidents, and no doubt they can work out their own methods in their own way better than a person who is not familiar with the many complex questions extending into the matter. So we come to the conclusion that any system which hopes to keep a man at his top efficiency either in production or safety must be prepared to see that the reward which should come to him shall be commensurate with the acts performed.

In life, as it is, loyalty must be rewarded with loyalty and sympathy and co-operation. Punctuality and continuous service in all modern organizations are rewarded with body comforts and ease when the body has lost its vigor, and so should special safety acts be rewarded as best befits the effort put forth to promote the habit, correct the evil, or alleviate the suffering of the injured.

Ideas, methods, and suggestions for safety should be rewarded by opportunities for educational or other advantages.

No organization can afford to be less careful of the reward for the safe worker than it is of the reward for its own efforts, for taking and not giving is a doctrine of the past. Taking and not giving has put a world in arms and has brought abysmal woe to the Nations of the Earth. Taking and not giving shortens the lives of the drones in every hive, for nature demands her price—a compensation for everything—and it is the veriest truism to say that she will be paid.

**CHAIRMAN MACLACHLAN:** You have heard a paper that comes into the work of everyone here. You know, as well as I do, when you talk to a foreman or superintendent regarding a man who is careless and tell him to reprimand that man, you get the answer, "He's a good man and we have got to keep him". We know the result of keeping some of these good men that are careless, and I would like to hear a very thorough discussion on this paper.

**DISCUSSION**

**MR. J. B. DOUGLAS:** Having heard the subject brought up and discussed along rather unusual lines last year, at which time there arose quite some difference in opinion in the question of disciplining employees, I didn't know just what turn Mr. Foster's paper would take, and I was certainly very much pleased to find that it was most reasonable in every respect.

A number of employes have, of course, been discharged. During the last two or three years the habit has been to retain certain men that otherwise would not have been retained, due to labor conditions, but one or two concerns with which I am acquainted have claimed that they would discharge a man instantly if he were guilty of neglect of duty, and I have often wondered just how they did it and maintained their organizations intact. I thought that it might be interesting to get the viewpoint of two department heads in our work at Philadelphia, and with that end in view I brought comments with me from our engineer of manufacturing and our engineer of distribution, the engineer of distribution having to do with all the work on the street, and with your permission I will read first the comment contributed by Mr. P. T. Dashiell.

**PHILADELPHIA GAS WORKS**

September 13, 1920

**DISCIPLINE AND ACCIDENT PREVENTION**

In the Manufacturing Department of the Philadelphia Gas Works in case of a serious accident, great care has always been taken to find out the cause of the accident; and if the accident was shown to have been caused by neglect of some employee or employees, great care has always been taken definitely to locate the responsible parties.

If, in cases of this kind, it can be fully shown that the accident was due to wilful negligence—sleeping on duty, for instance—or to complete disregard of the Company's interests on the part of the employee, the employee has been discharged forthwith. At the same time a complete exposé is made of the whole matter to other employees who might be brought in contact with a similar situation, so that they may profit by the experience, and so that they may also know what might happen to them in a similar case. It has been extremely rare, however, that any of the accidents that have occurred could be traceable to direct wilful carelessness.

In nearly every case, the accidents have been caused either by lack of foresight, slowness on the part of some employee to realize what was going on about him, or to the lack of judgment on the part of some employee. In such a case, where the desire of the employee has been to do

the right thing and to work to the Company's interests, we have always felt that a serious talk with the employee, by some one in authority, preferably his immediate superior, but in some cases by some one very much higher up than his immediate superior, was better for the Company's interests than the dismissal or disciplining of the employee.

In very many cases after an accident in which the Company has been the loser, but which came about rather from lack of judgment or oversight than from carelessness, the employee has usually shown that he felt the damage more than the Company, but, of course, in "a different place." We have always felt that, after an accident of this kind, the employee was a better man for the experience, provided he thoroughly realized what he had done and what the results of his action or inaction had been. A careful talk over the happenings which led up to the accident and a clear understanding of the results of the accident by him will make him more careful the next time, will add to his experience and will make a better all-around man, unless the accident has been of such a serious and horrible nature as to destroy his nerve control, in which case we believe that the man should not be discharged, but given other work and an attempt made at least to resuscitate his nerve strength.

In my own experience, there have been very, very few occasions where it was necessary to discipline an employee for an accident, and I have seen many men benefited very much by the experience of having been through an accident. In the case of chronic bad judgment, however, or wilful carelessness, lack of appreciation of his relation to the Company's interests, I believe that the employee should be let go promptly and not given a second chance to bring about a financial loss to the company which he serves.

P. T. DASHIELL

Assistant Engineer of Works

#### PHILADELPHIA GAS WORKS

#### ACCIDENT CASES FROM THE STANDPOINT OF THE EMPLOYEE RESPONSIBLE FOR THE ACCIDENT

In the Distribution Department of the Philadelphia Gas Works, we have always tried to proceed upon the theory that our employees mean to do the right thing. Therefore, when an accident occurs and the circumstances indicate that it may have been due to the carelessness of an employee, we attempt to keep an open mind in the matter until all the facts are known and it has been definitely shown where the blame lies. If there is no doubt that the employee was to blame for the accident, and if, in addition, the accident belongs to a class about which cautions have been previously issued, we are brought face to face with the fact whether or not the employee should be disciplined. Assuming it is not believed that the punishment need be as extreme as permanent dismissal, then the justification for any punishment at all lies in such punishment being deemed necessary either to prevent a repetition of the accident on the



part of the employee concerned or on the part of any other employee. We believe that a case of this kind should, wherever possible, be handled by the department head, and if he is wise, he will not make any decision until after he has had a heart-to-heart talk with the employee himself. Of course, his action should also be influenced by the previous record of the employee.

We recently had a case where the company paid over \$5,000 in damages to three persons injured by a motor truck. There is no doubt that the driver was careless, and yet after a thorough consideration of the case and a talk with the driver, it was decided that he had already learned his lesson and that no good would result to him from any punishment. Therefore, as he had always been a trustworthy and efficient employee, he was not disciplined. To prevent his case being used as a precedent later on, a suitable notice was posted on all the bulletin boards, calling attention to the case and the fact that its disposition would not serve as a precedent for similar accidents in the future.

In the above, we have tried to make clear that when treating accidents in which employees are concerned, we follow our general rule of emphasizing the personal element and of treating all our employees as individuals rather than as a mass.

WALTON FORSTALL,  
Engineer of Distribution.

**Mr. E. C. CARPENTER:** In questions involving discipline, who passes upon the discipline and who administers it?

**Mr. C. B. HARDIN:** Is there any reward given to the workman for the prevention of accidents?

I think we have been a little lenient on account of labor conditions in the past. We think a man has to be a very objectionable character before we would penalize him to the extent of discharging him. We have, however, two very pointed cases of accident where one of the men was found to be absolutely careless, and in that case we discharged him and that was all there was to it. In ordinary carelessness, we reprimand the men and draw their attention to the matter but we don't discharge a man for those little things.

I don't believe we can get the just results by offering a reward. I think it is better to teach the man that he has to do these things because they are right and until we succeed in getting the men to take that point of view, we are not really going to get the best results.

**Mr. W. A. NESSER:** I was interested in a plan for penalizing workmen for infraction of the rules of a large railway company in the East. I asked the superintendent for the ideas of his company along those lines. He said that they held the employees accountable for a knowledge of the safety rules as well as the operating rules, and they penalized them in this way: Rather than discharge a man for a first or second offense, if he broke any of the rules, they gave him a suspended sentence of ten days and then within the course of a year, if he did not break that or any other rule, the slate was wiped clean; but if, in the course of the year, he did break the rule, then he was given the double sentence. I believe

the suspended sentence is a mighty good thing. This superintendent told me that his company found it worked very well and that they have very few repeaters.

**MR. HERMAN SPOEHRER:** I have referred once or twice to a bonus system which we have. We have a research department that goes into the cost of operation, the cost of installation of meters, etc., and when unit costs are established, if a particular crew obtains better results than another accomplished in the installation of meters, for instance, and does the work at a lower cost, those crews are given a bonus. In that way the reward always comes to the crew that has the best record for lack of accidents or loss of disability hours, and that automatically takes care of the penalty and reward.

**CHAIRMAN MACLACHLAN:** I will ask Mr. Foster to close the discussion.

**MR. WILLIAM FOSTER:** We seldom have occasion to enforce the rule regarding discharges. We do discharge men but we have been obliged within the last four years to discharge only two men. That has been so effective that it was unnecessary to discharge others. We teach our men the safety rules and expect them to live up to them, precisely in the same manner as we teach them construction rules and expect them to live up to them.

As I said in my paper, "Temporizing with conditions of this kind will bring its harvest of indifference toward safety work on the part of workmen and this we cannot and should not tolerate." I believe that we should not temporize with this situation any more than a business manager should temporize with a commercial man who is unable to give him his support.

**CHAIRMAN MACLACHLAN:** I want to thank Mr. Foster for his excellent paper.

Mr. George Opp, of the Detroit Edison Company, Detroit, will now present his paper on "Accidents to Meter Readers and Other Employees on Equipment Outside of the Company's Premises."

### ACCIDENTS TO METER READERS AND OTHER EMPLOYEES ON EQUIPMENT OUTSIDE OF THE COMPANY'S PREMISES

GEORGE OPP, SAFETY ENGINEER, THE DETROIT EDISON COMPANY,  
DETROIT, MICH.

In the consideration of the electrical phase of this subject, we may consider:

First, the hazards that are potentially and actually causing the accidents in the varying degrees;

Second, the manner and method of avoiding the occurrence, and surely by all means, the recurrence of all such accidents.

By way of introduction, let us remember that accidents are ALWAYS to be regretted. They serve no beneficial purpose and their effect generally is to upset schedules, delay useful operations and inflict pain and injury

often causing rush trips to the hospitals and sometimes regrettably premature flower-bedecked caravans to the so-called "marble orchards" on the hill.

The only iota of good than can possibly be extracted from an accident lies in the study of its causes—and generally accidents ARE caused, though sometimes we feel that they just happen with a wicked perversity—and in the determination of the possibility of its happening again, and the taking of adequate and effective action to ward off any recurrence.

We shall attempt to get a close glimpse of the regular routine of, and to enumerate briefly the various accidents that may befall an electric meter-reader, and then also take a glimpse into the lines of their closely associated workers, the meter testers, meter repairmen and meter inspectors, and, finally, to complete the subject as it has been assigned, we shall take up the other departments of an electric utility that sometimes work on equipment off the company premises.

#### METER READERS

When we consider that within our own company there are 31 meter readers, walking upwards of five hundred miles in the aggregate daily, climbing up on elevations and hurrying down stairs to read on the average of from eight hundred to one thousand meters per day, and when we consider that each step taken is potential of casualty, whether on icy pavements or in dark and littered basements; whether up or down stairs that are in all conditions of upkeep and lack of upkeep—sometimes so full of eatables that the iceman would growlingly refuse to go another step, yet our faithful readers politely essay the hurdles or the inclines and risk their necks in accidentally stumbling; when we stop to think of how often the readers need to cross the streets, frequently so congested as to require a serpentine course to dodge all the vehicles, or streets so beset by the monster trucks or the dashing imps of "speeders" as to sometimes require more than the usual sense of sight and sound and the quality of agility to make the crossing safely; when we think of these men (and due to war-imposed conditions, women as well, because we have had women meter readers in our service) having to adjust their eyes from the glaring sunlight on the shiny pavements and sidewalks, or the glare of winter snows, to the darkness of back stairways pierced by the feeble attempts of the pocket flashlight, and just as readily to meet the physical reaction of extremities of temperature in going in and out of buildings in rapid succession, especially in the winter season; when we stop to consider all of these various possibilities in passing, is it any wonder that there are some accidents occurring these days to the "Knights of the Tin Books and Lead Pencils"?

We wonder, especially when we realize that the existence and removal of the hazards that are encountered are beyond the scope of the meter readers themselves, and in most cases beyond power of action by the company, that the number of accidents is not multiplied several times over.

It is often a game of politeness to eradicate those points of hazard to the meter readers, and the thing has to be handled, I tell you, in mighty

diplomatic fashion, especially at a time like this, when we are somewhat up against it on the proposition of furnishing all the service that is demanded, to win the co-operation necessary in repairing stairways or cleaning up debris in basements, providing clear passageways to meters, furnishing guards on pits and offsets, removing hazards, etc.

#### HAZARDS FREQUENTLY ENCOUNTERED

A list of the definite conditions that may be set down as most hazardous to life, health, and limb, and most frequently met in the regular routine of the meter readers, would show such items as:

1. Steps missing in the stairways.
2. Loose treads on stairs.
3. Obstacles on stairs such as foodstuffs, cans, mops, baskets of clothespins being dumped into or stepped into by the men coming in from the outdoor light and being unable to discern the objects in time.
4. Poorly constructed platforms.
5. Unguarded pits and off-sets.
6. Unsanitary and treacherously slippery floors in basements left perhaps by some folks who very nicely scatter a lot of water over the high spots to wash all of the debris into the low spots and leave it go at that, generally happening shortly before the meter reader comes in.
7. Dark and unkempt storage in basements, including rubbish, broken glass, rusty nails, ensnarling bits of wire, and the like, which create stumbling and tripping hazards. (If we might enlist the Boy Scouts in this new field of activity in a campaign to get into people's basements and back stairs to clean them up, I venture to say that gathered there would be more than again as many tin cans, by far than that mass which was mentioned in yesterday's discussion in the Public Safety Committee meeting.)
8. Ofttimes the meters are located, against all requests to the contrary and contrariwise to all reason and logic, apparently, in such almost inaccessible places as over ice-boxes, in close contact with the ceiling over stoves and ovens that are invariably hot when the reader appears to give the dials the "once over"; and sometimes in cubby-holes that require the agility of a house cat, the slenderness of a Venus, and the native training of a mouse to reach.

It is funny how the attempt is made, in many cases, to "hide" the little pulsating box.

These unfavorable conditions of meter location, of course, lead in turn to climbing and straining that often involve physical peril by reason of the lack of a suitable ladder or safe substitute; and certainly we cannot expect our meter readers to always carry their own ladders!

#### LOCATING THE METER

Surely these conditions compel the undesired, yet sometimes necessary, use of such expedients as boxes and tables and chairs or stoves to build

up a mount to the zone of vision of the dials of the pulsating meter, which the contractor or owner seems to think of such minor concern when he allots the space for its presence, and which sometimes—happily infrequently, however—he later considers so seriously when he orders the “miscreant racer” out of his premises by reason of “the ridiculously high bill this time.”

We attempt to discourage the thoughtless practice of placing the meter “just anywhere”, but we find that it is being done in some cases. There is where we need, once in a while, to exercise a little bit of diplomacy in securing the change which oftentimes can be made, and generally is made, quite readily, when called to the attention of the proper persons.

Sometimes, of course, due to foresight on the part of the architect, builder, owner, or due to the provisions of building code and ordinances, the meters are quite properly located, but the customer unthinkingly and quite unintentionally blocks the passageway to the meters by articles of storage, ranging from small boxes and pails in the basement or discarded hoopskirts in the attic at home, to automobiles in the garage, or huge store-boxes that resemble elephants in repose, down at the business places. These conditions lead to possibilities of accidents.

#### DODGING THE WATCH DOG

Man's most faithful animal friend, the dog, presents for the apparent stranger reader a considerable bit of worry, torment, and even menace. Some dogs show much faithfulness—faithfulness to devilry—as they come rushing upon the unsuspecting meter man from an obscure hiding place and attack an unguarded flank. Yes, dog bites contribute quite a goodly share to our meter man's accidents, although by reason of prompt attention bestowed upon such injuries, and by reason of the special police surveillance placed upon the vicious and playful dogs that figure in these accidents, our records for the past few years show no time loss due to accidents of this cause. Some time ago we made a special effort and secured the co-operation of the police department in Detroit (and in the municipalities outside of Detroit) to the extent of having every dog-bite accident thoroughly investigated and the dog retained in pound for at least two weeks for close observation. Now we also have the assurance of the possibility of legal action against parties who might permit vicious dogs on their premises without displaying adequate signs near the doors or gates leading to their premises. So, we are going to have a real effective way of eliminating, to a large degree, that bothersome, if not really serious, source of accident.

Then, too, there is the moral hazard that is often encountered by men who have the occasion and the privilege of entering all manner of homes, hovels, stores, and hostelrys; but very fortunately, and proudly too, we can say that for some time our company has not received a complaint of even a pin having been stolen, nor has there been experienced any of the salacious circumstances that you gentlemen may know are occasionally encountered.

Sometimes, too, a meter reader has been the unfortunate passerby or by-

stander at an altercation, arriving at the scene of a domestic quarrel probably just in time to receive a shoe, a broom, or a flatiron—we have had instances of that kind—the meter man having been mistaken for the returning husband in the case.

#### METER INSTALLERS

We may next consider the accident experiences of the members of the Meter Installation Department, who logically precede the meter readers in the rotation of work but who, as a class, slide considerably behind them in the results of hazards encountered.

In addition to nearly all of the aforementioned risks that fall to the lot of the readers, the installers have a few that are peculiar to themselves. Their work takes them into partially completed structures where overhead clearances are reduced by carpenters' scaffolds and horses, or when, as yet, mayhap, no housewife's broom or porter's shovel has cleaned up the debris of construction work, and in this situation frequently are found nail-punctures, skinned knees, scraped shins, bruised bodies and bumped heads. Of course we infer that we have such competent men engaged in this class of work—and justified we are to make such assumption when borne out by an almost clear record of accidents of this nature—that such things as smashed fingers, pinched and battered thumbs and badly scratched hands are almost unknown and surely very infrequent happenings among our meter installers. Nearly all the conditions of hazard which they meet are, as in the instance of the meter readers, quite generally beyond their own or even the company's legal powers to correct physically. The meter readers have only one rule of safety—we always try to simplify these days when the "world is growing tired of codes and rules" as Mr. Berresford so aptly remarked yesterday. That rule reads "Use the utmost care in moving around on customer's premises and report at once any unsafe condition in getting to a meter."

#### METER TESTERS

Closely associated with the meter readers and installers are the meter testers. They may be grouped into two classes:

First, shop and laboratory men, who are subjected to the shop hazards of pinched and scratched fingers and hands (I pass by the electrical hazard because in the case of meter testers in our shops that source of harm has been obviated by reason of the improved cables and contact clips, flush receptacles eliminating exposed contact surfaces and loose wires).

Second, outside testers. These men periodically test substation meters, meters on 500 volt direct current railway service, and meters measuring service supplied to Primary (4600 volt) customers. Electrical hazards are ever present but are largely under the control of the testers. Special cables with convenient and positive connectors are furnished. Tools are carefully selected and inspected to remove all possibilities of harm due

to mechanical defects. Some of the tools are given additional insulating qualities. Insulated stools, rubber gloves, goggles, etc., all play parts in reducing the possibility of accident to the very minimum.

In going off company premises, the meter inspector sometimes meets such other peculiar risks as faulty grounds of meter cases, electrically charged metal doors or door knobs and key holes of primary service houses or industrial substations.

In the typical service meter installation the primary service is well removed from the meter wiring, the testing is done on the low-voltage side of the instrument transformers, and a special connection box and special wiring and apparatus are used to safeguard the testing work. The accident hazard in working on or about live circuits must be thoroughly appreciated and these men are trained to think and act safety.

Meter men are instructed to report immediately any unsafe condition. Their department's Safety Rule No. 1 emphasizes this by saying: "If the apparatus to be worked on is in a dangerous condition, or if it is located in a dangerous place, do not work on it, but make a complete report to your foreman." The testers are fully instructed in the right way of testing all installations, and the serious results of the wrong way are also pointed out.

#### BACK FEED HAZARDS

I want to take just a few minutes right here to recite the circumstances of a condition which had strong accident possibilities—one that is apt to be encountered in some of your own companies.

Recently our Inspector Sievers was sent to a primary meter installation, at the State fair grounds to replace a number plate on the meter connecting box. As the customer was through with this service, the high tension disconnect switches had been opened. While at work on the meter connection box, Sievers discovered evidence of current at the terminal and upon a further investigation it was found that this installation was being energized due to a back feed from another meter installation on the ground. This created an extremely dangerous condition about the primary house, reversing the current through 250 K. V. A. transformers, and stepping up the potential to 4600 volts.

This was the existing condition on some of the lines about the fair grounds, but was not known to any of the electricians who were about to take down some transformers from these lines. Sievers immediately disconnected the circuit which created this condition and advised the construction foreman of his finding.

The condition was quickly corrected and the man who called this condition to our attention was given a money reward as a token of appreciation. I might further state that in our practice every safety suggestion received is promptly acknowledged and acted upon, and where adopted, a check is given to the man who suggested it.

We recently had one of our boys take a backward flying trip across a customer's premises when he touched a key to the lock of a transformer house at an industrial plant. It appears that the wiring in the lighting

was obliged to stand in a puddle of water while opening the door and when he touched the lock he received a rather severe shock, the full benefit of 110 volts.

#### IS THE 110-VOLT CIRCUIT DANGEROUS?

It might be well at this point to say that 110-volt circuits demand respect. Let me read from the National Electric Light Association Bulletin of July, 1920 (page 420) relative to low tension current:

"Too many men have a feeling of confidence in their immunity against injury by shock from circuits with potentials of 110 to 250 volts, and some have far too little respect for railway currents at 600 volts. It should be remembered that while 110 volts does not ordinarily produce a very unpleasant sensation of shock and to some persons 250 volts is only mildly unpleasant, yet it is a matter of record that numerous men have been killed by 110 volts alternating current, and others by 250 volts direct. If men can be killed on 250 volts direct current, attendants in railway substations should remember that the output is decidedly dangerous, and is capable under some conditions of producing death by shock."

And from "Power" (Vol. 51, page 341) we have the following excerpt which I believe is pertinent and justifies reading in this connection:

"A report made by G. S. Ram, Electrical Inspector of Factories in England, contains some very interesting data on fatal accidents on low voltage circuits. Out of 99 fatal electrical accidents occurring in England during the period from 1915 to 1918, inclusive, 20 were on circuits of 1,000 volts and over, while the other 79 were on circuits of 550 volts and less; 59 of these were on circuits having voltages between 550 and 346, and the remaining 20 happened on circuits of 240 down to as low as 105. Of the 69 accidents occurring on circuits of 440 volts and less, it is doubtful if any of the fatalities were due to pressure greater than 250 volts, since the voltage to earth on any of these circuits was not above the latter value. Ninety-five of the total number occurred on alternating-current circuits. This is probably due to the wide use of alternating current for industrial purposes.

"Since the probable voltage of the shock in 66 of the foregoing cases was between 250 and 200 volts, it would seem that these voltages are as dangerous as 550 volts. One of the greatest dangers of accidents from electric circuits is the disregard that a large majority of workmen have for low voltage circuits, which develops from knowing that under ordinary conditions a serious shock will not be received from these circuits. However, if a low-resistance circuit to ground is made and the individual cannot readily get clear of the circuit there is danger of as low as 110 volts or even less causing fatal accidents; therefore such circuits should always be treated hazardous.

Similar cases of serious and fatal accidents have been discussed recently in other publications and electrical periodicals: i. e., The California Safety News, The 1920 Report of the National Electric Light Association Committee on Accident Prevention, and Electrical Review of May 22, 1920.



## INDUSTRIAL POWER EQUIPMENT HAZARDS

Another source of danger in the industrial power class lies in the growing complexity of dual or multiple source of potential, use of dynamotor sets, gas engine set-ups and steam turbines in stand-by or part-time industrial power plants. All contribute to the possibility of back feed from other connections to lines which may be presumed to be dead for tests and repairs.

There is, of course, the proposition of some of the industries (because they feel they cannot always depend upon the central power stations, as they have in the past) setting up their own industrial power plants and generating equipment feeding to common busses, permitting change over for power requirement. In forgetting to handle their switches properly, or on account of inadequacy of control permitting potential at unsuspected places and intervals, there is a serious hazard to our meter readers and testers which would have become a prolific source of accidents if action were not taken along definite lines of switching control in charge of the company's system operator and providing adequate locking and safeguarding of disconnect switches and busses.

## UTILIZATION DEPARTMENT

Then there is the utilization department, another group of employees who operate on "foreign soil." I speak of the inspection and service division which has to contend with such conditions as:

1. Electric hazards in changing fuses
2. Stair hazards
3. Street hazards—driving automobiles, temptation to speed for "Service First" when it is thought that "Safety First" is not appreciated by the irate and momentarily anxiously waiting customer, who may have tried to patch up his old lamp cord or lamp socket and after an intense flash, finds himself in darkness that gives him thoughts only of Hades before he finally stumbles to the telephone to summon the "Minute Men Light Restorers".

## SALES ENGINEERS

Our sales engineers are deserving of a comment under the broad and very liberal topic which I have been assigned. In their behalf I might say that they often get into rather unpleasant places in the performance of their scouting duty for the advance of the company. I might refer here to such a predicament as standing under a leaking steam pipe in a run down privately owned plant that the owner is trying to show to the sales engineer with perfect equanimity, saying, "You see, I don't need your service as bad as you might surmise. Oh, excuse me, Sir, you better step out this way. Oh, look out for that pump there; it isn't guarded. Look out for that hot pipe; it isn't insulated. Look out, there goes a part of the rim of that god-darned flywheel!" Yes, these are cited from actual happenings which sales engineers of central stations have had to face in their quest of selling service.

## OTHER GROUPS

Of course we might refer also to the experiences of linemen, both overhead and underground, who handle equipment and lines outside of the company's premises, strictly speaking; of garage and truck men who are handling equipment outside of the bounds of the company's property, furnishing repairs and service to vehicles totalling over 600 automobiles and trucks; and of inspection and test operations performed by the purchasing department and construction engineering bureau on equipment before acceptance and arrival on company premises, or of the many peculiar plights which our customers' accounts department and claims division of legal department get into regarding such bits of illegally-used equipment as jumpers and meter off-setting devices—(all off Company's premises)—but these various phases have either portions of time assigned them in the splendid program of this section, or else are so fruitful of interesting accounts and anecdotes as to require passing over at this time.

You will note an almost complete absence of mention of electrical hazard in these various phases of work—not because it is not there, for just last week I read of the case of a man who was shocked to death in the simple operation of handling a defective extension cord on a wet basement floor—but because, I believe, our men are constantly warned to be on the alert and their familiarity with the "silent juice" has bred respect and not the oft-mentioned contempt that is cultivated with familiarity.

The following is a tabulation of the accidents during one year to employees considered in this paper:

## ACCIDENTS REPORTED IN ONE YEAR (1919)

| No. of<br>Cases                  | Dept.                                                      | Total<br>Time<br>Lost<br>Hours | Percentage of<br>Time Lost to<br>Total Available<br>Man-Hours<br>Per Cent |
|----------------------------------|------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------|
| 137                              | Meter Inspectors, Testers and Repairmen<br>at Shops .....  | 64                             | 0.03                                                                      |
| 20                               | Meter Inspectors and Load Testers Out-<br>side Shops ..... | 452                            | 0.18                                                                      |
| 3                                | Meter Installers .....                                     | 4                              | 0.01                                                                      |
| 2                                | Utilization, i. e., Inspection and Service....             | 0                              | 0.00                                                                      |
| 0                                | Sales Engineers .....                                      | 0                              | 0.00                                                                      |
| 0                                | Collection Bureau .....                                    | 0                              | 0.00                                                                      |
| 38                               | Meter Readers .....                                        | 1577                           | 1.46                                                                      |
| Accidents classified as follows: |                                                            |                                |                                                                           |
| 12                               | cases, falling down stairs and<br>off elevations .....     | 200½                           |                                                                           |
| 14                               | cases, dog bites .....                                     | 0                              |                                                                           |

|                                        |        |      |
|----------------------------------------|--------|------|
| 8 cases, falls on level.....           | 1048½* |      |
| 2 cases, automobile accidents.....     | 264    |      |
| 2 cases, striking obstructions.....    | 64     |      |
| 9 Garage Repairmen and Drivers.....    | 158½   | 0.12 |
| 4 Local Agents—Suburban territory..... | 0      | 0.00 |
| <hr/>                                  |        |      |
| 213 Total of these Depts. ....         | 2255½  | 0.18 |

In the departments which we have here discussed, I believe we have struck the real keynote of the success of safety work anywhere—we make the proposition of safety a personal obligation of the man himself. We stand ready, yes, eager, to co-operate with him in any way that he may designate. The special educational training of the meter man, especially, is considered to be of importance. The training and coaching bestowed upon the man before he is assigned to a place of responsibility inculcates in him the alertness and regard for accident prevention that grows to be a matter of personal pride.

We try to get our employees to see what the practice of safety means to them. We try to make safety a *personal matter* in their own individual cases and to get them to respond by making suggestions and working for the elimination of every possible hazard.

CHAIRMAN MACLACHLAN: I will now call upon Mr. L. D. MacLarty, of the Denver Gas and Electric Light Company, to present Mr. Tewksbury's paper on the same subject as related to gas companies.

#### ACCIDENTS TO METER READERS AND OTHER EMPLOYEES ON EQUIPMENT OUTSIDE THE COMPANY'S PREMISES

F. A. TEWKSBURY, CLAIM DEPARTMENT, DENVER GAS AND ELECTRIC LIGHT COMPANY, DENVER, COLO.

The first department to come in contact with the gas after it leaves the company's premises is the street or gas distribution department, which handles the installation of mains and services. The next departments, in order, are the fitting shop and meter reading departments, including the turn-on and shut-off men.

The first division of my subject includes the main gang, and the hazards most commonly met by these men are as follows:

The gas mains of the present day are either of cast iron or steel pipe,

\*Note: This classification includes one accident to girl in office tripping over a loose telephone cord, spraining ankle, causing loss of 801 hours. Exclusive of this very exceptional accident, the time loss is reduced one-half or to 776 hours, which in turn brings the percentage of time lost compared to total available man-hours, down to 0.73 per cent instead of 1.46 per cent shown above.

The writer is indebted to Mr. Geo. Wherle for excerpts from his book, "American Gas Practice".

the latter being the so-called wrought iron pipe in general use. Cast iron pipes are joined together by bell and spigot joints, with case lead, wool lead, or cement packing, or by a universal ground joint, with white lead or red lead packing. Steel pipes are either screwed, welded, flanged, or joined by use of a patent coupling. Several cases of injury have been cited where workmen have received injuries by being pinched or caught between the joints of pipe, or burns received while making connections or couplings. I believe that most accidents of this nature could be avoided, if the pipe layer or man making connection would take ordinary precaution, while the laborers are engaged in putting pipe in position, by means of cross ropes from top of trench, to see that he keeps his hands and arms in the clear, while guiding the pipe, so joints will meet. Burns occur in most instances from the careless handling of the ladle as the hot metal is being poured around or in joint. Care should be taken to keep moisture, such as snow, water, etc., from the hot metal. The pipe layer should be supplied with proper, fitting goggles. Discretion should be used in choosing the type of glove that he wears, but under no circumstances should the pipe layer be allowed to wear a glove with a gauntlet attached.

#### DANGERS OF CAVE-INS

Many injuries in this class of work have resulted from trench cave-ins, in sandy and filled ground; precautions must always be taken to guard against cave-ins, and possible injury to workmen. In such soils the weight of the earth thrown out should be kept back at least two feet from the edge of trench, and sufficient cribbing or bracing used to insure safety. Tight cribbing is usually unnecessary unless the trench is more than six feet in depth, or the soil very treacherous in nature. Generally, either one or two sets of stringers between each bulk-head, held parallel with trench walls by use of screw braces, will suffice. The foreman should, however, use his discretion and avoid taking any chances.

After the trench has been completed for a sufficient distance the work of pipe laying can commence. For sizes up to twelve inches, the use of a derrick is unnecessary, the length of pipe being rolled to the edge of the trench, and let in by use of ropes. In this operation two ropes are necessary, one at either end of the pipe, and a knot tied in one end of ropes that are laid at right angles to the trench beneath pipe. The men standing upon the stationary end of ropes push the pipe over the edge of trench and pay out the other end of ropes, over the top of pipe to allow it to roll slowly into the trench. The men handling these ropes should wear gloves to protect their hands from rope burns and splinters. For pipes over twelve inches in size, the use of a portable derrick is recommended. In this case the pipe should be skidded over the trench opening in as near the position it is to occupy as is possible. The weight of the pipe being lifted with the derrick, the skids should be removed and the pipe lowered.

#### COLLAPSIBLE BAGS AND EXPANSION STOPPERS

Where the main is of small size, or when it is desired to supply new consumers, before the completion of the entire job, the connection to

existing mains may be the first thing to be done, and gas carried along as the pipe is laid. This policy is not to be recommended if it can be avoided, as there are hazards in every length of pipe laid in the possible failure of the bags and stoppers. In bagging off, or stopping of the mains temporarily, there are two methods in use: collapsible rubber bags that are inflated with air after being inserted in pipe, and expansion stoppers. Experience teaches that each one has its particular advantages and disadvantages, while a combination of the two make an ideal arrangement. The gas bag is liable to burst or become dislodged by excessive pressure, but is usually a gas tight arrangement, while the stopper when properly set will not become dislodged, although it is not as a general rule, gas tight. It is recommended that on all mains six inches or over both the bag and stopper be used. By this arrangement the advantage of one offsets the disadvantage of the other. Another precautionary measure taken by the company that I represent is that all pipe layers or workmen connecting or tapping the main where workmen are liable to be overcome with gas shall wear some type of breathing device. At first we had the two hour, heavy type of self contained oxygen breathing device, but in our work the men complained they were too heavy to work in and were greatly hampered in getting in and out of the trench. In most instances the men refused to wear them, stating they would sooner take the chance of being "gassed." After this discovery was made, we adopted the lighter one-half hour type. We also have a nose arrangement equipped with a positive face mask. Since the time of the adoption of the lighter devices, we have experienced no trouble with the men, and all wear them while making gas connections.

Falling or tripping, another hazard to be met in the laying of gas mains, is largely due, I believe, to the carelessness of the injured or their fellow workers. All tools, such as bars, picks, shovels, etc., should, when workmen are through with them be returned to the tool box, and should at no time be left carelessly lying around the trench, where someone is liable to stumble over them, or knock them into the ditch. Another hazard in this class of work is the danger of falling pipe. The lengths should, if possible, be placed a safe distance away from the trench opening, or if this is not possible, wedges should be placed under the lengths to prevent rolling. At the time of lowering a pipe to its place at the bottom of the trench, no one should be permitted in the trench until the pipe has been completely lowered, and then it is time for the pipe layer, assisted by men on top, to place the pipe in position for coupling. The foreman should at all times assign plenty of men to carry out this work to prevent workmen receiving strains from excessive lifting.

After the main has been connected up and before the gas is turned on in the consumer's premises or turned into the existing main systems, the air contained in the pipes must be thoroughly expelled. In small mains this can be safely and thoroughly done by removing the plug at the extreme end of the new system. In a large installation this is of vital importance and is extremely hazardous. In purging large main installations, a stand pipe should be arranged in the holes to be used for "gassing" long enough to discharge over the heads of pedestrians. A control-

ling valve should be conveniently arranged in the stand pipes, and a fine mesh gauze inserted near the top of the stand pipe. All lights and flames should be kept away, and in no case should an attempt be made to light or burn the escaping mixture.

#### TAPPING SERVICE MAINS

When a consumer makes application for gas service, in either a new or old building, on a street where the gas main has been laid for some time, the company sends out several crews consisting of three to ten men. In many cases the men are ignorant and of foreign birth, and consequently they are more liable to accidents. The foreman must constantly be on the job reminding and talking safety to the men. In tapping service mains the same precaution should be taken to protect the worker as in similar work on new construction. Curb valves are required by city fire ordinance on all services larger than two inches. We use the gate type valve, which varies in weight from seven to forty pounds, according to the size of service on which it is to be installed. Care must be exercised at all times to prevent dropping these valves and striking the workmen in the trench below; the same precaution should also be taken when installing to prevent worker from being "gassed."

While drilling through cellar or basement walls, the worker should be furnished with proper, fitting goggles, and care should be taken to see that hand tools are in proper condition, that drills have no mushroomed heads, and hammers no cracked or broken handles.

The second division of my subject, while involving several departments of the company, has to deal with the interior of the consumer's premises.

Meters and governors are installed by the gas fitting department, after the service has been installed by the distribution department.

While our company does no piping of buildings for light, and feels that its liability ceases at the meter, we believe that the consumers should profit by our experience, and therefore we insist on two inspections on all work done by outside plumbers or fitters. One inspection is made before the piping is concealed, and the final inspection is made after the pipes have been plastered over. The former is to ascertain if the piping has been laid in accordance with the rules and regulations of the Company, and the latter is to ascertain if the job is tight. At each inspection the piping should be subject to air pressure.

Upon setting meters or appliances, the fitters should take precaution to see that all tools are in good condition. Particular stress should be laid on the subject of proper objects on which to stand while working on meters or appliances. A number of injuries have been caused either from a wrench slipping or breaking, due to defective jaws or handles, or the object on which the workman was standing giving way and allowing him to fall.

#### GIVING THE CONSUMER SAFETY INSTRUCTIONS

The fitter should instruct the consumer in the use of appliances installed on his premises. For instance, the consumer should be instructed

always to open both doors of the gas range oven before lighting, and to be positive that gas is burning before closing them. Attention has been given this fact in late years by the manufacturers, so that on most modern ranges an oven explosion seldom occurs, but an impression of carefulness without creating fear is a thing to be desired.

All water heaters should be equipped with a flue or vent pipe, connected direct to chimney, or some other suitable place whereby the fumes will be carried off and expelled into the air outside the building. No water heater should ever be installed in a room of less than 1500 cubic feet air capacity, unless such room is equipped with a permanently open ventilator not smaller than 13x14 inches. In no case should a gas water heater be installed in a bathroom or bedroom.

The permanent abolishment of the use of rubber tubing or metallic tubing with rubber ends, or in fact, the abolishment of all rubber connections for gas appliances is a thing very much to be desired. There is no reason why all hot plates or other small appliances cannot be rigidly connected with pipe and fittings, while the movable or temporarily connected appliance, such as room heaters, etc., should be connected with metallic tubing fitted with a ground joint union at either end. I believe more life and property has been jeopardized by rubber gas connections than perhaps any one thing pertaining to the gas industry.

Tubing pulls apart, or becomes leaky, or the ends split or become so large that they fall off the hose nipple or cock, or someone stumbles over the tubing or steps on it, with the result that gas escapes and a dangerous condition is created.

While the work of a fitter is not particularly hazardous, it may become dangerously so at times. He is working with a gas which under favorable conditions is not dangerous, but which may as a result of accident or incompetent handling become a deadly menace.

#### OPEN LIGHTS PROHIBITED

All workmen should be forbidden to use open flames in searching for leaks. A number of accidents which occur each year from naked flames being employed in the search of leaks, demonstrates the necessity for absolute prohibition.

If there is a strong odor of gas about the premises reporting a leak, the first thing to be done is to open doors and windows to ventilate the rooms where the odor is detected. Then examine all fixtures and apparatus in the rooms and all exposed piping. Make examinations either by smelling along fixtures and pipe, or by rubbing fingers over them and smelling fingers, or by listening for the sizzling noise made by escaping gas. Where these methods fail to locate the leaks, apply a solution of soap and water by means of a soft brush to all exposed piping and fixtures, particularly to each joint filling or cock, and along pipe seams. Watch closely for the bubble that will appear where a leak of any magnitude exists.

Meter reading, turn-on, and shut-off of meters is handled by the meter reading department. The largest number of accidents occurring to mem-

bers of this department is due to causes outside the company's premises, over which we have no control, such as dog bites, power vehicles and collisions. Meter readers should be furnished with an electric pocket flash light, and the practice of using matches while reading meters should be forbidden. One of the greatest sources of evil we have to contend with from the meter reader is his effort to locate a gas leak around meter when told of a leak by the consumer. This is a very dangerous practice, because in most cases the man is ignorant of the gas business, or the dangers from fire and explosions. All men upon entering any dark hall or cellar way should first make certain that the passageway to the meter is unobstructed, and that there are no broken risers or treads on stairs, or boxes or other material lying on the floor. Falls cause many injuries.

As a further precaution to our meter readers, at any house where there is a vicious dog, dangerous stairway, or dark or dangerous basement, we have this information printed on the meter book, so when a new man goes there he knows what the danger is before he enters. This costs but very little time and expense, and prevents many accidents of this nature.

#### DEPARTMENTAL SAFETY COMPETITION

As an incentive to keep the foreman of the various departments interested in safety, we have installed a plan of safety competition, based on lost time accidents. Each competition extends over a period of six months. The standings of the various departments are posted on all safety bulletin boards throughout the various plants on the first of each month. When this competition was first started, about two years ago, the departments were grouped in two classes, each having its handicap, based on the frequency and severity rate of the departments for the two years past. To the winning department the company presented a silver trophy cup, which when won three times in succession, would remain permanently in the department. A cash bonus of \$100 was paid to the foreman of the winning department. While this plan worked well, it was decided that a higher degree of efficiency could be obtained if the various departments could be grouped under two classes according to their employment hazard. We now award \$50 to the foreman of the department having the highest standing in each of the above groups at the end of the six months' competition. Also a trophy cup is presented to each department, which, if won three consecutive times, remains permanently in that department. Some time ago we organized a question and suggestion department, composed of the heads of the different departments. Meetings are held once a month. We have installed in convenient places throughout the various plants and shops suggestion boxes, and all the workmen are encouraged to offer suggestions regarding their work, whereby greater safety and efficiency may be obtained. These suggestions are collected a few days before our meeting and are carefully looked over, numbered, and then brought before the meeting for discussion. We also have a committee of four, who afterward go over the suggestions and award three capital prizes, first prize, \$5, second \$3, and third \$2. Each man also receives one dollar for each suggestion submitted by him.



## THE RECORD FOR 1919

In conclusion it might be well to mention a few statistics of the work carried on by this company for the year 1919, together with the number and nature of accidents occurring throughout the various operations in the several departments described in the foregoing.

In the gas distribution department a total of 20,992 feet of new main was laid, making at the end of the year a total of 2,108,556 feet of main (all sizes) in use in the city. This department also connected or put in gas services on 835 new installations, making a total of 42,858 services or gas connections in use in the city. We had only two accidents, both from gas poisoning, with the loss of only three days' time. These two accidents were caused by the failure of the men to use safety devices with which they were provided.

In the gas fitting department, a total of 2,561 meters were connected, while 290 were disconnected, leaving a balance of 49,763 meters in service (not including the changes of meters due to leaks and other causes, which were also handled by this department). Two thousand six hundred and seven appliances were set and 24 disconnected, making a total of 86,468 appliances in service throughout the city. We feel that this department had an unusual record, inasmuch as it did not have during the entire year a single accident which resulted in the loss of time to a workman, a record which the men so far this year seem likely to maintain.

The meter reading department with 49,763 meters in service at the end of the year, and employing an average of twenty-five men per month, had 32 accidents with a loss of 79 days. Most of these accidents were due to animals or power vehicles, over which we have no control.

CHAIRMAN MACLACHLAN: You have heard two admirable papers on this subject. I would like a short discussion on the question.

## DISCUSSION

MR. J. F. CONNER (United Gas Improvement Company): It is essential in the hose type respirator that we take care in taking it off not to get that in a contaminated atmosphere, otherwise the person who is wearing the mask is apt to become asphyxiated. An accident along that line occurred in a demonstration in Chicago.

In regard to the self-contained respirator, instead of using the three-hour type, we use the thirty-minute type which is very satisfactory. In opening the mains we use the safety tapping machine and it does not expose the workman to any escape of gas.

MR. L. D. MACLARTY: I notice that downstairs they are exhibiting the army type of mask, smoke mask. I think this should be discouraged for use in gas companies because it will not protect the wearer from carbon monoxide which we have to contend with. I have noticed these masks around fire departments where they are used through ignorance more than anything else.

Speaking of that safety tapping device, we use it but in many cases it

leaks a little bit, so we always take the precaution of seeing that the man is equipped for the emergency if it does break down or leak.

MR. I. GORDON (Bureau of Safety, Chicago): The speaker I believe said that they gave a dollar for each suggestion. Is that given to each suggestion that is adopted or to all those contributed by the men?

MR. MORONEY: In the elimination of accidents to meter readers, it seems to me that we can make quite a campaign with the public. It's the public we have to reach by sending out a flyer attached to the gas bill. In that way we could reach the consumers and possibly educate them, although it may be hard to educate them and make things clear for us.

MEMBER: Do you ever use the wire jumper in making gas connections?

MR. B. S. BEAUMONT (People's Gas Light & Coke Co., Chicago): What satisfaction do you get in case of dog bites? We have about from five to seven a month, and where they do have signs of warning up, the owners of the dogs do not use any care—in fact, they seem anxious, sometimes, to have the meter reader get bit.

MR. GEORGE OPP: In the question of dog bites we have the assurance of legal action. In the case where a dog is known to be vicious and is kept at the home or on the premises of a customer without adequate signs, we have the chance for legal action which not only involves the proper disposition of such dog but also recompense by way of damage to the man who suffers from the dog. I think that will most certainly solve the proposition.

MR. L. D. MACLARTY: To answer the question whether or not we pay the men for all suggestions or merely for the suggestions adopted—we pay for all in order not to discourage the men and let them think that we ridicule their suggestions in any way.

In changing meters on old hose pipings, if a leak is discovered and cannot be remedied by the meter changer, he refuses to set the meter and refers the customer to a plumber to correct the leak, and when that has been done the customer notifies us. Then the meter changer goes back again and sets the meter.

The use of wire jumpers for gas connections is an engineering feature with which we have had no experience.

CHAIRMAN MACLACHLAN: I would recommend to the incoming officers, that the only way of holding these sessions is to have the papers printed beforehand, distributed to the members, and then read here in abstract, in order to give us time for discussion.

I wish to thank the speakers for presenting these papers. I also wish to thank the Executive Committee and the chairmen of the various committees who have made this meeting such a success.

ADJOURNMENT.

## **Rubber Section**

**September 29, 30, and October 1, 1920**

---

**SIDNEY M. SCHOTT, Chairman**  
Morgan and Wright, Detroit, Mich.

**E. H. FITZGERALD, Vice-Chairman**  
Federal Rubber Company, Cudahy, Wis.

**R. N. WATSON, Secretary**  
Goodyear Tire and Rubber Company, Akron, Ohio

---

### **WEDNESDAY MORNING SESSION**

**T**HE meeting was called to order at 9:45 A. M., by the Chairman, Mr. Sidney M. Schott.

**CHAIRMAN SCHOTT:** We will start the meeting with the reports of the various committees. This is the first year that the Rubber Section has done any work as a formal section and most of the work done for the past year has been to get things standardized and on such a basis that the various members of the rubber industry will be on common footing for comparisons and interchange of ideas.

Report of the Bulletins Committee, Mr. W. N. Fitch of the B. F. Goodrich Company, chairman.

#### **REPORT OF BULLETINS COMMITTEE**

**MR. W. N. FITCH:** During the year—up to September 15—there were eighteen bulletins of the Rubber Section published; sixteen will have been distributed by the National Safety Council at the time of this meeting. Permit me to add that we have had splendid co-operation from a great many of the rubber companies. It is to be expected that photographs and subjects for bulletins will be sent in which are not applicable in all of the rubber plants. The importance of this point was brought to my attention upon the receipt from one of the rubber companies of a suggestion for a bulletin which operation I knew was not carried on in the Goodrich mill. It occurred to me that such might be the case in other rubber plants. Would the bulletin be of any value? Therefore, I communicated with nearly twenty rubber companies, stating the situation and asking

them to advise whether it existed or if they had had any accidents and whether a bulletin would be of any value on the subject. I received thirteen answers and in only one of them did the condition actually exist.

Bulletins to be of any value must cover the situation in which accidents have occurred. The right and wrong way should be demonstrated in the photograph or sketch on the bulletin, each one being emphasized by a very plain and short description.

The subject of the bulletin must be short and to the point. It is important that in showing the right way that you do not leave in the same photograph an opening in which an accident might occur. Bulletins of this type have been sent in and have even been published. Where an employee notes such a discrepancy, the value of the bulletin is then destroyed and it has a moral effect on all future bulletins.

Too much importance should not be placed upon bulletins of severe accidents as being the only ones of value. There are thousands of minor accidents occurring continually in rubber industries of which bulletins can be made and the thought conveyed to help eliminate future accidents.

Gruesome bulletins are considered by many of no value. However, an occasional one leaves a very lasting impression upon the mind of many employees.

Comical bulletins have their value and should be run occasionally to put a little spice and merriment into life, yet there are many comical bulletins which are very constructive.

Mr. Rosseland, who has charge of the preparation of safety bulletins for the Council, has requested me to turn over any material that I may have on hand for future bulletins. I am very sorry to find that we have none on hand.

Please permit me to thank you, other members of the committee, and the various rubber companies for their splendid co-operation.

CHAIRMAN SCHOTT: Report of the chairman of the committee on Accident Standardization and Statistics, Mr. R. N. Watson of the Goodyear Tire and Rubber Co.

#### REPORT OF COMMITTEE ON ACCIDENT STANDARDIZATION AND STATISTICS

MR. R. N. WATSON: I suggest that you all get copies of the National Safety Council's "Safe Practices Bulletin No. 21," which is on accident records—how to compile and use them—and then change the charts which are shown in this Safe Practices pamphlet to correspond with the sheets we have prepared, and use the explanation given in the pamphlet.

One change that some of us want to make is to add a column showing the cost in cents per hundred dollars of payroll. That corresponds to the rating which an insurance company gives you. They say, for instance, our rating in Ohio was 80 cents per hundred dollars of payroll with the Industrial Commission, and we would like to know what it is actually costing per \$100 of payroll. At the present time our cost at the Goodyear is running 30 cents per hundred dollars of payroll against the commission rating of 80 cents, and I think Schott at his plant has a rate which is

around 27 or 28 cents. So that shows you that the Industrial Commission rating on the rubber industry is entirely too high, and it is my opinion that if we get a lot of figures together showing that we can actually run our compensation section for 30 or 35 cents per hundred dollars of payroll, we will get a reduction in our rate as charged by the insurance companies.

We put in a plant in California and they wanted to charge us \$1.35 a hundred dollars, and we refused to pay it. We went out there and took up the matter with them and showed them our statistics, and right off the bat they gave us a reduction of 70 cents per hundred dollars of payroll. It certainly paid us to have the figures available. The rest of you can profit to a similar extent.

Here is one other sheet—the schedule which is used on the severity rating. That is, if a man loses a finger or a hand, and you want to rate it on your severity and extent of disability chart you have to know how many days we assigned to that particular entry, and I have some figures here which are made up and adopted by the National Safety Council and which have also been adopted by the United States Department of Labor as being standard figures. These are available to all of you.

Please check this proposed method up with your own work and see how it compares with the charts that you have at present. I wish you would correspond with me on any suggestions or changes that you have on the charts, and I hope that by the time of the meeting next year we can get figures from each company. I don't propose to come up here and say that the Goodrich and the Goodyear, etc., had such and such rates, but I think we ought to assign numbers. We will say Plant No. 1 had a rate of 10 accidents per thousand men employed and Plant No. 2 had a rate of so much, etc., and you will know what your own number is and you can pick out your place on the chart and see how your score compares with everybody else's. The same thing on the rate per hundred dollars of payroll. I think that way we will be able to get something out of our accident statistics.

CHAIRMAN SCHOTT: Undoubtedly some discussion is required as to the best manner of compiling these statistics, but the fundamental idea as expressed by the National Safety Council in all its researches and investigations and working with the U. S. Bureau of Labor Statistics has been that it is possible to standardize statistics for any given industry.

CHAIRMAN SCHOTT: Report of the chairman of the Program Committee, Mr. H. T. Martin of the Fisk Rubber Company.

MR. H. T. MARTIN: I think the program reports for itself. We have been fortunate in having no refusals and it stands about as originally adopted.

CHAIRMAN SCHOTT: The work of the Rubber Section is largely inspirational and for that reason the first and third programs of the section were designed to be inspirational and the second session on actual mechanical safeguards.

Report of the Engineering Committee, Mr. C. B. Mitchella, Engineer of Design and Construction, The B. F. Goodrich Rubber Company, chairman.

## REPORT OF THE ENGINEERING COMMITTEE

Mr. C. B. Mitchell: This Committee has been requested by the Executive Committee to submit a report on the best type of floor in Mill Rooms and in front of mills.

There are several kinds of floors and floor coverings being used in mill rooms. Among them wood and cement are most common. Wood flooring is not suitable for a mill room, as the boards will invariably shrink and produce wide crevices. The edges of the boards will be broken off by truck wheels because they do not lie tightly against the adjacent boards, and gradually the whole surface may be broken down. The crevices hold dirt and germs and in time a wood mill room floor becomes very insanitary.

A wood block floor will stand up under all the abuses which may be expected in a mill room, but it cannot be kept as clean as desirable because dust and pigments will lodge in the spaces between the blocks. It is very doubtful if any mill room floor receives sufficient abuse to warrant the greater expense of a wood block floor.

A cement floor is best, as it will withstand indefinitely the most severe usage and is clean and most sanitary. However, a cement floor may become polished and slippery from soapstone and other pigments if proper provisions are not made. New floors can be laid so as to be smooth and hard, but not slippery, as follows:

Proceed as in a neat cement floor finish to the point where the area has first been wood floated to a level surface and finished smooth with steel floats, then sprinkle the finished area with a dry mixture composed of one part 12-30 carborundum grit and parts of Portland cement. Wood float to a smooth surface and finish with steel float. Sprinkle the area a second time, wood float to a smooth surface and again finish with a steel float. In the two sprinklings use one and one-third pounds of carborundum grit to each square yard of surface. Cover and keep wet seven days, or longer, same as would be done for neat cement finish.

The above method will make a floor surface which is considerably harder than the ordinary cement finish. This method can also be used in combination with the metallic floor hardeners.

However, many mill rooms are in operation with old cement floors, laid improperly and insufficiently hard, which are breaking down under heavy trucking loads and various abuses. Wherever possible, portions of these old floors ought to be replaced as required with a cement finish as specified above, but where this is not possible the old surface should, at least, be hardened by a liquid floor hardener. If the old floor is smooth and slippery there does not seem to be any satisfactory way to make it non-slip. Frequent scrubbing will help, but this cannot always be recommended.

In front of the mills a slippery cement floor may be overcome by covering with a rubber mat, preferably perforated. In several instances such a cement floor has been roughened by a steel pick with good results so far as the slipperiness is concerned, but not best from the standpoint of cleanliness. Metal floor plates have also been placed in front of mills,

but these will wear smooth and slippery unless a non-slip material is instituted within the metal. The latter is a rough surface and cannot be most thoroughly cleaned. The life of any floor will be prolonged considerably if all truck wheels are covered with rubber tires.

Floor surfaces ought to be level throughout so that workmen will not be compelled to step down into pits or up on platforms.

CHAIRMAN SCHOTT: The Engineering Committee has been formed for the purpose of rendering service to any members of the Rubber Section. Engineering problems in the rubber industry should be sent in to the chairman of the Rubber Section who will transmit them to the Engineering Committee for action.

Report of the Committee for the Standardization of Safety Rules in the various rubber plants—Mr. Harold Keating of the Morgan & Wright Plant, Detroit, Chairman.

#### REPORT OF COMMITTEE ON STANDARDIZATION OF SAFETY RULES

MR. H. F. KEATING: I wish to present a report of the *Committee on Standardization of Safety Rules*. These rules apply particularly to the Morgan & Wright factory. It is realized that the rules of one factory cannot wholly apply to all others. Time has been limited preparing these rules, so as to be of more general application to all of the factories in the rubber industry.

These rules are compiled from the safety rule books of several of the largest rubber companies that have given splendid co-operation along this line.

The rules may be either printed in a book, for the whole factory, or may be printed separately for each department. The general rules on the first page should be printed in every case with each of the departmental rules.

There is a set of rules which apply to Foremen only, and should be furnished to them for their instructions and guidance.

Complete sets of these Safety Rules will be furnished upon request.

CHAIRMAN SCHOTT: We realize that these rules will not apply 100 per cent to any factory, but they are the result of comparing the rules of five or six of the largest rubber factories and incorporating in these rules all the rules which were common to those factories. We present them to you for whatever use you wish to make of them. It is hoped that these rules will be given out to the managements of the various plants throughout the country, to the foremen and in many cases to the men in the shops themselves.

Report of the Membership Committee—Mr. E. H. Fitzgerald of the Federal Rubber Co. is chairman.

#### REPORT OF MEMBERSHIP COMMITTEE

MR. R. N. WATSON: Last year at the time the Section was formed we had 43 members. During the year we gained 11 members, making a total

of 54. However, there were two companies that were dropped from the list, which makes a final total of 52. We have, I think, assurance that those two companies are going to come back in again.

CHAIRMAN SCHOTT: The next order of business is the appointment of a Nominating Committee, and I would like to appoint Mr. Harold Martin, Mr. W. H. Larkin and Mr. C. B. Mitchell as members of this committee to report at the beginning of the third session on Friday morning.

## PRESENT AND FUTURE OF SAFETY IN THE RUBBER INDUSTRY

S. M. SCHOTT, MORGAN AND WRIGHT, DETROIT, MICH.

The formation of the Rubber Section of the National Safety Council one year ago was the result of a definite need for the services which could be rendered for the betterment of conditions relating to safety, health and sanitation in the rubber industry. The desired results can only be obtained through co-operation and concerted efforts among members of the rubber industry. The purpose and intention of this Section is to benefit all persons engaged in the manufacture and handling of rubber goods.

The larger firms and manufacturers, as a rule, have very good and elaborate organizations for the improvement of conditions governing safety and health conditions, and have a staff of men who devote their entire time and thought to these subjects. The smaller firms, however, are not as highly developed, and need guidance and assistance which can be given by co-operative efforts. The interchanging of ideas and experiences will be of great benefit to them. This service will gladly be given, and it is hoped that they will take advantage of the discussion and solutions of problems which are the result of the intensive thought and effort which could only be obtained by dealing with large groups of men, and handling materials and machinery on a big scale.

The general feeling of friendship and fellowship among competitors is being fostered. The saving of life and limb, and the betterment of working conditions is of common interest to all, and future results will grow in proportion to the interest manifested. It is expected that this feeling to a large extent, already developed, will grow as time goes on.

The executives of all companies are realizing more and more that it pays to have safe plants. This lies not only along lines of physical equipment, but in the training of safe and careful workmen. All efforts should be made to have workmen realize that they should be more considerate of their fellow workmen, and more alert to avoid and prevent accidents. The only real organization for safety and health starts at the top, and not only the President should be "sold," but the works manager, superintendent, foremen, inspectors, and men,—down to the humblest worker—should realize that *Safety pays*,—not only in dollars and cents, but in the feeling that "I am my brother's keeper."

The installation and revision of manufacturing processes have in the



past been carried out with comparatively small thought as regards to safety and health, but, the successful executive of today, and the future, has constantly in mind that all processes and equipment *must* be made as safe as possible in all respects.

It is no longer the common practice to install machinery and put guards on "at some future time." Guards *must* be installed at the time the machinery is set up. In fact one of the largest manufacturers of rubber goods has printed at the top of its stationery the following:

"In selecting equipment we give special consideration to the character and completeness of safeguards provided by the manufacturer."

There has been an idea in the past that it was more dangerous, and that it was harder on the health to work in a rubber shop, than a great many other industries. This idea is now largely eliminated, and statistics will show that conditions are vastly improved, and that accidents due to machinery, and the handling of materials have very much lessened.

The work of the Rubber Section has been carried on with an idea of attacking those problems which are of the most pressing importance. Among these are the following:

#### PROBLEMS OF PRESSING IMPORTANCE

1. *Standardization of Accident Statistics:* This can be accomplished to a large extent, and will then be of great benefit to the members of the industries in promoting a spirit of friendly rivalry. It will then become a contest among the firms as to which one will have the best record of improvements.

2. *Education of the Workmen through Bulletins:* A series of these have been furnished for distribution, and these will be distributed at cost by those who wish them. In the past it was found that only about 5 per cent of the bulletins issued could be used in rubber shops. Bulletins relating to accidents common to the Rubber Industry are now being printed and distributed. Most of the lost time accidents are due to handling of heavy materials—such as cores, molds, etc.—or to carelessness—such as knife accidents, shears, picks, riding on trucks, etc.—and the bulletins are intended to call the workers' attention to these types of accidents.

3. *Standard Safety Rules:* Rules for such departments as Mill and Calender Rooms, Tire Building Rooms, Cement Shop, etc., are now being formulated, and will be presented for discussion and approval. No set of rules can apply to *every* plant exactly the same, but they are being presented as the results of experience, and can be applied where needed.

4. *Engineering Standards:* There are many problems in which members of the Rubber Section desire aid and guidance. The Engineering Committee stands ready and willing to work on any problems presented by the members. At the present time they have presented a report on best types of floors for Mill and Calender Rooms, and they are working upon standards for making Mills and Calenders safe.

5. *The Inspirational Work afforded by a Good Program:* Meetings of the Rubber Section which may be called from time to time are of great

value, and all persons are urged to hand in their ideas relating to the subjects for discussion.

The present lends much room for encouragement. May the future bear out the hopes afforded by the present.

CHAIRMAN SCHOTT: One suggestion which has been made is the appointment of a committee next year on Publicity. The work of the Rubber Section has not been advertised enough. Possibly there wasn't enough to advertise, but during the coming year we want to let all the members and the general public know what work is being carried out in the rubber industry.

Address by Mr. James Newton Gunn, Vice-president of the U. S. Rubber Company, New York City.

### SAFETY AND THE MAN

J. N. GUNN, VICE-PRESIDENT, UNITED STATES RUBBER COMPANY,  
NEW YORK CITY

I have been asked by your chairman to give an inspirational talk, though after some acquaintance with the extent of your program and of the work in safety that has been done through all of the participants in the National Safety Council, I think that I can safely agree to do just that, but we will divide the task. You will get the talk and I know I shall get the inspiration; for the secret of your work is that you must and you will continually get your inspiration from your work, and from the magnificent opportunities which that work presents.

You are members of the rubber industry which stands in importance in the employment of capital and men and the influence on the lives of the world, and the people of the United States particularly, very high among basic industries. I wonder if we all visualize the extent of that, and the importance of the rubber industry and some of its peculiarities.

I am going to digress for a moment to give just this picture. The rubber industry is peculiar in that it is concerned with two principal raw materials—rubber and cotton—which are the only two vegetable products that are consumed wholly away from the land where they are raised. In the instance of rubber, the Englishman is the farmer and the American is the manufacturer. In the case of cotton, we are the farmers and he is the manufacturer. That is true to a substantial extent, for, as you know, the British have many more spindles than we and they are dominant manufacturers in cotton.

The rubber industry is peculiarly bound up with the recent development of industry of the world. Of course, I understand that recently the rubber industry has been going through a little experience that I firmly believe is just what we might call "having growing pains"; nothing more serious than that. But irrespective of immediate difficulties in the industry, it is so well founded, and its opportunities are so great, and because it is new and attractive, it has brought to its service the minds of some of the best men in the country.

## SAFETY MAKES BETTER MEN

It is rather necessary for us to know why we are interested in safety work. It is not sufficient reason that we are preventing accidents, that we are effecting great savings against employers' liability, that we are protecting plant and men and product, nor is it a sufficient reason that we are protecting the property of the shareholders. Those things to my mind are really incidental. They are second in importance. As a result of your work you are building better men—better physically, better mentally, and better morally.

You build men with more peace of mind if your work is well done. To show how important a factor that is, insurance men will tell you that annuitants enjoy a much longer life than other members of their class. As soon as a man or woman has an annuity his stress of mind is relieved. Now, if you can relieve the workers in your factories of stress of mind you are going to add to their efficiency and add to their lives.

I think it is also interesting to note that much of your work in safety is very closely akin to the work of instruction of a child to walk or of a boy to swim or to motor. You are teaching him the elementary things, but if you are going to teach him to walk well and to swim well and to motor well in time of danger or stress, he must be taught through intensive and accurate training. The initial training is simple, but it is only the intensive training that will count.

We have all had this experience. I have driven a motor car for many years. In the last two or three years I have driven comparatively little, but seldom do I ride in a car when an object that must be avoided comes into view, or a possible danger presents itself, but that unconsciously my left foot presses the clutch and my right goes for the brake. It is automatic.

## TRAINING MAKES MEN DO THE RIGHT THING INSTINCTIVELY

It is the general use of your scheme of education to free the individual of taking SPECIFIC thought so that he may in time of danger do the right thing automatically. The rigidity of military training has little other reason than to insure the individual in time of battle performing all the multiplicity of ordinary acts that have become the subject of his intensive training so that the mind may be free to plan and execute the required unusual act.

Training men to do the right thing is so vital, not merely for the immediate ends of safety, but to insure the morale of the men, that it is the thing that should be accentuated above all of the provision of mechanical devices and all of the supplementary things to which perhaps too much attention has been paid in your scheme of publicity. Right acting cannot be extemporized. Instinct alone will not save a man. Trained instinct and intensively trained instinct is the thing that must guide him. To make the right play in the game, to do the right thing instinctively in an emergency or crisis is the result of exact training. To meet the unavoidable accident in the best way involves possibly months and even years of precedent training.

**BIG BUSINESS HAS HEART AND BRAIN**

There is another thing about this safety work that I think is noteworthy, and especially at this time when there is such an amount of ignorant criticism from many persons against large aggregations of capital. Safety work is peculiarly the development of and the product of big business. It has been made possible by big business. It has been made possible by big business because big business has a heart and a brain, but the heart and brain of big business is an aggregation of all of the hearts and all of the brains that big business has brought into its service and to which it has given big opportunity. It would be useful, therefore, to have our men understand that and realize that big business has given great opportunity to them.

I have been very deeply impressed in the last few days in realizing the extent to which the life of one big business man has influenced the lives of thousands and hundreds of thousands of people. Within the week in New York passed on a great American, a great banker, a great Jew, a great man—Jacob Schiff. The genius of this man's life seemed to be his ability at all times to keep in touch and to feel the throb of the life of men in every line of activity and every plane of thought. His example is truly worthy of the emulation of every worker, big or little.

It is particularly noteworthy that the new attitude toward our industrial problems is peculiarly the product of the last few decades; during the revolutionary period of the last half century. I don't know how to make this clearer than to call attention to this fact that the Pharaoh of the oppression—I don't remember how many years ago it was that he lived; we don't know exactly, three or four thousand years ago—had exactly the same facilities of transportation and communication that Napoleon Bonaparte had, just as good. He had roads and he had horses and he had vehicles and he had labor. Napoleon Bonaparte had nothing more. The entire world history has been changed since the time of Napoleon by the development of transportation and communication, and you in the rubber industry have contributed and are contributing to the further solving of that problem.

**THE HIGHER FUNCTION OF SAFETY WORK**

There is another reason why it is necessary for us to get very clearly the picture of our problem. In one of the Jewish books of wisdom is this picture of industry. "How shall he become wise that holdeth the plow, that driveth oxen and is occupied in their labors? Without these shall not a city be inhabited. But they shall not be sought for in the councils of the people and in the assembly they shall not mount high. But they will maintain the fabric of the world."

It is your privilege and your duty and the privilege of all of those who are directing the activities of these large aggregations of capital so to train these men that while they are "maintaining the fabric of the world" they will also have a chance to think about other things than immediately about their work; to give them the intensive training that shall protect them and make better men of them. That is the kind of a picture that I

want to give you today of the vitally important thing, the important end of all of this safety work.

It seems to me it would be extremely important if we in the rubber industry and in others could bring about the better selling of safety; not the selling of safety for safety's sake but the selling of safety for the sake of training men. We must bring about a close correlation between our other industrial activities, our Americanization work, our general educational work, and our work in safety. If we could elicit the interest and co-operation of some of our large universities and technical schools, it would be useful. It is quite within the range of possibility that the rubber industry can take the initiative and create that needed interest. You will then have men coming out of these schools with an intelligent knowledge of what this safety work is all about, and make the impression at a time in their lives so that later when they get into positions of responsibility, executive and engineering positions, they will help in the up-building of public sentiment to a very much greater extent than you will ever be able to accomplish in other ways.

It is not only important to relate the Americanization and education of our workers to safety work to build up their self-respect, their esteem of sanitation and health, their pride in their organization. Build safety work into the whole scheme of good organization and administration. Sell safety to the salesmen, to the sales department, not because the salesmen are greatly exposed—they are not—but you need their help in your propaganda. I have studied many reports of safety work and they seem to deal too much with the mechanical details and often as though they were written by insurance men endeavoring to show how good a record they have made in saving their company from something. That isn't the real end. That is only an incidental thing. It is much more important to train men and to build men, and so cure the evil at its source.

#### SAFETY'S STRONGEST APPEAL

Safety is so closely associated in the minds of employers with insurance and with protection against loss that you have to wipe all of that out if you are going to build up a dynamic interest and accomplish the thing you are working for.

It is emblazoned on the outside of your program that "Safety must be incorporated into the civic and school life and organized as a community activity." You are not going to get that until you give them something else than the saving of much money and possibly the saving of a few lives. We are so accustomed to hearing of accidents and deaths that our sensibilities seem dead, but if you can sell the idea of building better men and building new men, it will galvanize our hearts and minds to action.

A number of years ago two children were playing with one of these dissected maps of the United States. After having the map partly fitted together, they suddenly brushed it aside and commenced to turn the pieces over. Their father chided them for their impatience and for not finishing their task. One of the two daughters, who were at work with

the puzzle, said: "Oh, father, when we get very, very tired trying to fit these old rivers and towns and things together, we turn on the other side and work on the Man." The father then saw the opposite side of this dissected map had a large picture of an American Indian. The picture was large and broad, and when they had worked that out, which they could do very readily and easily, they turned it over on the other side and had the other completed map of America.

That is your problem. After you have worked very hard over your mechanical devices and all of the petty things, for after all they are petty things no matter how interesting they are, just turn on the other side and work on the Man.

CHAIRMAN SCHOTT: Address: "Health Hazards in the Rubber Industry," by Mr. C. F. Horan of the Hood Rubber Company, Watertown, Mass.

### HEALTH HAZARDS IN THE RUBBER INDUSTRY

CHARLES F. HORAN, HOOD RUBBER COMPANY, WATERTOWN, MASS.

In order to consider the occupational disease phase of industry from the standpoint of safety engineers it is necessary that we understand something of the chemistry and physics of life and the physiology of the human animal. From a strictly physiological standpoint there is but one type of natural death. When an individual lives to a ripe old age and his body is filled with the end-products of natural metabolism—when his body is actually worn out—he alone can be said to have died a natural death. If this same individual had died when thirty years of age from benzol poisoning, typhoid fever, or an industrial accident, his death would have been an accidental one, as the bacteria of typhoid or the vapor of benzol would have been foreign substances to his animal body. Accepting this fact, we have accidental and natural deaths and accidental diseases. There are no natural diseases to the human body.

The problems of a safety engineer in industry would seem to be:

1. The prolonging of the individual's natural life.
2. The prevention of accidental deaths, whether due to traumatic or other causes.
3. The prevention of accidental diseases with their resulting poverty, misery, and economic loss.

It would seem, therefore, that one of the duties of a safety engineer is the preventing of occupational diseases and deaths. But in order to prevent diseases one must know what the diseases are, how they are caused, and how they may be prevented.

The occupational diseases may be defined as the unusual physical conditions due to specific poisons, mechanical irritation, physical and mental strain or faulty environment, resulting from the specific conditions of labor. They may be either acute or chronic; may be the cause of instant death, more or less prolonged invalidism, and incapacity for further work; and may lay the foundation for other diseases of equal or greater hazard. They arise from a variety of poisons, irritant substances and exposure to

unusual physical conditions. They are for the most part the outcome of conditions of modern life, whereby new combinations of substances are being constantly employed in industry. In some cases diseases arise from the general environment of the worker. In addition to the diseases derived from the hazardous occupations there are others, notably tuberculosis and pneumonia, which readily assail those whose physical resistance has been undermined by exposure to toxic substances or faulty environment.

Broadly speaking, occupational diseases may be due to one of three causes:

1. Poisonous or irritant materials which enter the body.
2. Conditions associated with methods of work.
3. General unhygienic conditions surrounding the workman.

In a general survey of the subject of health hazards, there are three factors to be considered; namely, the industry, the worker, and the worker's home.

The industry includes the special hazardous substances employed, the conditions of cleanliness, ventilation, temperature, light, hours of labor, monotony of work, and average weekly wage as against the number of living dependents.

The worker presents the problems of sex, age, individual physique, and natural or acquired immunity.

The worker's home may be so poor, ill-kept, and ill-ventilated and his food so insufficient that some disease may arise from the home environment rather than the actual conditions in industry. This is a fact that many of the investigators have neglected to consider in charging industry with producing more than its share of accidental diseases.

There are only three ways by which an industrial poison can be absorbed:

1. As a gas or vapor
2. As a liquid
3. As a solid substance or dust

And there are only three channels through which an industrial poison can enter the system.

1. By the lungs in breathing, either as a vapor or dust
2. By the digestive tract in swallowing
3. Through the skin itself by actual contact

Several other points naturally need to be kept in mind in considering occupational diseases; such for example as to how soluble the material is in water and how far it is able to dissolve fat. The rubber industry is very fortunate in having, because of its very nature, very few industrial poisons which are soluble in water. If rubber shoe and tire stocks were mixed with soluble compounds, we should lose our automobile tires and our rubber shoes the first time they were exposed to a heavy rain. For this reason most of the compounds in the rubber industry are usually very insoluble in water. On the other hand most of the solvents used in the industry are capable of dissolving fats. This tendency to dissolve fats is what makes benzol extremely dangerous to use.

In order to illustrate the seriousness of the occupational disease problem it is of interest that the 1915 Mortality Report of the Federal Bureau of Census shows the number of deaths from chronic poisons increased from 258 as an average from 1901 to 1913, to 636 in 1915. This is an increase of 150 per cent.

In Massachusetts during 1917 there were 73,320 days lost by the employees of industry on account of occupational diseases. The rubber industry with its 2.1 per cent of all the persons in Massachusetts industry, reported all of the cases of benzol poisoning and 8½ per cent of all the lead poisoning cases. One and two-tenths per cent of all the injuries reported to the Industrial Accident Board were due to occupational diseases. Of the fourteen fatal accidents reported in Massachusetts by the rubber industry since 1916, 67 per cent were due to occupational poisons.

#### OCCUPATIONAL DISEASES

In the rubber industry the occupational disease hazards begin with the washing of the crude rubber. The work in most of the wash rooms is fairly heavy and wet. The high relative humidity interferes with the elimination of moisture from the body; and there is danger from the constant wetting of the body. At the present time it can be said that there are no recognized diseases which are transmitted by the rubber itself, although there does seem to be an unusually large number of boils and carbuncles among the employees who handle the raw rubber. A bacteriological examination of raw rubber usually shows a number of spore-forming bacteria; but before raw rubber can properly be charged with producing infections, additional laboratory research work should be done. It may be that the infections are due to the fact that the employees who handle raw rubber also are exposed to much insoluble dust and the dust may be the cause of irritating the skin, and thus opening entrances for bacteria through the skin. However, in the light of our present knowledge we are compelled to say that we do not know whether or not any disease condition is caused by the rubber itself.

The mixing and compounding rooms usually present the seat of greatest hazard from the standpoint of an industrial hygienist. Here we find the hazards of lead, antimony, zinc, anilin, tar, mica, and various organic accelerators.

Of the lead compounds used in the compounding and mixing of rubber the most dangerous is probably white lead, the basic carbonate. White lead is more soluble than litharge and pound for pound is more poisonous, but it is not so light and fluffy and therefore—from a practical standpoint—is probably less dangerous. Litharge is of much more importance because it is used much more frequently and in larger quantities than white lead.

Lack of proper ventilating and washing facilities, personal uncleanness, and ignorance of the dangers from lead seem to be the major faults in most mixing and compounding departments. It is always of interest to see the excellent ventilating systems installed in the lampblack rooms and compare them with the lack of ventilation for the employees han-



dling dangerous lead compounds. In the rubber industry the lead salts are handled with a carelessness that is alarming. They are taken from open barrels, run through open casks, dumped and shoveled with as little care as if they were chalk or coal.

So long as the coal miners wear red tubes and the motorists insist on red tubes we shall always have the danger of antimony. I believe it has been conclusively shown that much of the chronic poisoning among typesetters is not due to lead or to antimony. The physical symptoms of poisoning from antimony are not unlike those due to the lead salts; and further that the miner or compositor is equally exposed to both lead and antimony. It is not improbable that some of the cases of lead poisoning are in reality due to antimony, or it might be that the employee is suffering with the results of a combination of the two metals rather than either metal by itself. In a case of industrial poisoning where the symptoms seem to indicate a condition due to lead and where it is impossible to recover lead from the excretions, the history of exposure to antimony should be carefully noted.

There has been much discussion as to the toxic effect of zinc, but it seems that those conditions which have been attributed to this metal have been due principally to other metals which have been associated with it.

#### DANGER FROM ANILIN OIL AND ITS COMPOUNDS

Probably the most dangerous materials which are handled in the rubber industry are anilin oil and its compounds. Anilin oil is produced by the action of hydrochloric acid and iron filings on pure nitrobenzol and carries with it many of the dangers of nitrobenzol. It is not improbable that the rubber industry has had a number of deaths from anilin or its derivatives but because of the difficulty in diagnosing the diseases, the deaths have probably been reported as due to heart disease. It is of importance to remember that the exposure to anilin need not be for a long time for serious symptoms to arise. There have been two cases reported in Jena which came on after an exposure of only two hours.

The records of the State Board of Labor and Industries of Massachusetts show that in three years, five employees in the rubber industry died of benzol poisoning. Many of the rubber factories continue to use this material as a solvent and its continued use is a real danger. Proper ventilation, which means an air change of at least forty times an hour, or the substitution of naphtha, or xylol compound for the benzol, are the only safe methods of dealing with this material. The English rubber concerns are substituting xylol compound for benzol. So far as I know none of the American industries are making use of xylol compound. I am not acquainted with the chemistry of this compound as it is said to have been discovered by the English Ministry of War and is produced only by English concerns. Many of the experienced rubber men object to the use of naphtha because of the fact that it is almost impossible to evaporate all of the naphtha from the cement. Benzol or xylol compound do not present this difficulty.

Because of its toxic hazards and its liability to oxidation, carbon-di-

sulphide should give way to carbon tetrachloride and even when the latter is used adequate ventilating systems should be installed.

Recently the addition to the rubber stock of hexamethylene tetramine has produced among the employees a typical formaldehyde rash. There seems to be a direct connection between the acidity of the employee's sweat and the susceptibility to this rash. Several of the rubber factories have tried to neutralize the acids in the sweat by the use of alkaline washes but this has not worked out as satisfactorily as might be expected. Substitution for this compound by some other accelerator would seem to be the safest method that could be adopted.

Owing to the increase in use of certain organic accelerators in the vulcanizing of rubber; and the fact that many of these compounds are sold under trade names which do not indicate their true hazard, it is suggested that the various rubber factories take steps to ascertain the true nature of their accelerators. The Committee on Organic Accelerators of the Rubber Section, American Chemical Society, has done some interesting work along these lines. The short report of the committee was published in the October, 1918, issue of the Journal of Industrial and Engineering Chemistry.

#### SUGGESTS COMMITTEE ON HEALTH HAZARDS

Considering the fact that 67 per cent of the fatal cases in the rubber industry in one state have been due to occupational diseases, the necessity for the appointment of a Committee on Health Hazards within the Rubber Section would seem to be needed. I shall leave this suggestion with you and hope that before the sessions of the Section are over that some action will be taken for joint co-operation among the various rubber companies for a reduction of occupational diseases peculiar to this industry.

#### DISCUSSION

MR. HORAN: I recommend that we have a Committee on Occupational Hazards in the Rubber Industry, and that it be one of the duties of that committee to get in touch with manufacturers of organic accelerators under trade names and either get information from them or otherwise and advise the members of the section of the dangers from each individual organic accelerator.

CHAIRMAN SCHOTT: I think that suggestion will be well taken and presented to the chairman for the following year for his consideration. Undoubtedly an important step forward can be taken by following out Mr. Horan's suggestion.

MR. HORAN: Both industrial physicians and the family physicians are soon going to be able to make better diagnoses on occupational conditions. There is constant agitation for health insurance and the people who want health insurance want all the information that they can get.

We must act by first of all finding out what our hazards are in the particular plants, and working with the industrial physicians and the family physicians in getting correct diagnoses. We have had three or four lead

poisoning cases reported by the family physician in cases where the employee was a boot stripper. The only lead he is exposed to is the lead in the boot. We went to the Board of Labor in Industry and they said: "Sure, your men have lead poisoning." And we said: "How can they get it from a vulcanized product?" "We don't know how they get it, but they have got it." So we went to Harvard Medical School and Johns Hopkins, etc., and asked that they give us the approximate chemical constituents in human sweat, and we made up three or four hundred samples of synthetic human sweat and we tried to dissolve lead out of a vulcanized product with human sweat, and it can't be done, and if your industrial physician or family physician tells you that a boot stripper who handles a finished product gets lead poisoning, you tell him it absolutely can't be done.

MR. OLMSTEAD (DuPont Fabrikoid Co., Newburgh): In regard to benzol poisoning, is there a way to build up men after they have been slightly affected?

MR. HORAN: In order to answer that you have to first of all look into the chemical and physical effect of benzol on the human body. This is apparently what happens. The benzol either is taken in through the skin or breathed in through the lungs and is taken up by the blood supply. It dissolves quite a lot of fat. The temperature on the inside of the body is hotter than the temperature on the outside of the body, and as a result the blood in the heart or around the inside of the body can hold more benzol per cubic centimeter than cold blood can. The blood comes to the surface and is cool, and just as soon as the temperature drops some of the fat drops out and you have a supersaturated solution of fat. Some of the fat drops out and blocks up your blood supply.

We had five cases of benzol poisoning, all acute cases. All of them died. That is the disadvantage of benzol—you don't know that you have a case of it until somebody is sick, and then there is practically nothing to do but let them die.

MR. OLMSTEAD: We have used benzol for a great many years and never had trouble until this year.

MR. HORAN: We use benzol but it is all under cover. We make a tire with a double vulcanization. We put the fabric on the core and then take the core to a stand. A man puts the chafing strip on, wets the cloth with benzol and holds it on the tire and turns the tire, wetting it with benzol. Then he puts a little white shiny cloth on the tire so that when he puts on the first vulcanization the chafing strip won't become dirty. I think benzol poisoning could have been prevented there by merely having them turn the tire the other way. It is well to remember that most of the solvents used in the rubber industry are heavier than air and if you use benzol or naphthol or sulphur chloride and you want to ventilate you must exhaust at the floor. Take benzol vapor—if benzol vapor was poured on that table it would run off just like water does; because you don't see it run off, however, you think it doesn't. So when you are going to ventilate in the rubber industry, first of all find out whether your material is heavier or lighter than air, and then you will know what to do.

MR. IRVING: Where you object to the use of aniline as an accelerator in tire factories, the people in charge usually tell you that they use it only for a short while, and therefore they don't have any constant danger. Two weeks ago I read of two fatal cases of anilin poisoning where the employees were exposed less than two and one-quarters hours. When they tell you that they don't have any anilin hazard, call attention to the fact that there were two fatal cases reported where the employees were exposed less than two and one-quarter hours.

MR. R. N. WATSON: Another point in connection with these fumes and gases that I run into, and that is when I go to the Engineering Department with a proposition it is a question to them of when do the gases reach a point which is dangerous. That means fire danger as well as the health hazard, and as safety men we are interested in that too. I have been working for the past year on an apparatus which would show the percentage of gases in the air. I had written all over the United States and several other countries trying to find if there was such an apparatus made. We couldn't find anything that was satisfactory so we had our experimental laboratory work on the proposition and they have developed an apparatus which will show the percentage of gases in the air. The apparatus has an explosion chamber. The gases are sucked into that chamber and there a heating element explodes or ignites them. It works on the principle based on the percentage of gas exhausting at a rising temperature. The higher your percentage the greater will be the temperature rise in your explosion chamber.

We can't say that the thing is down to a fine point yet, but we are now having some of them made up for use in our cement mixing departments, spreader rooms, drying rooms, and such places where we know the gas vapors do become dangerous. If we can get an apparatus it will have to work on a continuous recorder system, and we are working this thing out so that as the gas percentage rises if it gets within a certain pre-determined amount, within a certain pre-determined distance of the danger point, it will sound a signal and you can stop your operations then or proceed to get more ventilation. I don't know whether the medical profession is ready to say just what percentage of gas is injurious to the man, but I am ready to say what percentage of gas is explosive, and that is one of the things that enters into it. I thought some of you might be interested in knowing that we are working on an apparatus of that kind.

MR. OLMSTEAD: Would the variation of humidity make a big difference?

MR. WATSON: Yes, we are taking that into consideration. All of our spreader rooms and cement houses have humidifying systems in them. That makes some difference in spreading cements on fabric, etc., in connection with your static propositions, and we have already provided those, except that in our bead drying rooms we haven't such devices. This apparatus should show you when it is necessary to humidify your room or raise your humidity figure.

CHAIRMAN SCHOTT: One of the problems which confronts us is the problem of ventilation, and in some of our factories the complaint has been made that the rooms become excessively cold in winter if you in-

stall a large number of fans in the rooms to take away the gases. It is simply a question of proper ventilation. In our plant in the millroom the incoming air is brought in through ducts and it is warmed before entering the room. In other factories it may be a case that the fresh air is simply drawn in through openings in the windows and in the walls, etc., and a considerable amount of attention ought to be paid to the manner of supplying the fresh air to the room. As many men will tell you, it is almost impossible to properly ventilate a mill room or calender room because the room becomes so excessively cold in winter.

MR. E. A. HOENER (Firestone Tire & Rubber Co., Akron): The only ventilation system we have had or ever attempted to install is the type that you mention of warming the air previous to putting it into the room. That is, in the winter time. We have found it impractical to do anything else. The great difficulty we have in addition is that the men, no matter what we do, insist upon opening windows, and especially in operations in the tube department where there is a series of acids and that sort of stuff. We have a great deal of trouble through the men opening the windows, which spoils your ventilation system. It is hard to convince a man that we are supplying him with washed fresh air. He seems to think if he is working next to a window that if he opens it he gets better results. That is one condition we have always had to fight against both summer and winter. We have never had any great trouble in our mill and calender rooms because we have always heated the air before putting it into the department.

MR. HORAN: We haven't paid much attention to ventilating the calender room. Our mixing room is entirely separate from the calender room, and we do exhaust air above the mixing mills. There is a formula that I found in the Harvard Library for determining the velocity needed to remove a given dust. The formula is that the velocity equals seven hundred times the square root of the weight of a cubic foot of the dust. You weigh the cubic foot of dust and find it to be 144 pounds; your velocity would be 700 times 12. That ought to be valuable in designing ventilating systems, especially where you are trying to handle dust removal.

MR. W. H. LARKIN (U. S. Rubber Co.): One of our plants in the vicinity of Boston ventilated a mill room with 54 mills in it by putting in the usual type of hoods over the mills. We found that not only did we take the air from the room and remedy the condition of dust, but we made it so cold we could not keep the men warm enough, and we had another room next year which was added to it and that made the condition so bad that we shut the plant down. The only remedy we had suggested was by the Sturtevant people who tried to sell us their air washer, and I think it is quite possible that the air washer might be a solution.

For these two rooms the dust and air were exhausted through a 48-inch pipe. The result was that we removed the dangerous dust and the poisonous pigments possibly from the mill rooms and simply deposited them in a new place, and to overcome that we finally moved them to the penstock, and the landscape was pretty white in that vicinity, even at that.

Ventilation in the mills presents several problems which need additional study.

MR. HORAN: When you exhaust the dust when you are mixing in compounding rooms you can run most of the dust through a cyclone separator and recover about all of the heavy dust. Some dust wouldn't be recovered there. You can then take and run it through an air washer. If you do that you won't get much talc back. If you put some liquid soap in the air washer the soap bubbles do take off some of the talc dust or you can use an electrical system. My idea is to use a cyclone separator and an air washer with soapy water in the air washer. I think that will be probably developed within the next year or so.

MR. E. A. HOENER: We have a system of drying crude rubber, and if that air from drying the crude rubber were put through an air washer, would in your opinion there be any harm if we exhaust that, for instance, into the mill room as a heating unit or system in heating the mill room? Our mill room is very large. It is one great big room and we do experience some trouble especially in the morning when we start out, before the mills give any radiation at all.

MR. HORAN: You could undoubtedly do it. I wouldn't even wash it. You have got a highly volatile odor and we haven't been able to take out any of that odor with an air washer. I think it would take something a little stronger than an air washer to take some of that odor out, but if you can get it by your employees' noses, I would say it would probably be safe to do it.

MR. C. E. MURPHY (Ajax Rubber Co.): In Mr. Horan's paper he passed over lightly boils and carbuncles. In the past year we have had a lot of trouble. He said that in the compounding room few cases occur. Most of them have happened in the finishing tube room rather than in the compound room. I would like to hear the experience of some of the other members on that.

MR. HORAN: The question of boils and carbuncles might be caused from many conditions besides those in the rubber industry. We know that certain nationalities—take the negro, for instance—are very much more susceptible to pulmonary tuberculosis than others. The Armenian is very susceptible to some infections and the Syrians and the Italians are subject to other infections that apparently don't seem to touch other types of people. I think we have got to be very careful before we say that either raw rubber or a finished product is causing boils. It is perfectly possible for a very sharp dust—take dust from an emery wheel, if it was rubbed into the skin it might produce lesion that might be easily infected. The dust from talc or soapstone, on the other hand, because of the fact that the dust is rounded probably wouldn't produce that, and if he is getting it in the finishing room and it is due to the finishing room and not to nationality or poor housing conditions or other exposure to infections, I would say that it was probably due to the sharp particles of dust rubbed into the skin. I have never known of cases where that happened, but if it is due to the industry it would probably be due to that particular cause.

MR. LARKIN: Is the rubber mill a place where the slightest scratch results in blood poisoning and infection? I have never fully believed it.

MR. HORAN: To answer a question like that properly one should have some statistics on a number of cases. I am trying to get that this year. Infections might be due to rubber. I don't know whether they are or not. They are probably not. In the rubber industry, as I said before, we use insoluble compounds that aren't soluble in water and are quite difficult to wash out of the hands, and I can see a possibility of a man cutting his finger and getting some insoluble compound into it, and in another industry he might get salt or chocolate or sugar or something else in it that would dissolve in water and wash out. It might be that because of the fact that the compounds are insoluble they don't dissolve and they keep the incision open, and keep it open for a longer time than they do in chocolate industries or some other industry, and for that reason the employee is exposed to infection. It might be that in a chocolate plant a wound might heal up in two days, and it might be that in the rubber plant, because of the amount of dust and the fact that the dust is insoluble, the wound would not get a chance to heal up for a week, and that means that the employee is exposed to infection for seven days whereas in the other case he is only exposed two days. Or it might be due to the fact that he is getting it from the rubber, or it might be that there isn't anything to it. I don't know.

The only way to find out would be to take the number of treatments on account of boils in your hospital by departments and by sets—perhaps by nationality—and add a couple of factors of safety and make up your mind. But up to the present time I don't know of anybody that has done it. I am trying to do it.

MR. MURPHY: In answer to Mr. Horan,—I investigated in all our departments on boils. We only employ foreigners in our curing room. We have very few boils in the curing room. I contend that if it is rubber we must have boils then in the mill room. In the mill room we never had a boil. Practically everything we have had is up in the tube room, and also in the finishing room, and they are about 80 per cent Americans, and 90 per cent of them at that time were under 33 years of age, so they are all strong, healthy, young blood.

MR. HORAN: A bacteriological examination of the pus in these boil cases might tell one thing or another. That is, you may find that one man's boils were due to one particular organism and another fellow's were due to something entirely different. Unless you find the same type of organism all through all your cases of boils, you could rule out any one particular kind. If you find that one was a scrofula and another something else, you know that they are not due to the same cause. If the infection is different they couldn't be due to the same organism and couldn't be due to industry. It is merely a coincidence that everybody happened to have them in that department.

MR. H. F. KEATING: Is there any figure showing the ages of the employees afflicted with boils and carbuncles? As I understand it the youth is more subject to boils than men of a riper age.

Mr. HORAN: Young people have more boils than older people. Young people have more whooping-cough and young people have more measles and scarlet fever than older people have. The first reason is that with whooping-cough or scarlet fever or measles after you have once had them your blood, your white corpuscles, are educated as to how to deal with these micro-organisms. Now the youngsters get boils, and they get an immunity to the particular organism that causes the boil, and the older people don't get so many because they have already had them. Everybody doesn't become immune, but some people do get a fairly good immunity to a particular micro-organism.

As to whether or not they are beneficial—a boil is mainly a lot of pus and I would assume it is beneficial to get the pus out of the system, to get rid of the toxins and the old dead micro-organisms and dead blood cells. That is, if you have a boil it is a good thing to get rid of, and if you don't have one I wouldn't say that it is a good thing to get.

The work in the rubber industry does not result in boils except in the fact that the dust might keep your entry for micro-organisms open. I don't want anybody to think that I came in and said that the rubber industry—everybody in the rubber industry—was going to die of poisonous carbuncles, because I don't believe it.

ADJOURNMENT.

#### THURSDAY MORNING SESSION

THE meeting was called to order at 9:45 A. M., by the Chairman, Mr. Sidney M. Schott.

CHAIRMAN SCHOTT: "Safe Methods of Handling Products and Material," by Mr. P. B. Martens of the Firestone Rubber Company.

#### HANDLING OF MATERIAL

P. B. MARTENS, MANAGER LABOR MAINTENANCE BUREAU, FIRESTONE TIRE AND RUBBER COMPANY, AKRON, OHIO.

This subject covers a great many items and it is impossible to touch upon all of them in the time allotted. However, we find that a great many lost time accidents occur while material is being handled. In a great many cases mechanical guards cannot be placed, and we therefore have to resort to other means of safeguarding, namely, by educational methods.

This requires the support of the foreman and his assistants, and we feel that the foreman should be held responsible for all accidents in his department, if he has not rigidly followed and enforced the following method:

1. Instruct each new workman carefully as to his duties, especially call his attention to the danger pertaining to same, and point out to him the unsafe methods.



2. He should make clear to workmen how to use the safety devices, and insist that his instructions be carried out.

3. He should make follow-up inspections and see that his men are using the safety appliances. He must not relax his vigilance in the use of safety methods.

4. He should not hesitate to reprimand or if necessary dismiss men who continually disregard safety instructions.

The foreman who follows the foregoing rules will soon eliminate the careless and shiftless workman, and accidents will be cut down to the minimum. Co-operation of this kind must be given by the foreman before we can hope to obtain the desired result in educating the workmen to use safe methods. We must convince the workers that they themselves are the greatest losers when injured. Statistics show that 80 per cent of all accidents are due to carelessness, and could have been prevented. Therefore, the management, foremen and workmen should all assume responsibility for accidents.

#### CAUSES OF ACCIDENTS

We may put causes for accidents in two classes:

1. Carelessness, indifference, recklessness, poor judgment, lack of forethought and inexperience.

2. Lack of proper safeguards, defective tools, and defective machinery.

The causes of Class No. 1 can be overcome by consistent efforts of the foreman and his assistants, while the causes in Class No. 2 are more easily controlled, for every progressive concern wants to have its equipment guarded, and it is only a matter of inspection and installation of the required safeguards to machinery and the replacing of unsafe tools.

In the tire industry, about 60 per cent of the lost time accidents are caused by drums and cores falling upon employees' limbs and feet. In a great many cases these injuries result in partial disability. Investigation of these cases show that men frequently disobey the rules and attempt to carry tires alone, or run while carrying tires. Workmen should not be permitted to carry alone any tire over 30 inches by 3 inches clincher type, and when they carry any tire alone they should be shown how to carry them in a safe manner. We have found workmen carrying tires looped over their heads leaving the tire hang on their necks and shoulders. The workman who carries a tire in this manner has no chance when he slips or stumbles. Therefore, the method of carrying tires while on the core must be looked after very carefully. Sizes above the 3½-inch type should be carried and handled by two men up to 5 inches. Above the 5-inch sizes they should be handled by mechanical devices, either chain block or air hoist.

The foregoing also applies to solid motor tires. Workmen should not carry sizes above 4 inches alone, and when carrying this small size alone they should be carried so as to permit the top of the tire to rest against the body. Tires should not be carried with the entire weight upon forearm, as this is liable to cause strain or perhaps rupture.

Dropping of tires either pneumatic or solid will cause damage to the tire as well as injury to the workman. When a solid tire is dropped the

result will be a flat space in the rim, and this will cause trouble when applying the tire. The result of dropping a pneumatic tire while on the core is a cut in the fabric. Therefore, great care is necessary when handling tires.

When rolling tires or cores, workmen should only handle the same diameter at a time, never try to roll two or more diameters at the same time, because the larger sizes will travel ahead of the smaller and the usual result is a smashed foot. New workmen should not be permitted to roll more than one tire or core. Experience will determine the number of pieces which each workman can handle, and the condition of the floor should also be considered.

#### TRUCK HAZARDS

When trucking solid tires, we recommend that they be placed on the truck standing against solid support on one end at an angle of 80 degrees, and the last tire should be on an angle of 60 degrees, or just low enough so that the top of the last tire will fit under the inside of the second last tire. This will form a lock and prevent the tires from falling over, even if the truck should strike a depression on the floor.

When piling solid tires they should be laid flat on the floor, and the flanges of the rim base must be straight on top of the lower tire. This will give you a rigid stack of tires, but if they are not piled straight a jolt against the stack is liable to topple it over.

All aisles should be kept clear and wherever possible we recommend that a permanent clearance line be painted on the floor. This should be done at all elevators at each floor, and all trucks should be kept on the outside of this line. This will prevent loss of time while elevator unloads, and it also eliminates the danger of trucks striking against the elevator gates or being caught between the floor and elevator. Height of loads on trucks should be at least six inches below the elevator gates, and the practice of the elevator operator assisting truckers to move trucks on or off the elevator should not be permitted. The operator should be at his control levers at all times. Operators should also be instructed regarding the safe carrying capacity of their elevators, and if in doubt as to the weight of loads to be taken on, they should not hesitate to get the exact weight from the supervisor in charge.

The unloading and storing of crude rubber is the cause of injury very frequently. Workmen while breaking the boxes or while removing the covering from the bales receive cuts and lacerations, which in their judgment appear to be minor, and the usual neglected infection is the result, because the workman did not go to the hospital to have the injury properly taken care of.

Great care should be used in piling crude rubber, especially the bales, and if not properly bound by cross pieces, the pile will be very likely to fall over, as rubber will settle, especially in hot weather.

We recommend the use of a three-wheeled truck for trucking single rolls of fabric. This will enable the workmen to use one hand to steady the roll on the truck to keep it from falling when he strikes a bump or

depression in the floor. This truck should be a warehouse truck with a swivel wheel attached, which will take the weight of the load and permit the trucker to use one hand to steady the roll.

#### INJURIES FROM IMPRINT TINS

The tin used to imprint the serial number on tires has been the cause of many injuries. The tin is very sharp and when workmen remove it from the tire they cut their fingers. In some cases the tin will be covered by the stock and leave only a corner of the tin projecting, and when the workmen handle the tires, there is great danger of cutting their fingers. The elimination of this evil should be given consideration by this section. There is need of a substitute for this method.

Workmen cut and puncture their fingers while handling stock books, caused by loose nails or wires. This can be eliminated and inspection should be made to see that nails are all properly cleated, and when cleaning the books, the inspector must remove the wires or cleats which have been left in the books.

At the present time conveyors are being installed and large quantities of material formerly handled on trucks, is now moved by conveyors. This will eliminate many hazards, but the safe guarding of the conveyor must not be overlooked. The hooks which carry the material should be so constructed that material will not fall from them, and the runway should be so guarded that workmen will not be able to get their hands caught in the guide rail or under the wheels.

Accident prevention while handling material must be accomplished through educational channels, as a very small portion of this work can be mechanically guarded. Therefore, local conditions must be taken care of as they come up, and each case should be handled individually.

#### DISCUSSION

MR. W. H. LARKIN, JR. (U. S. Rubber Co.): In a mechanical mill a great many accidents are due to the fact that they take a bolt about ten feet in diameter and try to roll it along like a hoop. We have frequently had serious accidents from that cause.

MR. W. N. FITCH (B. F. Goodrich Company): In regard to the question of the men working in compound rooms eating their meals, I think that the best scheme is to provide wash rooms and, in addition, a lunch room. Whether you furnish a lunch or not, furnish the material so that they can eat there—tables and chairs, etc., and insist upon their going in there and washing. Even insist upon their lunches being left there.

MR. LARKIN: It also brings in the same old question that one of the crying needs of the safety game today is to enforce the rules and get the foremen interested.

MR. FITCH: Not only get the foremen interested, but you have to sell it to the men. You have to get those men to understand it, and you have to get up there yourself and explain that situation. If you build a lunchroom or a space set aside, a space for lunch where it is clean and

healthy and there is plenty of fresh air, and a table, and if you perhaps furnish them with hot coffee, or something to coax them across—and have them go through a washroom to get there, not allow them to go into the lunchroom until they have washed their hands—I think you could sell it to them and get them to see it. They will enjoy it after they have once gotten into it.

#### ELEVATOR GATES

MR. R. N. WATSON (Goodyear Tire & Rubber Co.): Regarding the problem of the elevator man helping a trucker push his truck on or off the elevator, I find that it is very hard to eliminate that practice, and the management doesn't seem willing in most cases to supply enough truckers to push trucks off elevators. If the load is heavy the elevator will sag a little under the cables, and it is sometimes hard to get the truck off. The elevator man will invariably give it a shove off, and the possibility of a truck being pushed on or off and striking the handle of the controlling lever has been quite a problem. We have finally put a little lock-bar on that which can be dropped down into position if the man wants to leave his elevator. It is also provided with a padlock to lock the elevator in case a man wants to leave the elevator for any reason, and I think that is a matter that might be looked into.

CHAIRMAN SCHOTT: The elevators we use at our plant are of two types. We have in our old buildings what is known as the Christianson gate, a gate which collapses vertically and when that gate is up you cannot move the elevator more than four inches above or below the floor level. The minute that the elevator gets above or below the four inches the power is automatically shut off and a brake is set. The reason that we allow the four inches leeway is for the sag in the cable when a heavy load is going on or coming off of the elevator. It is impossible to move that elevator unless the gate is down.

In our new buildings we have another type of gate which is furnished by the Houghton Elevator Company. There are two gates, one of them travels with the car and the other one is at the floor landing. When the elevator comes to the floor landing and we want to raise the gates there is an interlocking toggle device and both gates go up simultaneously and the car is then locked in position at the floor level, and when we want to move the car both gates must be lowered and the car is then ready to move either up or down. The gates are rather heavy and they require a counterweight and a good steel cable. That is the only thing I could see that would possibly even remotely be of a dangerous character, because if those gates ever fell it would be rather serious.

MR. HOENER: We have an Otis elevator of the microdrive type, which is an automatic floor leveling device. It is worked by means of a small worm drive in connection with a floor limit device. In other words, when the elevator gets within about 6 inches above or below the floor, the operator shuts off the power and automatically the elevator is brought to an exact floor level, and if a heavy load is put on the elevator it will automatically rise, at a very slow pace. It will rise so slowly

that no possible accident could ever happen to it. And then we use a Quincy elevator gate with the gate mechanism on top of the elevator, and it is handled by two chains, one on each side. It is a very heavy gate also, and the elevator cannot be moved when the gate is up even an inch off its proper location on the floor.

Mr. Scott: I have seen that work very satisfactorily, that Otis lever device, but I know of a case where they weigh about 450 to 500 pounds. It is in a large gas plant, and they have heavy coal cars. There is a possibility of them shoving these cars against the gates. They have very heavy steel gates with bumpers on them. A regular lifting device and a hydraulic is used and works very satisfactorily. You can't move the car until the gate is shut, and you can't open the gate until the car is at a full stop. They have been in service for a number of years.

#### FLOOR LOADS

Mr. LARKIN: We have a great many old buildings and many of these old buildings are used for storing material. All buildings used for manufacturing purposes or for storing material, where there are heavy weights on the floors or variable weights on the floors, should be posted with signs saying: "This floor will carry 150 pounds to the square foot," etc. In one building there was a heavy load on the third floor, and a great many people working on the first and second floors. The superintendent had on the third floor about 600 pounds to the square foot. The floor boarding was good for 600 pounds to the square foot; the joist was good for 500 pounds to the square foot; the girders were good for 300 pounds to the square foot; the columns were good for 150 pounds to the square foot; the column caps good for 75 pounds to the square foot, and how the building stood up I don't quite understand, but it was there. They often say a building stands up because it is used to standing.

That is something that more thought and attention should be given to.

Mr. A. KORINGEL (Mechanical Rubber Co., Chicago): We have an inspector who looks after that. They come around once a year and inspect the buildings, and if they find the floor card is gone they make you put up another one pretty quick. They have to approve all these cards after they are printed. They take the measurement and it is approved by the building commissioner.

Mr. LARKIN: Undoubtedly the building inspectors have charge of that, but nearly all the city departments are overworked and they come when you send for them and not otherwise.

#### PILING CRUDE RUBBER

CHAIRMAN SCHOTT: One subject of common interest to all the people in the rubber industry is the handling of crude rubber itself. Rubber comes in various forms, bales, biscuits and boxes. When the rubber comes into the plant from the freight car, the first problem is that of piling it. Our rubber storerooms are long buildings with an aisle down the center and we formerly stacked our rubber simply in large piles. We found

that in the case of boxes the wood was rather flimsy and broke, and if the piles were too high the boxes fell over. If there were bales they also fell, and biscuits, of course, just had to be piled in a mound. We therefore constructed bins in our crude rubber department. These bins are about 15 feet wide and 20 feet deep, and all our rubber is piled in these bins so that there is no danger of the rubber tipping over. This also aids in the sorting of the crude rubber.

Down the center aisle we have a portable electric elevator conveyor, so that when the rubber is piled up above the height of five feet, the men do not have to lift the bales at all but they simply throw them over on this electric elevator conveyor, and we can convey our rubber right to the back of the bin, and simply move the electric conveyor around to all parts of the bin and pile the rubber evenly, and there is no danger of the rubber tipping over.

This is a solution of a serious problem because so frequently men are injured by the piles of rubber tipping over.

MR. H. F. KEATING (Morgan & Wright): Our experience has taught us that more accidents occur in the unpiling of the biscuit than in the unpiling of the boxed rubber. We have put a rule in force that in piling biscuit rubber they have to be piled bonded. Between each layer of biscuits planks must be placed. Since we have put that rule in force we haven't had any accidents at all in that department due to this cause.

CHAIRMAN SCHOTT: "Safety and Sanitation for Rubber Mills and Calenders," by Mr. C. B. Mitchella.

## SAFETY AND SANITATION FOR RUBBER MILLS AND CALENDERS

C. B. MITCHELLA, THE B. F. GOODRICH COMPANY, AKRON, OHIO

Safety and Sanitation for Rubber Mills and Calenders covers many opportunities that if discussed fully would fill a large volume. Many schemes have been tried with varying success for accomplishing the same purpose, and it is the intention that this paper shall present only the most important precautions and the most successful installations.

### EDUCATION OF OPERATOR

Although the education of the operator is the most important of all precautions in preventing injuries on mills and calenders, this part of the subject will not be presented in detail; instead, the discussion will be confined to mechanical safeguards. However, a few pointed suggestions or rules, to develop mental alertness of the operators are submitted as follows:

#### General Rules

1. Follow instructions of your foreman and your inspectors only.
2. Wear no clothing which can be caught in the machines, such as long sleeves, loose neck ties, aprons, or unbuttoned jackets.

3. Keep your eye on the job all the time, and give your work your entire attention.
4. Keep your hands off moving rolls.
5. Never force the rubber into the bite of the rolls with your hands.
6. Never oil, clean, or repair your machine while it is in motion.
7. When cutting stock off roll, always cut below the center.
8. If you feel ill, or in such condition as to interfere with your work, report at once to your foreman.
9. Stop machine at once in case of emergency. Do not wait for instructions.

*Rules for Mills*

10. Never allow your hand to go past the top of the roll, and never reach over one roll to work on the other.
11. Watch your hands when the rubber folds over. Don't let them get caught in the folds. Be careful in doubling the ends of batches when "batching out."
12. Never cross arms when cutting or rolling stock from the mill. Learn to cut and roll with both hands. When cutting from left to right, cut with right hand and roll with left; when cutting from right to left, cut with left hand and roll with right.
13. Never take anything out of the rolls while the mill is in motion. Stop the machinery.
14. Never stand on the mill pan, compound boxes, platforms, or make-shifts.
15. Never work with one hand under the rolls while the other is above them.
16. Take care not to catch your fingers between the guide and roll.
17. The back roll of the mill runs faster than the front. Be careful.

*Rules for Calenders*

18. Never pick stock out of the bite of the rolls.
19. In starting end of liner in building up plies, keep your hands at least six inches from the rolls.
20. Never start calender unless properly signalled.

## SAFETY IN OPERATION OF MILLS

*Safeguards on Mill Parts*

**Safety Throwout to Stop the Mill:** A horizontal safety throw-out bar heavy enough to resist the struggling of an injured operator should be placed over each mill roll. These bars should be located six feet above the floor upon which the operator stands, and in plan be located eighteen to twenty-one inches to the front and rear of the bite of the rolls. (Fig. 1 illustrates this double type of throw-out.) The cross bars are made of one-inch steel rods rigidly attached to the double levers.

There are three predominating methods of cutting off the power from the mills: (1) Magnetic clutch brake mounted on motor shaft; (2) mechanical clutch on either the drive gear of mill, or on the motor shaft; (3) dynamic braking of the motor. From the experience the writer has

had on all the above types, recommendation is made to use either the magnetic clutch brake, or the dynamic brake, preferably the former, and the discussion is confined to those types of apparatus. If the magnetic clutch brake is used, it is best to place over one housing of each mill an electric cut-out switch. Many installations of mill lines have been made with only one switch for the whole line, the switch being operated by a cable running from one end of the line to the other, or operated by an equivalent rod. This method is not perfectly reliable because of the lost motion due to the variable tension in cable, or the torsional deflection and binding of rod, any of which will slow down the responsiveness of

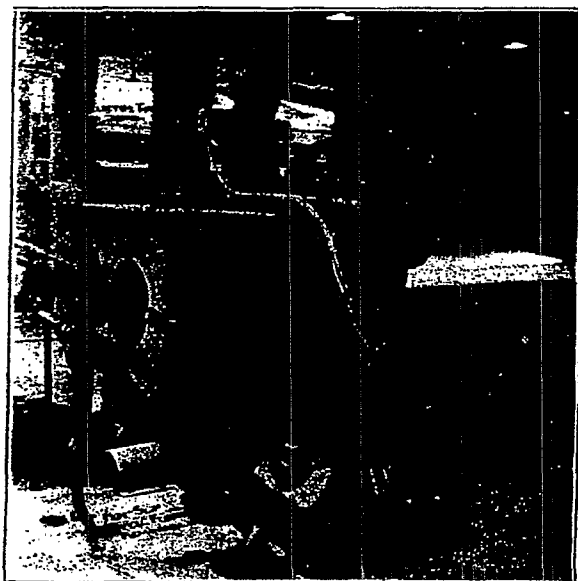


FIG. 1. DOUBLE BAR SAFETY THROWOUT TO STOP THE MILLS

the switch. In order that the cut-out switch may be opened with the least travel of the safety throw-out bar, the switch spindle should be geared up to the throw-out lever shaft in a ratio of about five to one. Consequently, it is not necessary to move the safety bar a distance of more than three and one-half inches either up or down. The travel of the safety bar and lever is limited by an adjustable stop, which prevents damage to the electric switch by being thrown too far, and which makes the safety bar more rigid to resist the struggling of an injured operator. It should not require more than a five pound force on safety bar to throw the switch. The electric switch should be entirely enclosed so that dirt cannot gather on contacts. The wiring from the mill switches should be carried in conduits down the housing, and through the mill pits to the panel board and magnetic clutch. The brake on the magnetic clutch should be operat-



ed by a counter weight and be capable of bringing the mills to a complete stop in one second. While the mills are running this counter weight is held inoperative by a solenoid electrified by a circuit which connects the mill safety switches and the clutch (Fig. 2). This circuit is fed through circuit breakers which are held closed by a solenoid operated latch. After the clutch circuit is broken these circuit breakers cannot be closed except by operator's going to panel board and re-setting by hand. Therefore the clutch cannot be engaged if operator should first close the safety switch. It is probably useless to describe the well known construction of the magnetic clutch, but it may be mentioned briefly that this



FIG. 2. SOLENOID HOLDING COUNTERWEIGHT INOPERATIVE

clutch is of the disc type, the two discs being drawn together by electro magnets.

Dynamic braking is accomplished by cutting off the current which feeds the motor and at the same time places a low resistance short circuit across the brushes of the motor armature. The motor then acts as a generator requiring considerable driving power. Obviously this power comes from the rotating parts of the mills decreasing their momentum. As the speed decreases, the power generated by the motor decreases and brings the motor and mills to a smooth yet rapid stop.

There are numerous types of mechanical clutches which have been applied to mill drives, most of them without brake. Among these, the

spiral coil clutch and a disc clutch operated by compressed air are used, probably more than other types. No doubt a mechanical clutch can be designed for quickly cutting off the power, but a great many of these clutches now in use do not release readily. In no event should a mechanical clutch be installed without a powerful brake in connection therewith.

The foregoing methods have been applied principally to groups of mills driven by one motor, but the method is equally applicable to an individual mill with its motor drive. An individual clutch for each mill on a line of mills is not so advisable as one clutch controlling a number of mills, because the greater the number of mills, the greater is the resistance and the quicker is the stop.

It is possible that the best throw-out mechanism that might be devised may not operate when most needed, and therefore, it is very necessary that daily inspection and tests be made to determine the condition of these safety devices, and a record kept of the surface travel of the rolls. No day ought to start without this test and no mill ought to be operated until its safety throw-out is in perfect operating condition. Frequent tests with the mills loaded should be made to ascertain the surface travel of rolls.

The location of the mill pan has much to do with the safety of operator, particularly as to the distance which the operator is kept from the face of the rolls. One of the principal precautions in safety to mill operators is to prevent the operator from placing his hands beyond the top of the nearest roll. It has been found excellent practice to have the least distance from bite of rolls to edge of pan 3 feet 8 inches on 84 inch mills, and 3 feet 1 inch on 60 inch mills. If, for any reason, it is not practicable to locate edge of pan so far from rolls, then a bar or pipe guard ought to be placed at the equivalent location. The front and rear edges of pan should be smooth, preferably turned down or beaded, to prevent injury to workmen's legs.

The height of top of mill rolls above the floor upon which operator stands should not be less than 4 feet 2 inches. A height less than this gives the operator too great an opportunity to place his hands too far into mill. This height may be increased to as much as 4 feet 6 inches without making it difficult to feed stock into the mill.

The speed of mill rolls should not exceed twenty-five revolutions per minute. Higher speeds cause difficulty and danger in cutting and rolling of stock.

The roll adjusting screw which projects through front of housing should have threads of large lead, so that the mill rolls may be separated in the shortest possible time, thereby releasing an operator caught between the rolls, before he can be burned seriously. With threads of large lead, the adjusting screw will tend to back off, because of vibration, but this can be overcome by placing a quick operating clamp back of the head of the screw.

Between the roll adjusting screw and front roll bearing is usually placed a safety breaking cup. This cup often breaks into many small

pieces which frequently strike operator. A band or screen ought to be placed around the cup to confine these pieces.

#### GEARS

Gears ought to be guarded *most* thoroughly if it is probable that a workman may be compelled to be adjacent to them. It is advisable in any case to enclose the outside perimeter or face of gears with a sheet steel band to prevent oil or grease from depositing on the floor of pit. For most thorough guarding, a solid enclosure of steel plate should be

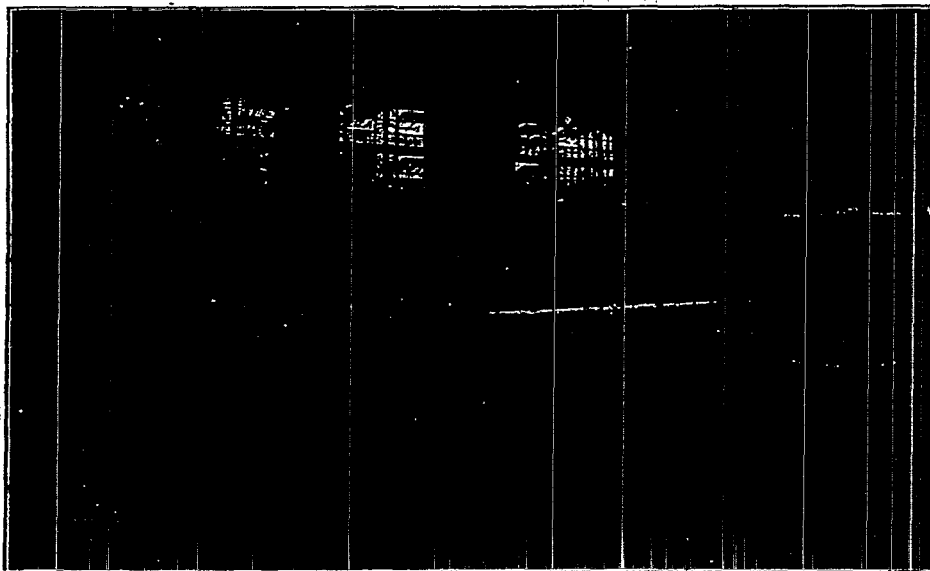


FIG. 3. GUARD AROUND PIT

provided over face of gears and down the sides beyond the depth of teeth, and the point of contact between gears covered completely. Projecting keys, and other projecting revolving parts, as well as spokes, ought to be covered with removable wire mesh, which will not prevent visual inspection of the gear parts. Proper door openings must be provided in various parts of the guards, to facilitate inspection of the gears, and the guard designed so that it may be most quickly removed when necessary to repair the mill. Guards should be attached neatly and rigidly to a machine to prevent rattling or sagging, or being knocked out of shape, for otherwise the guard may suddenly be removed by a self-appointed specialist, because of its being an aggravation and eyesore.

If there is no passageway between the ends of mills set in a group, then there is no necessity to guard the gears so thoroughly. Instead, a

pipe railing, at least 3 feet 6 inches high may be placed between the mills and be fastened to the mill housings. Pipe railing, with gate, should be set around motor panel boards and other electrical equipment, and these railings wrapped with friction tape, particularly where workmen may operate electric switch and be in contact with railing. Pipe railings around pits, such as for motor drives, are often covered with steel plate from floor to top of railing so that materials may be stored adjacently without falling into pit.

A mixing apron is desirable for continuously feeding rubber and pigments into the rolls. This apron reduces the number of manual operations which would otherwise be necessary to feed the mill entirely by hand, and therefore, it proportionately reduces the possibilities of injury to the operator. The apron should not be closer than five inches above the mill pan.

#### *Miscellaneous Safeguards Around Mills*

Many injuries have resulted to workmen who fell on slippery mill room floors, and various floor coverings such as rubber mats and non-slip metal have been provided for operator to stand upon. These are not entirely satisfactory except that light weight non-slip metal can be used to good advantage for cross overs between mills to cover pit and line shaft, and where it is necessary to remove floors for repairs to equipment. A non-slip cement floor can be made perfectly satisfactory and maintain a perfectly smooth surface. Several prominent firms have laid such floors for years by constructing the original floor finish with a carborundum treatment as follows:

Proceed as in a neat cement floor finish to the point where the area has first been wood floated to a level surface and finished smooth with steel floats, then sprinkle the finished area with a dry mixture composed of one part 12-30 carborundum grit and two parts of Portland cement. Wood float to a smooth surface and finish with steel float. Sprinkle the area a second time, wood float to a smooth surface and again finish with a steel float. In the two sprinklings use one and one-third pounds of carborundum grit to each square yard of surface. Cover and keep wet seven days, or longer, same as would be done for neat cement finish.

The above method will make a floor surface which is considerably harder than the ordinary cement finish. This method can also be used in combination with metallic floor hardeners.

#### **DANGERS OF GLARE AND EYE-STRAIN**

Several accidents have been attributed to improper lighting of mill rooms. Momentary blindness of workman caused by excessive glare of lamps may be the cause of a workman's making a wrong movement. A poor lighting system will produce fatigue due to continuous eye strain. A general lighting system of uniformly spaced units distributing light equally over the whole mill room, with an intensity of 5 foot-candles (as shown in Fig. 1) will make the mill room a safe and cheerful place to work. An inexpensive lighting unit may be used, the reflector being of

metal, dome type, porcelain enameled. This reflector used with a bowl enameled type C lamp of high wattage, will produce a diffused, high intensity, non-glaring illumination. However, where ventilating hoods are placed above mills it will be necessary to install a local lamp under the hood, in such a location that it will be up and out of the normal vision. This lamp should be covered with a heavy cage to protect it from breakage. The intensity of light on the mill rolls should be the same as provided in the general lighting system. This is important, for if the light on mill rolls were different from that outside the hood, eye strain would be produced with resulting discomforts and hazards.

*Safeguarding Health in Mill Room*

Ventilation and cleanliness are equally important with mechanical safeguards. It is possible that a workman can operate for a lifetime a machine having not a single safeguard, but not so, if he is compelled to work in a poorly ventilated, dirty room, for he may eventually become as much, if not more, a physical wreck, as if he had been injured on his machine. Bad ventilation and dry, dusty atmosphere dull the workman, and slow down his productiveness. In mill rooms the installation of a ventilating system is absolutely necessary. Oftentimes natural ventilation may accomplish fairly good results, especially in a small mill room having a high ceiling. However, it is impossible to handle a few pigments, such as lampblack, zincs, and leads, as well as soapstone, satisfactorily, without mechanical ventilation. The ideal ventilating system is one which will heat, ventilate, clean, and humidify the air; but local conditions and first cost often prevent a near approach to this ideal. Because the maintenance of air washers handling rubber pigments has been difficult, many systems have been installed without the washers, with success. A brief description of such a system is as follows:

Heat, dust and fumes arising over the mills are carried away by an exhaust system. Each mill is provided with a sheet iron hood covering the mill. The under side of this hood should not be less than 6 feet 6 inches above the floor upon which the workman stands. (Fig. 4 illustrates this hood and the air ducts.) The two sides of hood over the housings are enclosed with sheet iron, but the front and rear are open. However, conditions often demand that canvas curtains on spring rollers be mounted upon the front or rear of hood to prevent the operator actually throwing compounds across the rolls and out on other side of mill. The preferred type is the ordinary box style of hood with the air duct connected to the middle of the top through a flared connection. This style of hood insures that the air currents carrying dust and heat from workmen will go directly to the middle of the top of the hood, where the duct connection is made. An alternate type of hood has a so-called false ceiling which makes a small space through which the air passes near the outside edges of the hood. This small space creates a higher velocity near the edges of hood. There is also an opening in the top of this ceiling directly into the air duct. This alternate type does not carry all the dust-laden air directly from operator to the middle of the hood. It has the objection of carrying a great portion of the dust to the front or rear edge,

where there is a possibility of its rolling out from underneath the hoods, and it is necessary in order to overcome this last objection, to maintain a very high velocity of air which will actually carry away all of the dust.

In the preferred type a slower air velocity may be maintained, and it is found that near the center of the hood a considerable amount of the dust actually drops back onto the rolls and is mixed in with the rubber. This is one of the best features of this type of hood, for it does away with the necessity of an air washer, and the small amount of dust which is carried away through the ducts is easily collected. The hood should be

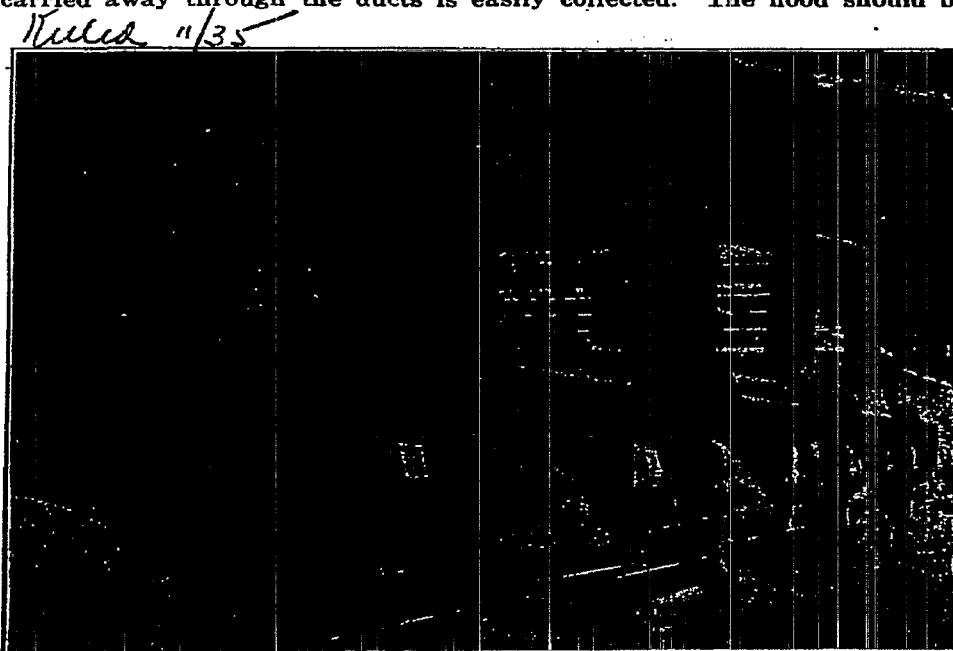


FIG. 4. EXHAUST HOOD OVER EACH MILL TO CARRY AWAY HEAT, DUST, AND FUMES

connected to the air ducts by a flexible connection so that the vibration created on the mill will not be carried to the ducts and cause leaky joints. The ducts are carried to a centrifugal multivane exhaust fan which discharges into, preferably, a vertical flue carried to the top of the building. In the case of a one-story building it is preferable to carry this exhaust flue at least forty feet above the ground level. At the base of this flue is a collecting chamber located below the entrance of the fan duct, into which nearly all the dust descends by gravity and may be removed through a cleaning door. For an 84 inch mill the volume of air for the preferred type of hood is thirty eight hundred cubic feet per minute, at a velocity of thirteen hundred feet per minute. The static pressure necessary to be maintained in the ducts varies according to the design of the

ducts and the length of runs. Such pressure will rarely exceed one and one-half inches of water.

In order to offset the large volume of air removed from the mill room through the hoods, it is necessary to feed in fresh air. In summer time this is most simply accomplished by opening the windows, but in winter it is necessary to force heated air into the room by fans. This air ought to be heated to about ninety degrees Fahrenheit, and distributed equally over the entire room. It is also possible, in order to save expense of heating the entire volume of air, to re-circulate a portion fed into the flue by exhaust fans, and also to draw air from other portions of the building, preferably from stair and elevator towers.

With the best type of ventilating system, as described, there is still an opportunity for dust to collect in various parts of the mill room. Perhaps the most frequent cause is from dusting batches of stock with bags of soapstone. This dust will accumulate on the floor and stock racks. To keep these parts of the building and floor in the cleanest condition a vacuum cleaner is advisable. With this system of cleaning there is no dust stirred up, as is the case with brooms or brushes, and the cleaning is more easily facilitated. With the vacuum cleaner system one man under ordinary circumstances, ought to clean thirty-five hundred square feet of floor per hour. This system is also very desirable to clean walls, ceilings, pipes, machinery and equipment, and motors.

Another aid to cleanliness is the running of curbs around all pits, so that rubbish, etc., may not be kicked into them.

#### SAFETY IN OPERATION OF CALENDERS

##### *Safeguards on Calender Parts*

The various methods of quickly stopping mills, previously described, are equally adaptable to calenders. The dynamic braking of motor is perhaps most simply applied and operated and requires no more floor space. A throwout bar is necessary in both front and rear of calender, and this bar should be of steel rod or pipe and be placed full width between calender housings.

Signal bells or their equal, should give warning each time the calender is to start or stop; one bell to be so connected that any workman may signal when he desires the calender started or stopped, and another bell directly connected with the motor controller or other starting and stopping device. The latter bell will automatically give warning to all workmen. If calenders are operated in trains, the safety appliances should be so arranged that operation of any one of the safety switches on the various calenders will instantly stop the entire train. The operation of a train of calenders should be as a unit, and under the control of one operator, the only person who can start the machines.

All switches and control boards should be of the enclosed type, making it impossible for the operator to be in contact with live parts. Control panels are best situated in a separate room open only to authorized electricians. Rubber floor mats are necessary in front and rear of all control boards.

## FEEDING STOCK INTO CALENDERS

Feeding stock into calenders has caused more accidents on these machines than any other operation. Nearly all of them resulted from feeding fabric or sheet rubber into the calender rolls, and into windup. Statistics show that comparatively few accidents have occurred from feeding batched gum, and there is no good reason why any should occur. A sheet metal table about twelve inches wide and the same length as the rolls, located about six inches below the bite of the rolls, will hold the gum while feeding. If it is necessary to feed small pieces of gum this may be done with the aid of a wooden paddle or pusher.

Feeding fabric or sheet gum is not so easily accomplished, and it is necessary for operator to place his hands close to the rolls, unless it is possible to use a guard which will also assist in starting the fabric into the rolls. Although numerous efforts have been made, it seems that no really efficient guards of this type have been devised, and experimental ones have generally met antagonism from the workmen as being a hindrance to rapid and successful work. Such a safeguard is most needed to feed sheet stock between closed rolls, but the space available is not sufficient to provide safety without impeding production by making it impossible for workman to place his sheet within a reasonable distance from the rolls.

## GUARDING THE ROLLS

If a calender does not require the two bottom rolls to be in contact with each other, and if the bottom roll is used only as an idler roll to return the stock to other side of calender, then the bottom roll should be lowered about three inches, a sufficient opening that a man's arm can pass between the rolls and not be pinched. Where the rolls cannot be separated to such an opening, it may be possible to separate them to such an extent that a guard can be used successfully. A guard used in several factories consists of two horizontal steel plates about 1½ inches apart, extending in between the rolls. The lower plate does not extend so far inwardly as the upper plate, and this allows workmen to place the stock onto the lower roll; and if the travel of the roll should carry his fingers forward they will strike the upper plate without harm. To be successful, this guard must be constructed very heavily, and be very rigidly attached to the machine. A scraper bar is attached to the lower section of the guard after the guard is in place, and so adjusted to the roll that there is only a very small clearance between the scraper and the roll. This scraper is for any stock which may get around the lower roll and which would have a tendency to roll up under the guard and bend it out of shape. It must be urged most forcefully that a man who is working on a calender with separated rolls shall never be transferred to another calender having its rolls in contact, for the knowledge of not being subjected to danger on the first type forms a habit of placing the hands between the rolls, and this habit will unconsciously be continued on the latter type and result in severe injury.



All wind-ups and let-offs should have a stationary handwheel for adjusting the tension in stock. This can be accomplished by mounting the handwheel on the wind-up bearing, the outside of the bearing having screw threads upon which the handwheel adjusts itself against the friction disc.

To hold the stock shell bar into the wind-up spindle, a smooth ring should slide on the spindle and cover the end of bar. This ring can be locked in position by a pin with a spring. No projecting set screws or pins should be placed on any revolving part of the windup.

All idler rolls ought to be placed as far as possible from calender rolls. Particularly is this true where the stock passes between the idler and the calender rolls, for serious accidents have occurred where the operator was caught by the stock and drawn between the rolls.

Gear guards and pipe railings as described under the subject of mills, are equally adaptable on calenders.

Non-slip floors are particularly necessary around calenders. A concrete floor with carborundum treatment, previously described, will not become slippery from soapstone because the grains of carborundum cut the pigment and prevent the latter polishing itself into the floor finish. Between the housings of the calender it is usually not practical to lay a concrete floor, and therefore, a metal floor predominates. This metal floor surface ought to be rough. Objections are often heard against this, and it is contended that a rough floor may damage the tail end of the stock which drags along the floor before being wound up. However, this objection is greatly overdrawn.

#### GOOD LIGHTING IS IMPORTANT

Illumination for calender work is important, not only to safeguard the workman, but particularly to produce work of highest quality. Too many calenders are being operated with local lights attached to the machine. The general lighting system described for mill rooms is recommended for calender rooms, except that the maximum amount of light should be given the calenders, and a lower intensity in the aisles. The intensity on the calenders ought to be 10 foot-candles uniform lighting, and about 5 to 6 foot-candles uniformly in the aisles. If glare is eliminated this difference in intensity will not produce eye strain.

The tendency in calender work has been toward increased width of stock and greater lengths, which has produced rolls of stock of great weight and unwieldy size, and consequent greater chance of injury to operator. Careful consideration of methods of handling heavy rolls of stock becomes very important. An electric or air hoist mounted on a trolley is perhaps the simplest and quickest means of lifting these rolls.

A calender may produce excessive heat or fumes, making it advisable to install a ventilating hood above, and connected to an exhaust fan. However, it is far better to have a high calender room, preferably one story, with saw tooth skylights to give good ventilation and light. If the room has a low ceiling then mechanical ventilation is necessary, especially during summer months and times of high humidity.

## VACUUM CLEANERS FOR FLOORS.

Where excessive soapstone or stock dusting accumulates on floor under calender wind-up and let-off, a suction system should be provided. This dust should fall onto and through a latticed or perforated floor into a chamber from which it is drawn into a duct and thence to a fan exhausting into a stack as described for mill room ventilation.

The vacuum cleaner principle has been applied to the cleaning of liners and this obviates most of the flying dust around calender let-offs and wind-ups. A vacuum cleaner is of even more importance in a calender room than in a mill room, for in addition to the benefit to workmen, there is an extreme necessity for cleanliness of calendered stock.

All pits and openings in floors should be free from rubbish and grease, and should have proper curbs around them.

The foregoing descriptions have covered mechanical safeguards which for a large part depend upon a little common sense on the part of workmen in providing personal care. Workmen should be educated to know thoroughly the dangers which a safeguard covers, that he may furnish the precautions which the safeguard cannot. It may be possible to safeguard a machine so thoroughly that it would be impossible for a workman to injure himself deliberately, but with the result that the workman would eventually dismiss from his mind any thought of danger. It would be folly to place such a man on another machine which cannot be so well guarded. Thorough education in safety is, after all, the most important requirement; and it not only provides protection in his mechanical duties, but it expands his mental capacity and alertness to provide protection for himself and his fellow men at all times, everywhere.

CHAIRMAN SCHOTT: Mr. Mitchella is chairman of the Engineering Committee of the Rubber Section. The greatest part of this has been worked out personally by him. This is one phase of the work which the Rubber Section is attempting to accomplish to render service to its members. We started on what we considered the most pressing needs common to all members of the rubber industry. Any other problems which come up will be welcomed and reports made on them.

## DISCUSSION

MR. G. B. WILLIAMS (Mishawaka Woolen Mfg. Co.): In regard to mill room equipment for footwear plants—that is, the safeguarding of power die machines—have you ever investigated those? We have more accidents in that line than we have in any other part of the mill room.

MR. MITCHELLA: I take it that it is a press machine, a type of punch press in which the stock is placed on a lower platen and dies the shape of the stock are placed on top of the stock, and the power comes on presses through perhaps a dozen different layers of stock. Our principal precautions on that have been to place an operating bar in front of the press—that is, two operating bars. A man must use both hands in turning on the power, and it cannot be turned on in any other manner, and those bars are far enough apart so that he can't accidentally get his

body on both at the same time. Therefore, his hands are removed from between the platens when he turns on the power.

MR. WILLIAMS: The power is not turned on. The men work in pairs. It is piece work and they are in a hurry. Sometimes there will be a little reaction and it will come down unawares. Have you anything to safeguard that?

MR. MITCHELLA: We formerly had a type of press formed by a trip clutch. We have done away with all of those so you cannot possibly turn on that power without an operator. We have one operator on each press, not two operators.

MR. WILLIAMS: Does your type of machine interfere with the efficiency of the workmen?

MR. MITCHELLA: I don't think so. We have feed rolls which feed the stock in.

MR. BRUMM (Industrial Commission of Wisconsin): I have in mind one press—I think there are three types in this particular factory—where they use a number of layers or sheets of this rubber placed on the plate. The form is set on a number of the sheets—I don't know just the number they use—and they trip this press and the die comes down. I have investigated three accidents in the past five months where the man has had the top of his fingers pinched and lacerated. A suggestion was made for a means of preventing these accidents and the man said he was going to dispense with the use of these presses and intended to use a machine that resembles a jack, where it has the swinging beam and one hand is required to swing it. I saw him about a month ago and he said that he was trying to get in touch with the men in the rubber industry to find out which would be the most practical machine in that particular line of work.

I suggested that in the meantime a little flange be attached to the form, extending probably a quarter of an inch over the side. That is, that a flange extend outward a quarter of an inch from the top of the side so that a man's hand would be underneath the die. I realize the number of forms required, but that would eliminate any chances of the man getting his finger over on top of the form. They are equipping the smaller dies now, or forms, with a handle, which of course eliminates any possibility of the man getting his hand underneath the die. They are a hazard especially where two men are working on this type of machine, and where it is piece work. The chances for accident are, of course, then increased.

MR. LARKIN: In the average rubber mill, especially in the footwear and mechanical goods, there is usually a long line of "beckers" as we call them, big machines, and a man comes along and takes a large slab of rubber, and he steps on the machine and that machine makes about 100 revolutions a minute. Every time it comes down it presses out perhaps five heels, or perhaps soles, or whatever it is. In other words, that man stands in front of the machine and works all day turning out heels or soles and a great many of them, and the press isn't quiet except when he is putting in a new slab. We have had a great deal of trouble and I imagine everybody has.

Here is what we have done to help matters. In the first place the treadle that the man puts his foot on to stop the machine has over it a long bar so that he can rest his foot on it when the machine isn't working, and that bar should be forward far enough so that when his foot slips off, as it frequently does, he won't start the machine.

In many of the mills the dies shaped like a sole or shaped like a heel were too short, and a great many people threw away equipments of dies that were perhaps only three inches high, because when a man held one would have to hold it in his hand in a certain way, and if his mind became distracted his finger would get over the top. Another trouble was that they were too long. When they are too long they tip over slightly without his knowing it, and then the thing will come down on the side and his thumb will be under it.

It was suggested that a beading or enlargement be made at the top of each die so that when a man's thumb approaches the danger point at the top of the die he knows it; unconsciously he withdraws it because it feels different from the rest of it. Another scheme was to put a little pin through so his hand couldn't get above the die. I think most accidents, however, are caused by the man carelessly getting his finger or thumb over the top of the die, brought about by the same old thing—mental lapse.

MR. HOLMES (U. S. Rubber Co.): We have had success with a traveling safety head on that type of press, and it is necessary for the operator to use both hands to move the head over the die. Should he trip the press in any way before that traveling safety head is in place, the press would operate but it would take up on this safety head and his hands would have three or four inches of space so he would not be in contact with the die in any way.

MR. E. T. FOOTE (Cutler-Hammer Mfg. Co.): In connection with the safety stop on rubber mills, some tests which we recently made I think possibly might be of interest to this section. The tests were made on a mill line consisting of two 22 by 60 inch mills driven by a 250 horse power 580 R. P. M. motor. This line was provided with a Cutler-Hammer clutch brake, the breaking torque being 4,850 foot-pounds, the torque of the motor being 2,300 foot-pounds. These figures to give the relation between the motor torque and the brake torque. We have been attempting to get a safety stop of four inches measured on the front roll. Mr. Mitchell speaks of ten inches. I don't know whether he had reference to the mills loaded or unloaded. He says it is an unloaded test.

These tests point out one thing which is very significant when studying the matter of safety stops on mill rolls. With the mills unloaded and the rolls being permitted to drift to rest there was a drift on the front roll of 240 inches. Disconnecting the motor and permitting the mills only to drift to rest, there was a drift of 103 inches. That is, there was approximately 137 inches of drift accounted for in the energy of the motor rotor. With the clutch brake—that is, disconnecting the motor rotor and applying the brake—there was obtained a stop of 8½ inches. That is keeping in mind that the mills were unloaded.

With one mill loaded, which was equivalent to about 130 H. P. on the motor, about half load, there was obtained a stop with the clutch brake of  $4\frac{1}{8}$  inches. That means if the operator were to be caught in the pinch of the rolls and immediately threw his tripping bar, he would probably not lose more than a hand. If he were to be caught in the rubber, which is frequently the case, before his hand got to the pinch of the rolls the chances are the rolls would stop and he would not be caught. Mr. Mitchella speaks of dynamic braking. I would like to ask him if he has attempted to apply this on mill lines where alternating current motors are used?

MR. MITCHELLA: We have not.

MR. FOOTE: Most mill lines are operated by alternating current motors. Of course, dynamic braking is possible with alternating current motors, but it is complicated. It is hardly a thing which can be considered in the rubber industry. It has been done to a limited extent on coal bridges and coal hoists, but it is not an entirely practical engineering problem when considering the matter of first cause. Dynamic braking caused on a direct current motor will give you a stop; you get a decreasing torque as the rotor of your motor slows down. That means that you do not get or cannot get as quick a stop as you can where you apply a constant torque, because your average torque throughout the stopping time will be less. In that method of stopping, of course, you still have to combat the high kinetic energy of your rotor, which is the element of highest kinetic energy in the line because it is the highest speed element of your mill line.

There is one other point upon which I would like to obtain some information, and that is the question of using—assuming that a clutch brake were used in a mill line—the safety stop to stop the line every time it was stopped. In these tests it was shown that there was in the brake approximately twice the torque that there was in the motor. That means that the braking effort is probably not a great deal higher than that obtained sometimes in starting, if started under conditions where one or two mills might be loaded on a long mill line. It is essential to get the men to do things instinctively. If you train them to stop mill lines by tripping the safety bars, the chances are that if a man is caught he is going to instinctively throw his arm over his cradle and get his safety stop. The objection that has been raised to this is that stopping by means of the clutch brake every time they stop the line imposes too severe a strain on your gearings and bearings. But it has been a question in our minds if this is the case. We feel that with the braking torque which is provided the strains are not so great but what your average mill line will stand it without excessive wear.

MR. MITCHELLA: We have used safety devices for service stops. I don't altogether approve of it myself. Now the same principle applies to the closing down of the mill line by a clutch brake. The clutch brake will close down the mill line very nicely, but the maintenance problem is the principal issue there.

I think this would impose overwork upon the brake. There will be a

wear on the brake and it will leave a tension. I am considering, notwithstanding, that the brake is operated by a counterweight which ought to drop and will compensate for a great deal of wear. It is simply a matter of judgment between maintenance and the point which you bring out in regard to getting a man trained to always stop his mill in one manner, which of course is a good point.

MR. HOENER: We have a system in our plant where the conditions make it practically necessary to use the clutch brake as a service stop for the simple reason that our mill motors are all at one end of the room, entirely enclosed away from the line, and we do not allow anybody but an authorized electrician to go into the mill motor room on account of the electrical hazard involved. So we insist that the inspector on the line when he is through with the line use a safety stop as the method of closing down the mill line.

We have considerable trouble sometimes on our mill lines due to the rubber tripping out the safety stop repeatedly on the line. We have had occasions just recently—perhaps with a new mill man who doesn't cut his stock properly—where the line tripped out six, seven, and eight times a shift, and on our large mill motors it causes delay and is rather expensive. I would be interested to know whether any of the other rubber companies have experienced similar difficulty. This constant stopping of a mill line antagonizes the operators towards the safety devices which we place on these mills, and we usually have quite a job to get them to keep them in shape and report any occasions where the safety doesn't work.

MR. G. A. MATER (General Electric Co.): It seems to me that on the calender dynamic braking has been satisfactory. You can set that dynamic braking for any figures you want. As far as I am able to determine, dynamic braking is perfectly satisfactory on the calender motors. Direct current motors are used almost universally on calender motors. There are very few cases where counter motors are used and they are not satisfactory.

The almost universal practice is to use a counter motor on mill lines, and there are three ways of stopping that. You can use a clutch with brake; you can plug the motor, or you can use a brake of some type, mechanical or airbrake.

Mr. Mitchella gave the time of stopping as one second. I think that should be verified by the various companies and some definite recommendation made as to the time of stopping the mills. If you should decide that a braking of some kind was sufficient, figure up the amount of torque required to stop that mill line in the time you determine upon. See what that would mean in mechanical strains along your machinery.

Another point should have consideration here. That is the manner of reversing and taking a man out from the rolls. Some companies recommend that they reverse the mills and pull a man out, and others loosen up the rolls and dig him out. We usually recommend in all of our equipments that a reversing switch be provided with the mill line equipment, but that is not for releasing a man unless they want to follow that practice.

On the calender motors again Mr. Mitchell made some recommendations as to the signal bell on there. Just how would you like to have that arranged, on the first step of the controller? Would you want that bell to ring all the time? Do you want that to ring every time you change the speed?

MR. MITCHELL: I think that would be preferable. I don't know whether it is necessary.

MR. MAIER: What do you think about putting on a warning light of some kind to show the direction of rotation—whether you are going forward or reversed?

MR. MITCHELL: I see no objection to it.

MR. R. N. WATSON: Goodyear uses that on all calenders, a red light when it is running reverse.

MR. MAIER: I should like to see the chairman here appoint a committee to make some definite recommendations on these various points, so we would have something definite to work on and use in our designs. It would be of material benefit to everybody, to electrical companies and other companies as well.

CHAIRMAN SCHOTT: What you have suggested will be put in our records and taken up during the course of the following year.

MR. HOLMES: Regarding the switches on the mills, we have had that trouble and we have also had the added trouble that the employees themselves would try to make adjustments, and would set up the adjusting screws on the bottom of the spindle so tight that I have tried with all my weight to pull the cradle bar down and I couldn't budge it. We overcome the trouble of the gum hitting the bars by placing a fitting on the end of the bars and raising the bars four inches which still gives a good operating distance, eliminating that trouble. The operators, unless they are watched, tie up those bars at times, so the safety man has to be on the job in the mill room.

MR. MITCHELL: I would like to clear up the records on this time for stopping mills. It was mentioned that I set the time as one second for the stopping of mills. I asserted that a maximum time should be no greater than one second. Nothing is desirable that breaks the machinery all to pieces. Our machinery will stand just as sudden stopping as any motor can be designed for.

CHAIRMAN SCHOTT: "Vulcanizing Apparatus," by Mr. Frank Scott, Superintendent of Inspections of Hamlin & Co., New York City.

## VULCANIZING APPARATUS

FRANK SCOTT, SUPERVISOR OF INSPECTIONS, SAFETY DEPARTMENT, HAMLIN AND COMPANY, NEW YORK CITY

Vulcanization is the act or process of treating rubber with some form of sulphur to affect certain changes in its properties, so as to render it insensible to atmospheric changes, to increase its durability, and to adapt it for various purposes. Since the process of vulcanization was patented by Charles Goodyear, in 1844, pure India rubber has been very rarely

used, the vulcanized rubber being far preferable for almost every use. In general, the process of vulcanization consists in mechanically mixing rubber at moderate heat with sulphur, which is the only essential ingredient necessary, although other materials are often added at the same time, such as silicate of magnesium, carbonate of lead, asphalt, and tar, each of which imparts a different quality to the product. After the sulphur and other ingredients are added, the curing takes place in sealed vulcanizers generally by heat from steam at 250 to 300 degrees Fahrenheit. The substance thus formed acquires extraordinary powers of resisting compression together with a great increase of strength and elasticity, and cannot be dissolved by ordinary solvents. By using a greater proportion of sulphur and a higher temperature, hard rubber, known as "vulcanite" or "ebonite" is produced.

#### VULCANIZING APPARATUS

Vulcanizing apparatus is made in numerable forms: long horizontal cylinders, vertical cylinders with hydraulic ram pressure plus steam pressure, pot heaters, special cast-iron castings of various forms for vulcanizing and repairing tires, platen presses of various sizes and shapes for belts, etc., but the types most generally used are the large horizontal cylindrical ones. Although in the tire industry, the vertical cylindrical presses, having a hydraulic ram, are used in great numbers, also. The horizontal cylindrical vulcanizers run in standard sizes from 12 inches to 84 inches in diameter, and are usually about 20 feet long. For some purposes, they are made considerably longer. The construction of these should consist of shell plates, but straps and heads of open hearth fire box steel or of open hearth flange steel having a tensile strength of not less than 55,000 pounds nor more than 65,000 pounds per square inch of cross section; the rivets to be of boiler rivet steel with a tensile strength of not less than 45,000 pounds nor more than 55,000 pounds per square inch of cross section. The flanges and doors should be of cast steel, conforming to all of the requirements of the Boiler Code of the American Society of Mechanical Engineers for Class "B" steel, castings soft grade. The doors should be hinged and provided with rollers, so as to support the weight of the doors when open. They are usually held shut by means of bolts, although there are a number of different types of quick opening and closing doors on the market, all of which are not approved by insurance companies. It is advisable when insurance of the vessels is to be considered that the approval of the Insurance Company be obtained before the equipment is purchased. On this type of vulcanizer the utmost care should be taken in setting up the equipment, in vessels longer than 5 feet, to have it supported on the tail end by a saddle, fitting the shell with plain surfaces at each end to bear on turning metal roller which would lay between the finished guides and a sub-base. All intermediate saddles on long vulcanizers should also be this way, so that a shell when contracting and expanding would roll longitudinally instead of the shell scraping and cutting itself, which is a very important factor on account of the great amount of contraction and expansion that takes place, due to the



rapid heating and cooling of the vessel. The vessels should also be so set as to drain to steam traps which are essential to remove condensation. It is very necessary to eliminate all possible water traps to prevent injury to the vessel by corrosion.

**TIGHTENING ALL BOLTS ON DOORS**

The utmost care should be taken on the part of the foreman to see that employees properly tighten up *all* bolts on doors, and in doing this, to use a wrench of suitable length to enable them to do the work properly without causing injury to threads on bolts, which is often done by the use of pipes on wrenches, thus weakening the bolts and causing serious trouble. Emphasis should be made on the fact that *all* bolts should be tightened, and it should be instilled in the minds of all those having any connection with the vulcanizing equipment that all vulcanizers are subject to an internal pressure by means of steam, a highly dangerous element unless handled properly. A high temperature of steam together with its terrific expansion, I believe to be second only to explosives. On account of its general use, the danger is ignored, and in the case of most operators, they are ignorant as to the possibilities of serious accidents which are liable to be caused by not manipulating the equipment as it should be. It is all important that the element of danger from improper handling be forcefully called to the attention of the foremen and workmen, and care taken to see that they perform their duties, in connection with the handling of this equipment, in a safe manner. They should be thoroughly instructed, particularly with reference to the question of bolting the doors, opening the vents (which should be at least 1 inch) when the steam gauge shows no pressure after the steam is shut off, and not attempting to open the doors until it is definitely known that the pressure has been relieved.

*Reading of the Gauge.* They should also be instructed not to depend on the reading of the gauge, as it is possible that it may not show a proper reading. Many cases are known where men have been injured by depending on the gauge which was incorrect, and releasing the fastenings in the door without first opening the vent, the door blowing open with serious results.

*Safety Chains.* Safety chains, to be kept in place until it is absolutely known that the pressure is entirely relieved, are sometimes used on doors.

*Drainage.* Another source of trouble in connection with the horizontal type of vulcanizer, from an accident point of view, is improper drainage. In a number of cases when the doors have been opened, men have had their feet scalded, or when the water is trapped in the vulcanizer, men have gone in and have been burned. This is a condition that should be watched carefully.

*Elimination of Steam.* In some cases, to eliminate the steam from the vulcanizing rooms, the vulcanizers are connected to a suction pipe and a valve on the back of the vulcanizer opened, and the suction in the suction pipe thus exhausts the steam. This can be condensed and water saved. The feature, however, is the elimination of steam from the work

rooms. This same method can be applied to the vertical type of vulcanizer.

*Safety Valves.* Every vulcanizer, regardless of the type of apparatus, should be provided with a safety valve on the vessel side of the steam connection. This would bring it between the reducing valve and the vulcanizer. The safety valve should be set at the minimum pressure permissible with which to accomplish the desired results in the equipment. All valves should be tested daily, and at least every six months by allowing the pressure to raise in the vulcanizer until the valve pops itself. Care, however, should be taken to see that the gauge used at the time is correct, and that the allowable working pressure is not exceeded on the vessel. It is always advisable to have the safety valve set for at least five pounds pressure under the allowable pressure. Of course, if a vessel is allowed 100 pounds pressure and only 60 pounds pressure is required to accomplish the results, the valve should be set as close to 60 pounds as is feasible. Safety valves should be in size equal in area to the size of the supply line to the equipment.

*Insuring Vulcanizers.* It is my opinion that vulcanizers should be insured, so as to receive the benefit of inspections by men specializing in this work. In connection with this question of insuring vulcanizers, it is advisable that before vessels are purchased, the approval of the Insurance Company be obtained, or that there be a stipulation in the contract that the vessel will meet the requirements of the steam boiler insurance companies. Some of these companies have very strict rules as regards requirements for vulcanizers, especially of this horizontal type and, of course, the Boiler Code of the American Society of Mechanical Engineers should be followed in construction.

*Numbering Vulcanizers.* All vulcanizers should be numbered, and when once given a number, it should be maintained during the life of the equipment, so that their records can be kept without any question, which is a very important matter.

*Inspections.* Regular inspections should be made by men properly qualified to judge conditions correctly, and a careful record kept of inspections. This record should be checked periodically to see that inspections are made and the recommendations complied with promptly.

#### VERTICAL SHELL VULCANIZERS

Vertical shell vulcanizers of the French press type used generally in the manufacture of automobile tires, are constructed along the same general lines as the horizontal vulcanizers, with the exception that they are heavier to withstand the hydraulic ram pressure plus the steam pressure. Care should be taken not to use a type of press of this kind which would permit the water pressure going into the cylinder. I understand that this type is practically obsolete at the present time.

#### TIRE VULCANIZERS

Tire vulcanizers for small repair shops are usually of cast-iron and are generally in the hands of persons inexperienced in the handling of

steam equipment. Consequently, the element of danger is not appreciated or known. Therefore, the utmost care should be taken to have those using equipment of this kind instructed as to the possibilities of serious trouble that may result from improper handling. The vessels in all cases should be equipped with safety valves set at the lowest minimum pressure necessary to perform the work. It has come to my personal attention that in small equipment of this kind in branch stores, the spring loaded safety valves have been so set that they were nothing more than plugs. In another case, I found an equipment in branch store where they had a lever safety valve loaded with extra weights so as to make it practically useless as a safety valve.

To generalize in connection with vulcanizers, there are a number of points that should be considered:

*First:* In many of the rubber plants of today, they continue to operate vulcanizers anywhere from 25 to 50 years of age, and not infrequently, they are equipped with all kinds of attachments and other items making internal inspection difficult, and with their entire exterior completely covered with insulating material, precluding any possibility of external inspection. For years, they have alternatively been heated and cooled, and why more of them do not explode under pressure due to metal fatigue is a question.

*Second:* A great many of these old vulcanizers were built by rule of thumb by handy-men (master mechanics of the old days). The doors, hinges, hinge pins, swing bolts and pins for the latter together with the lugs for holding the pins on these old vulcanizers are all items under stress, and in every case, should be given a most careful scrutiny by a man who knows what he is doing. Such items in a vulcanizer are very like the different items in a building structure where the floor is good for not more than 25 pounds live load per square foot, while the columns, or a combination of all members, lacking one, would be good for 200 or 300 pounds per square foot. The whole structure, whether building or vulcanizer is only as strong as the weakest member.

*Third:* Every vulcanizer in a rubber plant, after being inspected and figured, should have set against it with the usual factor of safety (at least five) the maximum working pressure. This figure to be determined and given to the owner without any regard as to what they may want. Where the examination proves that the vessel is not in a safe condition to be operated at the pressure required to do the work, it should be replaced by a vessel that is of safe construction. It would be advisable in all states to have a law, making it compulsory, where vessels are found unsafe, to have such conditions reported to the state authorities for the enforcement of the discontinuance of their use, where necessary.

*Fourth:* Vulcanizers are occasionally removed from one part of a plant to another, and two things are liable to happen. First, in skidding or lowering and raising them, more weight is handled than is known by the gang, and serious accidents are likely to occur by the failing of tackle or the carelessness of the men. The other point concerns the safety of the vulcanizer itself. In falling or even in moving it, the

plates, rivets, heads, or castings; long subjected to metal fatigue might easily be ruptured.

In summarizing safety features:

*First:* Cast-iron should not be used on large vulcanizers. Where castings are necessary, they should be of steel.

*Second:* Vulcanizers should be built according to the American Society of Mechanical Engineers' Boiler Code. This means of tested material. They should be subject to a hydraulic test of one and one-half times their safe working pressure before placed in service.

*Third:* All vulcanizers should be regularly inspected by specialists on boiler inspection.

*Fourth:* They should be properly set so as to allow contraction and expansion to eliminate undue wear or strain.

*Fifth:* All vulcanizers including belt presses and platen presses should have safety valves between the reducing valve and the connections, the size of the relief to be governed by the size of the steam inlet connection.

*Sixth:* Employees should be thoroughly instructed as to the proper use of the equipment and the hazards due to improper use.

*Seventh:* All vulcanizers should be properly drained so as to eliminate the possibility of injury due to burns. In this connection, it is advisable with vulcanizing equipment and other steam pipes to place pipe coverings where possible, so as to eliminate accidents caused by contact with the hot steam pipes.

*Eighth:* The men should be thoroughly instructed to fasten all bolts securely in vulcanizer doors, and not to open same until it is absolutely known that the pressure has been entirely relieved. Check on this as described above, when the gauge shows no pressure, open the vent pipe which would show the true condition.

*Ninth:* Wrenches should be of suitable length to fasten bolts on vulcanizers without using pipe on the wrenches which causes unnecessary strain on the bolts. This use of pipe is a common practice and should be avoided.

*Tenth:* Protection should be placed in the vulcanizers to prevent cars from striking the heads, as continual bumping is liable to cause injury to the vessels.

*Eleventh:* Special attention should be paid to the drainage of vulcanizers and efficient traps of ample size should be used.

*Twelfth:* Care should be taken properly to fasten leading tracks. The wheels of truck carriers should be checked, so that in loading the heater, the possibility of upsetting the load will be overcome.

*Thirteenth:* Where track bridges are used to run cars from the floor level to the heater, these should be counterweighted with weights under the floor. This would make the bridges secure when in use, and eliminate the tripping hazard when they are out of service.

*Fourteenth:* Where CO<sup>2</sup> vulcanizing apparatus is used, special attention should be given to the fact that this gas is very dangerous and the following precautions should be observed:

a. Do not let the CO<sup>2</sup> drums drop.

- b. Keep caps on tops of drums when not charging.
  - c. When charging CO<sup>2</sup> tank, see that the valves between CO<sup>2</sup> drums and tank are opened before valve on top of CO<sup>2</sup> drum is opened.
  - d. See that there are no leaks in CO<sup>2</sup> tank or piping.
  - e. Pump vulcanizer to zero pressure before opening its door.
  - f. When throwing away old CO<sup>2</sup>, see that it is discharged out of doors where it will not be injurious to the health of employees.
  - g. Test all safety valves daily or during each heat.
- The CO<sup>2</sup> drums stand a much higher pressure than any pipe, tank, or fitting which is used in connection with them, so it is absolutely necessary that the full drum pressure be prevented from extending to any connection or related apparatus. If a drum head breaks, the drum will fly around like a fire hose nozzle, and is liable to do serious damage, so great care must be taken in handling same.
- CO<sup>2</sup> gas should not be permitted to escape in a confined space where persons are present.

ADJOURNMENT.

#### FRIDAY MORNING SESSION

THE meeting was called to order at 9:50 A. M., by the Chairman, Mr. Sidney M. Schott.

CHAIRMAN SCHOTT: Report of the Nominating Committee, Mr. Harold T. Martin of the Fisk Rubber Company, chairman.

MR. H. T. MARTIN: Mr. Chairman, the Committee has selected for your approval as Chairman, Mr. E. H. Fitzgerald of the Federal Rubber Co., as Vice-Chairman, Mr. P. B. Martens of the Firestone Company, and as Secretary, Mr. W. N. Fitch of the Goodrich Rubber Co.

CHAIRMAN SCHOTT: If there are no other nominations I suggest a motion for the unanimous election of those named.

(A motion was made and seconded that the nominees be unanimously elected. The motion carried.)

Address on "Industrial Sanitation" by Mr. W. N. Fitch of the Department of Safety and Hygiene of the B. F. Goodrich Company, Akron, Ohio.

#### INDUSTRIAL SANITATION

W. N. FITCH, DEPARTMENT OF SAFETY AND HYGIENE, THE B. F. GOODRICH COMPANY, AKRON, OHIO

To many, sanitation may seem to be a new word but history carries the word "sanitation" back to the time of Moses, who along with many other honors was recorded as being the first sanitarian.

Agrippa in Caesar's time, in the year 27 B. C., built the Pantheon, called the All Holy Place, which was a wonderful structure of Roman art and contained the splendid baths in which the Romans took such high delight. One of the characteristics of the ancient sanctuaries of the old churches of Rome was the provision for bathing accommodations for the weary pilgrim. So down through the ages the various angles of sanita-

tion have progressed, but only within the last few years has industrial sanitation been given any consideration by the employer.

As a result of investigation by progressive employers, the safety first movement was inaugurated and this was the first step to improve the working conditions of the workmen. Then paralleling it came the sanitation movement.

Employers, recognizing the economic side of sanitation as applied to industry, have taken the lead and made great progress toward improving working conditions, not waiting for the representative boards of health, state factory inspectors, and commissioners of labor to secure legislation to force better sanitary conditions.

Those who have given sanitation consideration realize how much workmen are affected in their health, habits, personal appearance, and efficiency by the environments under which they work. In passing through our industrial centers we have only to gaze upon the manufacturing buildings of yesterday and those of today to appreciate the fact that industrial architects are giving important consideration to the two great problems confronting the working conditions of employees in industry—safety and sanitation.

#### GENERAL CLEANLINESS

There is probably no type of factory sanitation which is so much neglected as general cleanliness. Industrial managers are just beginning to understand the economic values resulting from proper cleansing of the floors, walls, ceilings, light fixtures, and machinery.

To maintain a pure air supply, both artificial and local ventilation are now being applied to units which produce large quantities of dust, thus eliminating the particles of dust flying and settling about the room and impairing the health of employees.

Two prime essentials in the different operation of any plant are sufficient light and pure air, clear of dust or poisonous vapors. Light and cleanliness are to some extent interdependent; for however good the first installation may be, if layers of dust are allowed to accumulate on fixtures and windows as well as walls and ceilings which act as reflectors, the lighting standard will be greatly lowered. Then, the dark shop while not necessarily dirty is usually so. Dark, uncleanly surroundings have a noticeably depressing effect on the cheerfulness and morale of the employee, a fact clearly recognized by physicians and hospital superintendents.

The broom and brush formerly used almost entirely as a medium of cleaning the floors and benches, are fast being relegated by progressive employers to the museums as relics of the past, while the up-to-the-minute manufacturer turns to new and improved methods.

The large and progressive ventilating and vacuum cleaning manufacturers, who have made it possible for the housewife to clean carpets, rooms, walls, and upholstered furniture with less physical effort and more efficient results by eliminating flying dust, realize the possibilities of cleaning industrial plants by a similar method.

### *Rubber Section*

It is true that vacuum cleaning has been used for a number of years on specialized processes but it is only within the last year or two that real efficient vacuum equipment has been introduced to the industries and today industries are having an opportunity of trying out portable machines of large units.

One of the foremost industrial plants has for several months had a machine on trial. The room in which the machine is located has been painted white and a complete test is being made both as to the efficiency and the economic value of vacuum cleaning of floors, walls, pipes, and machinery as against the old broom and brush method.

Observations taken so far show that the floors are not only being cleaned but the dust is being absorbed instead of stirred into the air. The dust is being sucked from the cracks. As a result, no dust is circulated into the air, therefore, the walls, ceilings, and pipes remain comparatively clean. Furthermore, it appears that the operation of the layout is much more economical than the broom and brush method.

Industry has only to be patient and co-operate with the vacuum cleaning manufacturers in their efforts to work out the problem and industry will soon be cleaned by the most economical and efficient method yet produced—vacuum cleaning.

Of great importance to general cleanliness is prompt and efficient removal of all rubbish, sweepings, etc. It is very good sanitary practice to furnish receptacles of fireproof material in which rubbish and sweepings can be deposited. Employees can be persuaded to use these sanitary receptacles for rubbish by means of education through the house organ and by bulletin boards.

### **DRINKING WATER**

Every industrial establishment should have an adequate supply of drinking water of a pleasing temperature as well as attractively clear and, by far the most important, it should be pure. Drinking water should be tested for impurities daily by a bacteriologist.

In some of the older plants there still exists the crude method of serving water to employees by the use of the Bristolware jars. Water of a proper quality but of varied temperature may be served reasonably safe in this manner if the jar is provided with a faucet and an individual cup of either metal or paper is used. However, extra care must be exercised to prevent the contamination from others using the same drinking vessel.

The filling of these jars safely depends largely upon the unit used. A tank mounted on wheels equipped with a pump has been found very efficient. This method prevents the possibility of an operator with dirty hands filling the jars from a pail and coming in contact with the water, also is less likely to catch any flying particles of dust that may be in the atmosphere.

Many industries where they have a good pure water supply either of their own or from the city, have installed individual cooling fountains at various points throughout their plants which are equipped with sanitary

drinking fount heads, the water being cooled by the medium of ice placed in the cooling tanks. This system works out fairly successfully.

The most satisfactory and effective method of distribution of water is by an automatically cooled circulating system with founts located at convenient places throughout the building for employees. There are several types of drinking fount heads on the market and if considering such a system, great care should be taken to give a thorough study to the drinking fount head as this is the point at which contamination can occur.

One of the heads which has given exceptional satisfaction and by many is believed to be the safest from contamination is one from which several streams of water flow from the inside of the ring toward the center. These streams unite in the center and form a larger stream of such pleasing quantity of water as to satisfy the employee.

It must be emphatically borne in mind that these founts as all other types of drinking units must be thoroughly cleansed daily to prevent contamination and to present a wholesome appearance.

A cuspidor is sometimes placed a short distance from the fount for the use of those who are in the habit of chewing tobacco. It is claimed by many to eliminate the possibility of employees expectorating into the bowl of the drinking fountain, which is very disgusting and insanitary.

Those desiring further information along the best lines of drinking equipment are referred to the United States Public Health Reports, Volume 32, issued May 11, 1917.

#### CUSPIDORS

Cuspidors are a most necessary nuisance both in offices and factories to prevent spitting on floors and other places. The proper cleansing of the cuspidor is a very serious problem. First, because the work is not desirable; and, second, there are very few really efficient methods. However, I have in mind one which has been used for several years and has given fair results. Cuspidor is made of galvanized metal about 9 inches in diameter with a removable top which is concaved with 2-inch opening.

#### COLLECTION AND DISTRIBUTION

The collection and distribution is done through the medium of a rectangular metal box equipped with a cover in four parts mounted on a four-wheel truck and demountable in order that the load, box included, may be promptly removed from the truck and a load of clean cuspidors started on its tour of distribution and collection.

Cuspidor is emptied into a digester composed of  $\frac{1}{4}$ -inch screen receptacle placed on a sewer, the opening of which is surrounded with a metal cylinder with foot operated cover. When the solid matter has filled the screen receptacle, it is removed from the cylindrical vessel and an empty screen replaces it, the full screen being emptied into a garbage can and covered ready for final disposition at the incinerator. Cuspidors after being emptied at the digester are passed to a bench provided with



racks properly equipped with pegs to set the bowl and covers of the cuspidor. These racks are placed in a machine having a capacity of four racks.

This machine is provided with warm water into which has been placed a washing solution. The water is pumped on to the contents through rapidly revolving sprays of considerable force. When the washing is done, which requires 1½ minutes, pump is stopped and the cuspidors are rinsed with a douche of steam and hot water. This thoroughly cleanses and disinfects also heats the metal of which the cuspidors are made and they dry rapidly after removing from machine. After removing from trays they are again placed in the metal box ready for distribution.

#### TOILETS

Perhaps in some industries no item is so neglected as toilet accommodations. Frequently you find them located outside of the factory, sometimes quite a distance, causing a loss of time and endangering the health of the employees. Toilets should be located within a factory building on an outside exposure for light and ventilation.

All industrial and sanitary codes demand separate toilet compartments for each sex in every factory where men and women are employed.

It is good practice to provide toilets on each floor with due consideration as to distance the employee has to travel. Frequently toilets are installed in a tower especially built for elevator, stairs, and toilet rooms located at the most practical point for the convenience of the occupation of the building and due consideration for future building construction. Much expense and trouble will be eliminated if the industrial engineers will select a standard of toilet equipment, considering the various points as applying to sanitation and efficiency. (See Safe Practices, No. 27, p. 14, "A Toilet Room to be Proud Of.")

The following points have been tried out and found practical to good, sanitary toilet equipment:

1. Location on outside walls for light and ventilation.
2. Solid porcelain closets with open front type of seats automatically flushed by seat action.
3. Each closet enclosed in a metal cabinet with doors.
4. Inside dimensions of cabinet 48-32 inches, door having a minimum height from the floor of 18 inches.
5. Each door provided with a spring which will close it up to a point of about 1½ inches.

(Where a compartment door is ajar, not locked, it gives the same privacy but eliminates possibilities of employees loafing, maneuvering with the equipment, or writing inscriptions on the walls.)

6. Metal for cabinets formed in such manner as to leave practically no opening for the accumulation of dirt.

(Fig. 1 shows lock on door which is not practical, use spring instead.)

7. Floors constructed of concrete pitched to floor drain.

Hose bibb supplied for attaching hose for flushing entire unit.

8. For convenience, one small porcelain or white enamel lavatory foot control, no stopper, spray head should be installed in every toilet room having five toilets or less with an additional lavatory for each multiple of five.
9. For the sake of cleanliness, closets should be washed every twenty-four hours with a solution saturated with a disinfectant. It is desirable that some standard painting scheme along practical lines be adopted, such as a 6 inch slate wainscoting, white enamel walls and ceilings and cabinets, and black around the handles of the doors.
10. Full-length solid porcelain urinals equipped with supply pipe for



FIG. 1. A GOOD TYPE. THE LOCK ON DOOR, HOWEVER, IS NOT CONSIDERED PRACTICAL

constant running water is good installation. If there is more than one urinal, they should be separated by a screen for privacy.

11. Urinals should be set on floor slab with concrete platform 6 inches at the outer edge and tapered to the lip, platform to be  $30 \times 30 \frac{1}{2}$  for a single unit.

A clearance of  $\frac{3}{4}$ -inch to be left on sides and filled with pyrex.

#### NECESSITIES AND COMFORTS

Until recent years little or no attention was paid to the comforts of employees in reference to where they should hang their coats, hats, or

dinner baskets; how or where they should wash their hands or take a complete bath. In most instances, the coat and hat were hung on a nail in the workroom, the dinner basket was set under the work bench and if complete change of clothing was made into a working uniform it was done in the open workroom. It can be readily understood that under the old type of sweeping and performing of work without ventilating units, the dust circulating in the air settled over the clothes and dinner basket.

Many plants have no washing facilities and lunch is eaten with hands soiled from work. Investigations and efforts upon the part of progressive industrial managers have worked many improvements. The locker has taken the place of the hook, washing facilities and showers, even tho in some instances crude, have come to stay. In most instances lockers and washing units are distributed on working floors. Investigations and systematic study develop that from an economic standpoint lockers, washing units and showers should be centralized under a caretaker at one or more entrances in the mill.

Almost invariably the individual locker system is being adopted as the cleanest, safest depository for outer garments. Some system of inspection, however, must be provided to prevent the housing of unnecessary articles in lockers and to bring about the proper care of the locker itself by the employees.

Lockers should be constructed of metal connected in units to the best advantage of space available. Sufficient depth should be allowed for the use of a coat hanger in order that the garments of the employee could be spread out, for on some occasions they will be damp as a result of rain and spreading them on a coat hanger they will dry more quickly and will have a more presentable appearance. The width of the lockers should be sufficient to allow the hanging up of the hat and other garments if the employee desire to make a complete change. The height should be sufficient to take care of the average length coat.

The top of the locker slanting toward the floor eliminates the catching of dust, the catch-all for various types of material which might fall off and injure employees, and presents a more orderly appearance. (See Safe Practices, No. 27, "Drinking Water, Wash and Locker Rooms, and Toilet Facilities, p. 10.)

For purpose of cleaning, locker should be set up sufficient height from the floor, at least 8 inches, also to make it possible to attach a ventilating system to the bottom of the locker.

The selection of the latch and lock have much to do with the life of the locker. The latch should be of a type that the handle may be operated by pulling upward and outward. Cabinet lock system is more apt to get out of order than a padlock system and combination padlocks have been found to be the most appreciated by the employee on account of there being no keys, to bother with or lose. Less garments have been stolen as a result of combinations being picked.

The following is a description of a locker unit used by one of the largest industries of the country after a most thorough investigation and

test made both by the Engineering Department and its Safety and Sanitary Organization:

Unit composed of 5 lockers setting upon a base of 4 legs, 8 inches from floor.

Height from the floor of the locker from the base to top is 5 feet.

Height back is 5 feet 6 inches.

Width of each locker 10 inches, and depth 18 inches with a shelf within same 54 inches from floor extending 9 inches from back.

A groove in the shelf upon which the coat hanger can be hung.

Two hooks on the opposite side from groove.

In the bottom 2 inches from the back end is a 2-inch hole.

Edges turned down for ventilating purposes.

Over this opening is a slanting hinge cover, back of which is 5 inches from the floor, louvred so as to allow passage of air.

This installation protects garments from covering up the ventilating floor of locker or any material falling into the hole.

Slanting roof, combination padlock insert from top of locker door.

In selecting lavatory equipment, economy of course is a most important factor. The type of unit as to construction, material, control, life and appearance is also important. Units of porcelain and white enamel iron are perhaps the most desirable.

In large washrooms where the control of water can be handled by a caretaker, very practical lavatories are those constructed 8 feet in length of white enamel iron with five goosenecks provided with spray heads about 2 inches in diameter located 20 inches from the bottom of the lavatories through which the water flows with some pressure. Liquid soap dispensers are located between each spray head. No stopper at the waste openings should be supplied thus allowing the dirty water to run away, the employee washing under clean running water from the spray heads. Individual linen or paper towels can be used. (See Safe Practices, No. 27, p. 8.)

Where lavatory units are not under the control of a caretaker, it has been found most desirable from a health standpoint to control the water by foot equipment. The box foot control valve is considered one of the economic types of individual controls, requiring less upkeep.

A most desirable individual porcelain unit is now on the market. It is simple in construction, having no stopper and water is supplied by a gooseneck with spray head and a foot control. The soap can be either furnished by individual tilting style of liquid soap container or from one container with individual control for each lavatory. (Fig. No. 2 illustrates this type.)

#### SHOWER BATHS

Every industrial plant whether they do or do not have centrally located locker rooms ought to have a few shower baths. Where you have centrally located locker and washrooms, it is most desirable and efficient to put in a neatly constructed shower bath equipment, taking into consideration the number of showers required for the type of occupation of

plant. If the work is dirty and grimy and poisons are used, men should shower before leaving for home especially if they change all their clothes upon entering and leaving the mills.

#### LUNCH ROOMS

The sanitation in industrial lunch rooms is most frequently a much neglected situation. The success of the lunch unit and the health of the employees depends largely upon the inspection and sanitation of the unit itself and the control of the foods. I shall not go into detail on this

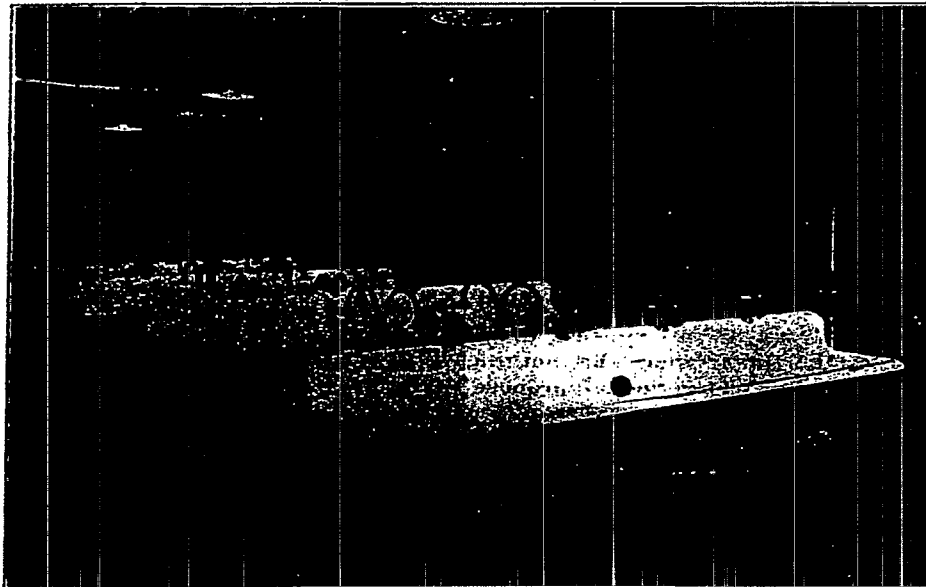


FIG. 2. PRACTICAL TYPE OF LAVATORY WITH LIQUID SOAP DISPENSERS.

subject but I wish to warn all industrial managers that if their lunch units are not a success, they should make a thorough personal investigation and without doubt they will find that sanitation enters more than any other item into the unsuccessful result.

After all, we are all human and we have more or less pride not only in our dress and cleanly appearance but in the food we eat. The Bible tells us: "Cleanliness is next to Godliness."

The better dressed and cleaner an employee, the greater asset he is to your business.

It goes without question that in the future both men and women are going to be attracted to the industrial plants which have good, clean, healthful working conditions.

## DISCUSSION

MR. HOENER: One question that has often come up in various layouts for new plants is the question of whether or not washrooms should be located in toilet rooms, or whether they should be located adjacent.

MR. FITCH: The general washroom should not be in the toilet room. I think that in every toilet room there should be at least one lavatory. That is very important.

MR. J. T. BURKE (Chief Factory and Office Building Inspector, Province of Ontario, Toronto, Canada): Is it necessary to provide double lockers, one to take care of the shop clothes and the other for the street clothes?

MR. FITCH: It is a question in my mind whether we ought to have double lockers; at the present time we are using the single locker. In our compound rooms we have just built on new locker rooms and a very fine shower bath. We are studying the plan of what to do about the clothes. Every man who comes in, who works in our mill rooms where there is dust and in our compound rooms, comes into the locker room which is centralized, removes his street clothes and puts on a uniform which he himself pays for and is properly numbered. I am figuring with the vacuum cleaning people to see if we can't secure an arrangement whereby those suits, until they become so dirty that it is necessary to wash them, can be thrown into some type of vacuum cleaning apparatus so that we can clean them quickly. The caretaker can take care of the clothes. They are all marked, and my idea is to put a hook on the outside of the locker where the clothing will be hung for the caretaker.

In the new locker room I propose to go further and put in some sort of washing unit so that we can wash those clothes and dry them over night, or between shifts if necessary.

Each man should be given a washrag and towel, and either liquid soap or individual cake soap should be furnished. Those who are using lamp black are probably having a lot of trouble trying to find a soap that will quickly get rid of the lamp black. We are using a soap put out by the West Disinfecting Company. We have used all kinds of cake soap. We also have a colored fellow in there and he is put into a bathing suit and he washes the backs of the men. At the present time he is using a brush which he sticks in a solution between each act, but we propose to give them a washrag and they can wash themselves, and he will take this washrag and wash their backs.

MR. BURKE: How many showers have you determined for a certain number of employees, and how long does it usually take each employee to take a shower?

MR. FITCH: I don't think we have been able to work that out ourselves.

MR. BURKE: Do you find, as a matter of fact, that the men take the shower bath opportunities?

MR. FITCH: We don't have a bit of trouble. The first thing they do is look for the shower. Adjacent to that same room we have built a lunch-room. The men in the compound room go there to eat their meals, and they cannot get in there until they have washed. We have provided a

special washroom outside of the lunchroom so they have to go through that. We haven't put that lunchroom into action yet, but that is the scheme, and one of the foremen every day stands at the door and sees that the men are washed.

MR. SCOTT: In the white lead industry they have two locker rooms with a shower bathroom between. The men come in and leave their street clothes in one room, go through the shower room to get into their working clothes, and when they get through they take their working clothes off and have to go through the bath and shower room to take their shower before they can get their street clothes. A law in the State of New York provides for that. The National Lead Company uses that system and employs men to see that the men do take their showers.

The United States Steel Company has some statistics and figures on the number of showers required per unit. The New York State Safety School also has some information on that.

CHAIRMAN SCHOTT: Mr. Fitch, what is your opinion regarding the spraying of locker rooms, lockers and workrooms? Have you had any experience on that?

MR. FITCH: We haven't done any of that work at all. I have talked with our doctors and they laugh at it, so we haven't started it.

MR. R. N. WATSON: I may say that the employees sometimes request that you clean out their lockers. We have had that experience, men coming in from the factory and requesting that old lockers be cleaned out before being put into use, and we have had to use a disinfectant spray on those. I think our medical department claims the same as Mr. Fitch says—that the spraying actually doesn't do any good, that the best way to do is to take a scrubbing brush and water and wash the locker out thoroughly on the inside. We have made a practice of doing that in rooms used by compound men and lamp black departments, etc.

MR. HOENER: We have had considerable trouble in some of our shower bathrooms, especially where the men use soapstone, due to the men slipping on the floor, and we have found it necessary to put in wooden racks made out of slats about one inch wide spaced about a half-inch apart to prevent slipping.

MR. FITCH: We have used matting in our mill rooms.

MR. HOLMES: How long have you had the seat-operated valves in your factory? Have you had more or less trouble with them than with the hand-operated valves? Can you give me any comparison as to the upkeep and maintenance?

MR. FITCH: We have had the seat power valves for a good many years, and while there is some upkeep sometimes from the abuse of the employees, it isn't any greater than that of the other type. One of the reasons we changed is so that a man does not have to touch his hand to it. This is worth while from the standpoint of health and cleanliness, even though it costs a little more.

CHAIRMAN SCHOTT: Regarding lighting at night for purposes of cleaning the factory and other purposes, what is your opinion regarding the

Cooper-Hewitt light in factories? Has anyone had experience with those lights?

MR. HOENER: We had considerable experience, and we have had quite a discussion with the Cooper-Hewitt people recently. The United States Government at the time we were making balloons insisted on the Cooper-Hewitt lights in our assembly plant. That happens to be our present calender room and we have left those lights in. Our medical authorities took the stand that even though they didn't injure the eye they had something of a bad effect on the morale of the employees, and recommended that we change them.

MR. FITCH: I think the Cooper-Hewitt light leaves a sickly impression, and the workmen look up and see the effect and it kills the cheerfulness of the room.

MR. LARKIN: We went into the subject thoroughly at Chelsea and we put Cooper-Hewitt lights in the mill and calender room. After a week or so the employee gets used to it and he can't see that yellow color. A Cooper-Hewitt light is a peculiar affair in that respect. The first time you see it everything looks purplish. After you have worked in it for a week everything looks white. You love that effect absolutely. We had Cooper-Hewitt lights in the drafting room, for instance, and there were great objections—everything looked blue but after a short time everything looks the right color. After a month's use in this calender room the men preferred it to the old system. It gave far more light with less expense and less wattage. We call it a success.

CHAIRMAN SCHOTT: One of the objections to the Cooper-Hewitt light has been that the men could not distinguish the colors of the various stocks, but the Cooper-Hewitt people say that the Cheney Silk Mills use Cooper-Hewitt lights, so I guess rubber plants ought to be able to use them.

MR. C. W. KENNEDY (Wisconsin Industrial Commission): Recently the Advisory Committee in this state has been revising its orders on industrial sanitation, and we have reported on some of the points that have been taken up in Mr. Fitch's paper.

We have reported favorably on cleaning equipment in plants that have explosive dust, and we are recommending the use of the vacuum systems in all other plants for the purposes of cleaning. Taking up the matter of pure water, I find in going over the state that many plants do not consider cross connections as important; yet you will find your drinking water sometimes cross connected with process water which sometimes has many different kinds of industrial poisons in it. That is one thing that I think is important.

One thing that our committee on sanitation here is recommending throughout this state—the considering of the main points on new construction, and we have two conditions that face us—new construction and existing construction. In plants that are now operating it is well sometimes to consider, instead of fixing up and patching up the present department, the construction of new buildings to take care of those departments.



I want to commend that part of the paper which so well took up the matter of toilets. It seems to me that there is a very common sense way of putting it—the requirements which are necessary to make a plant as clean and efficient as it should be.

The matter of double lockers for street clothes and working clothes was taken up, and we almost concluded to report favorably on the asking for the use and furnishing of those lockers by the employer whenever the man was working in industrial poisons—when his clothes were covered with poisons and not merely dirty—but we did not come to a unanimous decision in regard to that. We did, however, come to a decision in regard to the cleaning of clothes, and we reported that some help should be given and some attention should be paid to the matter of cleaning the workmen's clothes when he is working in industrial poisons in such a way that his clothes become saturated with them.

MR. L. H. SHEA (Lycoming Rubber Co.): We have had considerable trouble with employees who would not take cement from their hands after making shoes. They would go direct to the cafeteria or eat their lunches that way, and those who would clean it off would use benzine or anything they could get a hold of, and the fumes would remain on their hands and probably a considerable amount of this material. The results of this were that quite a number of severe headaches were reported by employees who reported to the dispensary four or five hours after taking this into their system through the food. We have tried petrolatum, to be applied to the hands in a very small quantity before beginning work in the morning or after they have had their hands cleansed at noontime. It worked very well as far as taking the cement from the hands is concerned, but it left a yellow tinge, and also the employees claimed that it had a disagreeable odor.

I would like to know if any of the men here have a knowledge of anything which will not be disagreeable which can be used either to take the cement off the hands, or be put on the hands before they start work in the mornings?

MR. SCOTT: We have had cases where people using gasoline to wipe the cement off of their hands have burned themselves. They don't like to use kerosene. They don't want to use kerosene and then go to the lunch room. I would like to know if anybody knows anything that would take it off without being objectionable.

MR. FITCH: I won't attempt to answer that question as to what will take it off. To my mind it is a matter of control—you have to impress upon a number of employees the importance of good health, the importance of eating their meal with clean hands, and while you can't do that to the whole group you perhaps can bring some leaders into your medical department and convince them of the importance of that, and have the foremen with them. If you sell it to them it will gradually percolate through the department. You have to deal with the employee like a human being. You have to talk to him in a business way and convince him of the proposition. I don't think you will have much trouble then.

MR. SCOTT: Do other people have trouble in the shoe plant with burns on the hands? We have actually had cases where the men washed their hands with gasoline to get the cement off and in rubbing under certain atmospheric conditions a friction fire was started.

MR. BURKE: The first thing some workers do is smear their hands with heavy machine oil before they start to work in the morning. They don't attempt to remove that until noon, and then, of course, that brings up another question as to whether the hands are better washed in hot or cold water. Some medical authorities say lots of hot water. Other medical authorities say that lots of hot water opens the pores and allows the stuff to get into the pores and in that way the system is inoculated. The majority of our shoe workers say that is the best way—to smear the hands in the morning and wash them at noon. When they come back to their work they smear their hands again.

CHAIRMAN SCHOTT: "Selling Safety in the Factory," Mr. Harold T. Martin, Manager of the Health and Safety Department of the Fisk Rubber Company, Chicopee Falls, Mass.

### SELLING SAFETY IN THE FACTORY

H. T. MARTIN, MANAGER, HEALTH AND SAFETY DEPARTMENT, THE FISK RUBBER COMPANY, CHICOPEE FALLS, MASS.

The greatest results will be attained in accident prevention work in the factory when the safety habit has been sold to every employee.

The accident reduction problem is one of salesmanship and must be dealt with accordingly. There are always three things of vital importance in any selling campaign—the article for sale must have merit, the sales force must be organized to the highest point of efficiency, and the advertising connected with it must be the very best possible.

The article for sale in this instance is the safety habit and there can be no question about the merit of the goods.

#### THE SAFETY SALES MANAGER

Before we go far into the details of organization we must have a sales manager. The logical man for this job is the factory manager—let's look him over. If he is not qualified for the position it would be better not to fill it at all. He must make good or the whole plan will fail. He must be sincere, have plenty of back bone and pep and be willing to spend some of the company's money to make the plant mechanically safe. Assuming that he has these qualifications, he is made sales manager. This fact should be given considerable publicity. It pays to have every member of the factory organization familiar with the fact that the manager is heart and soul for safety.

In looking over the field for a sales force, we find the foremen particularly adapted because of their relationship with the people with whom we are going to do business. The workman judges the company by the foreman with whom he comes in daily contact and will listen to him

as to no one else. The foremen, therefore, have long lists of prospective customers. They are intelligent, and when they once realize their responsibilities in connection with this selling campaign, they will sell effectively and are, therefore, engaged. At a series of meetings called by our safety sales manager, these men are instructed about their new duties and advised of methods to be used in order to become efficient safety salesmen, which is essential if they expect to remain on the payroll. They should be put to work immediately in their respective departments.

It is not always possible for the foreman in a large department to get the desired personal contact with the worker, and of course ultimately it is the worker we must reach. In such cases, the work of selling the safety habit must be delegated to an assistant, the foreman becoming an assistant sales manager and his subordinate the salesman. These men should receive preliminary instructions similar to those given to the foremen from the sales manager, and frequent conferences of members of the sales force should be held for the exchange of ideas. There must be no lost force to the selling talk, even though it is transmitted two or three times. Such an organization cannot help being efficient if the boss insists that the men show results. Accident records will soon show where the weak spots are, and they should be strengthened at once even though the extreme measures of removal have to be resorted to. The movement is very contagious. Volunteer salesmen from within the ranks almost invariably join the forces and work with a will. This is highly desirable and should be encouraged in every possible way.

Up to the point of sending the salesmen into the field, the Safety Department has acted in an advisory and statistical capacity only; but when the sales force is organized and on the job, the Safety Department becomes also the Advertising Department and assumes responsibility for snappy safety advertising which will be of real assistance to the sales force, keeping the subject alive and reaching not only the foremen but the workmen as well.

#### THE SAFETY ADVERTISING MANAGER

The safety advertising manager must be a thoroughly human individual, capable of gaining the confidence of the several classes of men with whom he must mix. He will get co-operation if he knows how, and he must have it to succeed.

The Safety Department must keep the foremen posted on results they are securing, and give them every possible assistance by studying conditions and making known to them everything which has any bearing on their accident records.

Further work must be done by the Safety Advertising Department which will reach the worker direct. Safety Departments in various concerns as a general thing find it very difficult to put over a new idea. Generally some one else has used and discarded the same thing. The advertising must not be permitted to become stale, changes being made frequently in order that the subject may be of interest.

Some of the methods used to assist the foremen in their selling campaign are described in the following paragraphs:

Many concerns issue periodically pamphlets devoted to safety giving accounts of recent accidents within the plant, and material of a general nature. However, it has been found that a far more valuable method of driving home the gospel of safety is through the factory house organ. This paper contains many items of interest and is invariably taken home, so that in cases where a certain space is devoted to safety propaganda it is difficult to avoid those articles. The fact that other members of the family are made familiar with this reading matter means that more pressure is brought to bear upon the man we are trying so hard to impress, by some one to whom he may be more willing to listen.

We all appreciate the value of motion pictures in safety work. Many of the larger concerns have prepared films which are interesting as well as instructive and are taken seriously by many who pay no attention to other kinds of safety propaganda. In some cases it is not practicable to make films of this description, but where they can be used, they are always effective.

Safety meetings for the workmen may be held at infrequent intervals to great advantage. However, these meetings are made as short and snappy as possible and are planned to make the men feel that they have an actual part in the whole affair. They are sometimes held away from the plant on the men's time, and in that case arrangements are made to give them as good a time as possible. Safety meetings held at the plant on the company's time can best be confined to subjects interesting the particular department for which the meeting is held.

#### DEPARTMENTAL SAFETY RULE BOOK

Instead of the cumbersome rule book which is often given to the new employee in many concerns, a departmental safety rule book has been published which deals with the operations in a single department only. In that way the individual about to enter upon a new position can easily familiarize himself with the rules pertaining to the operation at which he will work. This subject is important, and gives the foreman the kind of backing he needs in the event that it becomes necessary for him to insist upon a strict adherence to some of the simple rules mapped out for the prevention of accidents which are common in his department. It is advisable always to have the foreman draw up these rules with the assistance of the Safety Department.

One of the best ways of reaching the man on the job is to designate some definite date as No-Accident Day, to advertise this day in every way possible, by special notices, special literature and bulletins, rallies or meetings, by erecting a large score board, tagging every man in the organization with a tag suitably inscribed and to see to it that all of the workers understand the meaning of the tag and the idea. It is advisable in events of this kind to count as an accident only those which result in the loss of time. To do otherwise may prove detrimental because the desire on the part of some not to mar the record may keep

them away from the hospital for some slight injury, the neglect of which might prove serious. This plan guarantees action and a real, honest-to-goodness drive for safety for the time specified at least, and the after effect is very beneficial. These days may be repeated with variations, such as following with a tagless day after a reasonable interval. After a date has been selected the foreman may be made responsible for the passing of information down the line without the assistance of tags.

#### THE SPIRIT OF CONTEST

Safety contests are sometimes used with success. The spirit of contest is in us all whether it be baseball, pie eating, or accident prevention. All that is needed is the necessary stimulation. Plants, departments, or units may be pitted against each other in contest for a specified time. In one instance, a contest was held between two departments with about the same degree of hazard existing, and the same number of employees, where there was at stake something in which both factions could participate, such as a theater party or picnic. Each employee made a small deposit, the money to be refunded to the winning department, and the money of the losers together with some of the company's money to be used in defraying the expenses connected with the event. This proved to be a big success arousing the personal interest of each individual, and has been worked out along similar lines several times since. Care should be taken to keep the deposit so low that no one will be hurt financially, and extremely close supervision should be exercised to guard against the neglect of minor injuries.

In some plants it is considered advisable to give the workmen an active part in the accident prevention program by placing them on inspection committees, serving for an interval usually of one month, at which time the committees change, retaining one member as chairman of the new committee. There is a variety of opinions as to the merit of such committees. It is a fact of course that by actually engaging in the work they may take more interest, while it is equally true that a great percentage of items reported by such committees are of trivial nature and refer to other than humanitarian errors which they seem to overlook.

A means of direct contact which should not be overlooked can well be carried on by the factory doctor, safety man, man paying compensation insurance, and the visiting nurse. These people coming in contact with the man who has received an injury find him in a most receptive mood, and it generally follows that he returns to work a 100 per cent safety salesman. After he has been through the mill, he can well describe to his fellow workers some of the trials and tribulations of a man who is forced to remain away from his work because of injury.

A court of inquiry on all serious accidents conducted by the factory manager has the effect of keeping all foremen and departmental heads on their toes, as no one is anxious to accept the responsibility of a serious injury to his fellow man.

"TELL IT TO THEM QUICK AND TELL IT TO THEM OFTEN"

A pretty good slogan for this advertising campaign would be, "Tell it to them quick, and tell it to them often." The workman can easily grasp one thing at a time, but in order to make a deep impression on him, an idea must be kept constantly before him.

The entire safety movement is still in its infancy. The efforts for preventing accidents are not confined to industry, but are being carried into every walk of life until every one realizing the enormous unnecessary loss of life and crippling of men and women, forms habits of safety which will reduce accidents to a minimum, and so we urge every thinking man and woman of America to join the ranks of salesmen who are trying to make this world a safer place in which to live.

CHAIRMAN SCHOTT: Mr. Martin has presented an aspect of the safety work which gives an entirely new light on the subject, and which if adopted by a great many safety men would make the work many times more enjoyable and effective than it is at the present time. I had occasion to visit one of the largest plants in Milwaukee yesterday, and although the plant has an international reputation, yet it is extremely dark and I don't know whether the windows have been cleaned since the plant was built or not. I wasn't quite sure. But we had occasion to ask some of the chief executives whether they had a safety man in the plant. Two of them said: "Well, we have some men that do some such sort of work." But it would be absolutely impossible to start any safety work in a plant of that type unless the plant were brightened up and shined up, and it was clearly shown that the management hadn't been sold on the work. There could be a proper "esprit de corps" among the workmen because the plant itself wasn't shined up.

#### DISCUSSION

MR. E. B. LEWIS (Gillette Rubber Co.): Regarding the movie situation, it seems to me that movies are an effective medium through which to get safety into the plants. We have not a movie projector in our own plant, but recently an insurance company put on a program in which they showed bulletins on the screen with lectures and a human interest picture. Every seat in the auditorium was filled. I think the movie has a great deal to do with this business of safety. My idea of selling safety to our men is through the bulletin. I think the bulletin board can be made effective and will bring out the points that you want to especially illustrate. There is a bulletin that will apply to almost every accident that might happen in your factory.

Relative to clean windows, aside from the fact that it brightens up your factory, it has a moral effect on the men of making them think that you are looking after their welfare. You expect to keep your windows clean at home, but keeping factory windows clean is something entirely new, and a man who sees his fellowman up cleaning the windows in the factory is affected, I think, in a way that is very lasting.

Every window should be cleaned at certain specified periods, and to my

mind that is one of the most effective ways of keeping the good will of your employees, through both good light and ventilation.

**CHAIRMAN SCHOTT:** Mr. Martin made a statement which the chairman disagreed with more or less, and that was to the effect that the safety rules should be made by the foreman. It is indeed true that if all foremen could be interested enough to take the time to get up a set of safety rules for their department, it would be immensely effective. However, the fact remains that a great many foremen do not take the time or the trouble or the interest to make safety rules, and in the smaller rubber shops where you may have simply one mill and calendar, or just a few mills and calendars, the amount of accumulated experience to get up safety rules is not great enough for them to do this with any amount of authority. For the benefit of those particular shops a suggested standard book of safety rules has been gotten up, and anyone is welcome to as many copies as they wish. These books are the compilation of safety rules from five or six of the largest rubber shops in the country.

One of the main reasons why there should be safety rules is ignorance of what to do. You can walk through many rubber shops and find a man sitting in the mill pan, for instance, at lunch time when the mill rolls are probably running, and you say to the man: "Please get out of the mill pan", or else you say: "Get out of the mill pan", and the man says, "What do you want me to do that for?" "Well, it isn't safe." "Well, nobody ever told me that before." And so it is all the way through the factory. No one ever told them that this practice was wrong.

The wearing of gloves in warming up rubber can be eliminated if you go after it right. There are ways of warming up rubber without the use of gloves by wearing long sleeves and carrying the rubber in the fold of your arm, for instance, and if you have certain rules by which you tell your plant management, your foremen, and your inspectors what is right and what is wrong, you are taking a long step in the right direction.

**MR. FITCH:** A suggestion system in a plant will bring out many things along safety lines. The Goodrich Company has carried on a suggestion system for a good many years. We started on this basis. A man makes a suggestion in which there is no change made in making the installation and which is approved by the committee, and we pay that man from \$2 to \$5, depending on the suggestion. If there has to be some remedy—if we have to help him out and he simply brings in an idea, we pay him \$2 for it if it is approved. And we follow this plan of asking that man to come into the office of the secretary of the Suggestion Committee after his working hours, and discuss the plan with him. We get in personal touch that way.

Those who had the opportunity of sitting in some of these public safety hearings, and the Local Council Committee yesterday, can't help but appreciate that one of the efforts to secure results is going to be through the public safety movement. If we are going to strike home with the man and the boy, we have got to go through the community and the home. All of us would do well to go home to our plants and get behind a good public safety movement in our city. Get to the man through his children in

school; the boy bringing in safety suggestions and ideas from the school will have more effect on the father in his work at the plant than almost anything that the plant can put over. You may be able to reach the foreman to a certain degree, but the man you are after is the man that performs the operation, the man that is being hurt, and you can hit him through the schools, and you can hit him through the community. The public safety movement is one of the biggest movements in this safety game. I have been in it for several years, and I know it to be a fact that if we can get into the public safety movement with a lot of spirit, it is going to aid the industrial managers that have been trying to put over safety and sanitation through the plant.

**MR. SCOTT:** It is not generally known that the National Fire Protection Association issues a book "Safety in the Home" which dwells both on fire and accidents, and it is written up so as to be interesting both to the child and the grown person, and I have noticed in their ad that they are sold in quantities at four cents a copy, and they are good.

**MR. FITCH:** The National Safety Council has lessons on safety for foremen. In a great many plants in cities where there are local councils they are using these to great advantage and accomplishing a great deal of result in lining up their foremen along safety lines. These lessons can be secured from the National Safety Council, and a copy should be given to each of your foremen.

**MR. LARKIN:** Mr. Martin, in his paper, touched upon the great importance of selling safety to the manager. It isn't so terribly hard to sell the idea to the foremen, and perhaps some of the men, but after six or seven months you wonder why it is they don't make progress, and after a long time it dawns on you that there is a brake in the movement in some stage of the game, and we realize after a while that this brake is in the management. The manager is there to save money. He has an overhead. If his overhead runs 15 per cent this year and 16 per cent next year, perhaps there will be a new manager. Now you are asking him to spend money out of the overhead. He is the brake on the whole matter, and if you don't sell the manager, your chances of success are very small, because he controls expenditure of money and he says what work shall be done and what work shall not be done. From a practical standpoint you must sell safety from the top down.

**MR. BURKE:** During the two safety weeks, did the production suffer?

**MR. MARTIN:** I don't know that I can answer that question accurately because I am not familiar with that so much. I do know that there is a very great element of danger in a "no-accident week" in the possibility that minor injuries may be neglected. It requires the very closest of supervision because we know that there are probably just as many small cuts and scratches during safety week as any other time, but invariably you will find a reduction of 50 or sometimes even greater per cent in your hospital visits for the small injuries. Now the 50 per cent who don't come may get away with it all right, and on the other hand if one or two of these men finally get infected because of that neglect, then you are better off if you never held a safety week. It is very, very seldom that I disagree with our chairman, but on the subject of safety rules I



can't let him have the last word. I don't think that safety rules are so very important when you come down to it because they are very seldom if ever enforced anywhere. They may be enforced for a few weeks. Our scheme is to go into a department and spend the time necessary with the foreman, draft rules from his past experience, and publish them in an illustrated booklet. The rules are not mandatory, simply suggestions to the man on how he may avoid some of the pitfalls that others have fallen into in the past. Yet the foreman is given the weapon to dismiss a man if he wants to. Perhaps the best thing that we have ever tried is the safety contest between departments.

The difficulty perhaps is the same as in "accident week"—watching very sharply for minor injuries, and the desire on the part of the contestants to have a big feed somewhere at the expense of the losers. The contests certainly do get a personal touch into safety work that I had never heard of in any other way.

**CHAIRMAN SCHOTT:** In formulating the program for the year the Executive committee of the Rubber Section realized the fact that this proposition of selling safety was of utmost importance. It was decided that we enlist the aid of the most prominent men in the rubber industry, and to our intense gratification we received immediate acceptance from two of the most prominent men in the industry—Mr. James Newton Gunn, Vice-President of the United States Rubber Company, whom we had the pleasure of hearing last Wednesday morning, and Mr. Arthur A. Frank, General Factory Manager of the Federal Rubber Company, Cudahy, Wis.

### A BROADER FIELD FOR SAFETY WORK

**A. A. FRANK, FACTORY MANAGER, THE FEDERAL RUBBER COMPANY,  
CUDAHY, WIS.**

The words "Safety First" and "National Safety Council" have stood for many broad principles in the prevention of accidents and sickness and since their coinage and adoption have done a wonderful work. When the campaign was first launched, all attention was turned to the guarding of hazardous machines and operations and it was felt that by thus properly guarding equipment accidents would be reduced, but this was just the beginning. Statistics quickly showed that the big majority of accidents were due to personal negligence and apart from machines where the mechanical guard could not be placed. What then, did this require? It required education and training in the art of self-defense against harm. This was much more difficult than the placing of mere guards.

Large industries at once undertook this difficult task of teaching and are meeting such success that the movement is making itself felt all over the world. The more this subject is studied and analyzed, the more one begins to realize that it is so closely allied with about everything we do that we can well carry it along in all our phases of livelihood. The fundamental of safety in industry lies in good industrial relations. A plant that has a good morale will generally be one with a low accident record. Safety should not mean merely safety from accident or

injury to the body—it should mean safety for the mind and soul. It should cover clean surroundings, fair wages, efficient work, proper home protection, recreation, and outside interests.

An industrial plant that interlocks the prevention of accidents with all of these will find it to be not only humanitarian but a paying investment as well.

The Organization Plan of industry is generally to divide a plant into a dozen or more units to facilitate proper control and I want to show that each unit can further the safety movement. The Industrial Commission of Wisconsin has said that safety is essential to efficiency. I believe that efficiency is essential to safety. Most executives in seeking maximum safety strike at the end instead of at the beginning of the chain of factors which jointly act to reduce accidents.

In my opinion the most important of these units is:

#### INDUSTRIAL RELATIONS

Where the feeling between the management and employees is that of the best, the putting over of a thorough accident prevention campaign is made considerably easier. It is difficult at best to train men in such subjects as being careful regarding health and accidents. However, if we have the proper co-operation behind it, it becomes a pleasure. The men must have confidence in the firm and the rest is comparatively simple. Confidence is a wonderful thing and is the basis of all sound business today, and will be forever. There are many ways that industrial relations are being promulgated and developed but the fundamental in all must be confidence. Some of our largest manufacturers have organized what is commonly known as Industrial Democracy, Shop Committees, and the like, which, so far as is generally known, are proving more or less successful, although the experiment on the whole is quite new. Industry is watching such concerns as the International Harvester Company, Goodyear Tire and Rubber Company, and others with great interest. Other companies have planned their relations on less radical lines and carry out many activities in a less organized form to promote this good feeling. But there must be confidence in back of it all. An employer must do whatever he does with earnest and whole-hearted endeavor. He must be sincere in all he does to create this confidence.

The rubber industry has fortunately been free from any serious labor disturbances in the last few critical years, which shows that good feeling must exist and I know that this industry ranks among the foremost in the safety movement. The two go hand in hand.

Next to good industrial relations, and just as important, comes the matter of a clean plant, not only to further a good product and a better morale, but it is the foundation-stone upon which a Safety First Campaign should be built. A plant, no matter how large or how small, how intricate or how simple its process of production, must first be put in good physical condition and must be so maintained to promote safety. Aisles littered up with material, dirty dark corners, and rubbish piles must be eliminated if accidents are to be reduced.

We have a department called PLANT INSPECTION the sole purpose of which it is to keep the plant clean, co-operating with the foremen to prevent congestion, which helps production; but also makes for safety.

Then there are the MECHANICAL ENGINEERING AND PLANT LAY-OUT DEPARTMENT which can do a great deal for the promotion of safety.

In so far as guards for machines are concerned, I need not go into detail because most all industrial plants have this well in hand. It comes almost as second nature in installing machines nowadays to plan a guard for them.

It is in the proper construction of buildings, the proper lay-outs of both buildings and machinery, ventilation and good water supply, that this department can best prove its worth not only for production purposes but directly to further the safety movement. At the present time factory buildings are designed to give the most light possible to further production. Possibly safety was not given a thought when these buildings were planned but just think what they have done toward the reduction of accidents. Then the location of departments for proper movement of materials and the location of machines in departments: A proper lay-out must mean a reduction in accidents notwithstanding that it naturally helps production. Shall plants generally allow foremen to lay out and plan their departments and locate their machinery? I believe it to be money well-spent to have a separate department or only an individual whose sole duty it is to plan lay-outs of the entire plant. When we consider the large investment of machinery and equipment of even a small plant, is it not worth while to spend at least the salary of a good plant lay-out engineer to place it most efficiently? Such a man has a mental picture of the operations of all departments, and considers a lay-out for the plant as a whole and plans production along the simplest labor-saving lines. This ease of flow of materials must necessarily mean safe practices for the human element.

#### STANDARDIZATION OF EQUIPMENT

The Plant Lay-out Department is one of the most efficient units we have in our organization today. It functions separately from our Engineering Department, reporting directly to the Factory Management. Lay-outs are given to the Mechanical Engineering Department for execution and standardization. We endeavor to standardize all equipment that is used in practically all of our departments. Equipment like motors, shafting, and hangers have long been standardized. Endeavoring to standardize tables, racks, benches, and trucks to satisfy the needs of various departments is, however, comparatively new. We have a standard table which was designed after taking into consideration every use that any table might be put to. Safety was the chief requisite, it being perfectly balanced and with every consideration to prevent injury. Then we have standardized such items as trucks for internal or departmental trucking.

Only a few years ago when a foreman wanted a truck he picked one out of the most convenient catalogue and it was ordered. In consequence, we had some 70 different species of equipment, much of which was in-

efficient and highly dangerous to our employees. No truck is ordered now unless the requisition passes through the hands of our Internal Transportation man; then the truck must be one of 22 standard pieces of equipment. The trucks have been so standardized as to insure the best methods of handling and in this instance also with the safety factor kept well in the foreground. We are still refining this and expect, within the near future, to have three distinct types of chassis to cover all requirements and that these chassis will accommodate any of a dozen or more types of superstructures. I could enumerate a good many items of equipment that we have standardized in the past five years but I believe it is needless for me to tell you that this method of standardization is not only helping from the angle of duplicating equipment but it has a big bearing on the reduction of accidents. The Engineering Department, outside of its routine safety work, can be made a very important factor in reducing accidents. They, of course, must have the full support of the management in bearing in mind the safety movement when laying out the plant and designing and locating equipment.

The standardizing of trucks was brought about largely by the development of an INTERNAL TRANSPORTATION DEPARTMENT. This is a unit that should be included in every organization no matter how small the concern. It saves money in itself—it cuts down one of the greatest causes of accidents today. Our experience during the last three years has proven this beyond a doubt. The reduction of accidents is not due alone to standardizing of trucks, but due to the fact that we have put all of our transportation in the plant under one man. A certain small group of men handle all of this work, whereas under our old system of every department having truckers, ten times the number of men handled trucks and the accidents were considerably higher.

Then we have a comparatively new department in industry:

#### INDUSTRIAL ENGINEERING

which was first installed to control the methods of remuneration for production, piece-work, bonus-methods, etc. More recently, however, it has branched out into a very valuable asset by having it control production standards. If properly supervised and with the proper support, this department can be made one of the most valuable adjuncts to safety that we can have in any industry. When time-study men are sent to study an operation it should be their first duty to analyze the work and suggest better methods of handling. They may even recommend the relocation and alteration of machines in order to facilitate the ease of operation. By ease of operation I mean reduction of labor effort or fatigue, which is a large factor in the reduction of accidents. The chief object of a time-study man, of course, is to submit what some may call 100 per cent time, which is the time it takes to produce an article under the best conditions in the best way, in the least possible time. Obviously in suggesting the best way under best conditions, the man unconsciously is recommending operations in the least hazardous way, as the simplest is generally the least dangerous. If the industrial engineer is instructed to watch operations from the safety angle, just think of the value he

must be when drawing up production standards. There may be some question about piece-work or bonus methods of payment being detrimental to safety but from personal experience I can assure you that our accidents to piece-workers have shown to be less than to day-workers. It is, of course, always highly recommended and desired when setting rates to have the earnings on the part of the men reasonably high so that men not quite so efficient as others can draw good wages. A fair and good rate will always tend to balance an operation and not develop into a mad race to make money and thereby possibly cause accidents.

#### EMPLOYMENT DEPARTMENT

The duties of this department are many, chief of which is the keeping of a perpetual inventory of the human machinery of a plant. The employment man should know the condition of all the employees. He must endeavor to keep them on the job and endeavor to keep down labor turnover. This is one of the most costly items of expense in industry today, not only because of breaking in men but it also means higher accident losses. Our accident chart shows that as labor turnover fluctuates, our accident frequency also goes up and down. Many men say that safety cuts down turnover. Here again I believe the cart to be before the horse—turnover cuts down accidents.

In the placing of men where they are best fitted to work, this department can do its best for safety in industry. This is most important, not only for the prevention of accidents but is a link in the chain that spells success or failure in building up a stable and efficient force. The Employment Department is generally given the responsibility of being the "go-between" between the management and the individual workers and acts in the capacity of a Personal Service Department. They are the first ones to express to the new man the policy of the management and can do so much in promoting good industrial relations that they possibly should head the list of departments that indirectly further safety.

Then there is the Production Department that controls about 75 per cent of the men of a plant. This is the department that must see that every individual worker carries out the rules and specifications laid down by the Factory Management, which covers every phase of industrial life. The foremen of the Producing Departments are the lieutenants of the management and upon their efficiency depends the success of the work planned and laid out by all of the other units that I have mentioned heretofore. Their chief function, of course, is to produce rubber goods according to specifications but they must manage their departments as real managers, taking into consideration every phase of activity that their men are supposed to engage in. Their influence counts for so much in any activity, whether it be safety or otherwise, that it pays to have good foremen and good department heads in the producing departments. It is the men from these departments that are generally chosen to act on safety committees and in this way tie in each individual worker of this department to the Central Safety Department and others that plan the campaigns that are to be followed and carried out through the entire institution.

In many instances, when selecting foremen, generally the most proficient workman is taken off the work-bench and given the opportunity to run a department. This may or may not be satisfactory, depending entirely upon the man himself. It is not so essential that the foreman be an efficient worker as it is that he be a good manager and a good handler of men—in other words, a good executive. In most industries in the country the method of making various products is all laid down by the Engineering and Specification Departments for the various producing departments to follow. Therefore, it is not the most essential qualification to be a good workman. I cannot express myself too strongly in selecting men to become foremen to see that they are properly equipped to handle men.

#### HEALTH AND SAFETY DEPARTMENT

I am bringing this department in last not because it necessarily belongs there but because I want to show that all of the departments of an organization play such an important part, that if they were not co-operating, the Safety Department would have great difficulty in making progress. The most difficult work this department has in launching a safety campaign is the training of men to be careful and to co-operate in the safety movement, but as I mentioned in the beginning of my talk, if the proper foundation of good feeling exists and the plant is in good physical condition, the equipment is right and the men are happy, it is a simple matter to make a showing on the part of the Safety Department. I do not mean to infer that this department must wait until the others have done their share. They can be very instrumental in pointing out to the various units of an industry, how they can assist the movement.

I trust I have shown that safety cannot be isolated to be successful. A Safety and Health Department does not mean a safe plant. Every unit of an organization must help directly and indirectly to further this great cause. I believe this spirit is fast developing in American industry and is making American industry rank foremost in the world today.

CHAIRMAN SCHOTT: I want to call upon Mr. E. H. Fitzgerald, the newly elected chairman of the Rubber Section, for a few remarks.

MR. E. H. FITZGERALD: A year ago when the Rubber Section was organized I little thought that we would get the expression from the different companies that we have at this session. The Rubber Section has really grown to something. Next year I promise you that we will be up in front and unless business conditions are entirely shot, our next convention or sectional meeting will mean more than this one has meant.

I wish to announce the chairmen of the different committees for the coming year. Mr. Schott will be chairman of the Program Committee for next year. Mr. Frank Scott of the Membership Committee, Harold Martin, the Building Committee, Ray Watson will still remain on the Standardization and Statistics Committee, and the Engineering Committee will again be in charge of Mr. Mitchella, of the Goodrich Company.

I want to thank you for the honor conferred on me, and I want to tell you that I will give my best endeavors to making this section one of the liveliest of the Council.

ADJOURNMENT.

F. J. Masen, Baltimore, Md.  
 E. H. Mattingley, Chicago Terminal, Chicago, Ill.  
 W. A. Mitchell, Safety Agent, Grafton, W. Va.  
 J. C. Morgan, Safety Agent, Baltimore, Md.

*Bessemer and Lake Erie—*

A. A. Stebbins, Superintendent of Safety.  
 S. G. Watkins, Superintendent of Safety, Boston, Mass.  
 T. C. Whiteman, General Attorney, Greenville, Pa.

*Belt Railway of Chicago—*

E. D. Swift, Chairman, General Safety Commission, Chicago, Ill.

*Buffalo, Rochester, and Pittsburgh—*

John S. Rockwell, General Agent, Rochester, N. Y.

*Central of Georgia—*

S. S. Morris, Chairman, General Safety Commission, Chicago, Ill.

*Chesapeake and Ohio—*

L. G. Bentley, General Safety Agent, Richmond, Va.

*Chicago and Alton—*

R. J. McDonald, General Safety Agent, Bloomington, Ill.

*Chicago, Burlington and Quincy—*

E. M. Switzer, Superintendent of Safety, Chicago, Ill.

*Chicago, Cleveland, Cincinnati and St. Louis—*

A. L. Mason, Safety Agent, Bellefontaine, Ohio.  
 T. R. McCampbell, Safety Agent, Indianapolis, Ind.

*Chicago and Eastern Illinois—*

J. F. Lord, Superintendent of Safety, Evansville, Ind.

*Chicago and Great Western—*

O. P. Larson, Assistant Chief Clerk, Oelwein, Ia.  
 G. O. Perkins, Superintendent of Telegraph and Signals, Chicago, Ill.  
 E. L. Waltz, Superintendent of Telegraph and Signals, St. Paul, Minn.

*Chicago, Milwaukee and St. Paul—*

W. Anderson, Superintendent, Milwaukee, Wis.  
 B. J. Bjorkholm, Assistant Master Mechanic, Milwaukee, Wis.  
 C. O. Bradshaw, Assistant General Manager, Chicago, Ill.  
 C. Busch, Assistant Superintendent, Milwaukee, Wis.  
 A. J. Cassette, Milwaukee, Wis.  
 W. H. Cobb, District Safety Inspector, Milwaukee, Wis.  
 L. T. Curtis, General Store Keeper, Milwaukee, Wis.  
 Tom Hamlin, Section Foreman, Milwaukee, Wis.  
 G. T. Gilliop, General Manager, Chicago, Ill.  
 W. E. Grant, Special Agent, Milwaukee, Wis.  
 M. F. Hogan, District Safety Inspector, Spokane, Wash.  
 J. T. Johnston, Superintendent, Superior District, Green Bay, Wis.  
 J. F. Kane, District Safety Inspector, Cedar Rapids, Ia.  
 D. Kelly, Superintendent, Portage, Wis.  
 H. F. Killilac, Solicitor, Milwaukee, Wis.  
 J. Macdonald, Superintendent, Madison, Wis.  
 Ben Ohara, Claim Agent, Milwaukee, Wis.  
 Harry Riley, Machinist, Milwaukee, Wis.

A. W. Smallen, General Supervisor of Safety and Fire Prevention,  
Chicago, Ill.  
Wm. Thiele, Superintendent, Milwaukee, Wis.  
N. P. Thurber, Superintendent, Milwaukee, Wis.  
C. L. Whiting, Superintendent, Milwaukee Terminal, Milwaukee, Wis.

*Chicago and North Western—*

F. G. Brown, Conductor, Fond du Lac, Wis.  
E. J. Finel, Signal Foreman, Lake Bluff, Ill.  
Wm. Gebel, Car Dept., Chicago, Ill.  
T. J. Holland, Machinist, Antigo, Wis.  
Charles Jehlik, Machinist, Chicago, Ill.  
J. W. Kilgour, Conductor, Chicago, Ill.  
P. J. McAndrews, Road Master, Sterling, Ill.  
P. E. Parish, Conductor, Baraboo, Wis.  
R. C. Richards, Chairman Central Safety Committee, Chicago, Ill.  
M. A. Schuster, Air Brake Foreman, Milwaukee, Wis.  
James Sullivan, Safety Inspector, Chicago, Ill.  
A. W. Tabert, Roadmaster, West Allis, Wis.  
C. L. Young, District Claim Agent, Milwaukee, Wis.  
W. W. Young, Chief Engineering Electrician, New Butler, Wis.

*Chicago, Rock Island, and Pacific—*

L. F. Shedd, Superintendent of Safety, Chicago, Ill.

*Delaware and Hudson—*

R. C. Helwig, Safety Agent, Albany, N. Y.  
J. E. Long, Superintendent of Safety, Albany, N. Y.

*Duluth and Iron Range—*

W. A. Clark, Chief Engineer, Duluth, Minn.  
E. T. Freeman, Machinist, Two Harbors, Minn.  
W. Johnson, Hoist Engineer, Two Harbors, Minn.  
H. A. Rowe, Secretary Central Safety Committee, New York City.  
J. C. Wingate, Two Harbors, Minn.

*Duluth, Missabe and Northern—*

Wm. Axford, Duluth, Minn.  
T. H. Bell, Chief Electrician, Proctor, Minn.  
J. Dormedy, Foreman, Duluth, Minn.  
G. Fremanus.  
B. H. Miller, Safety Inspector, Duluth, Minn.  
A. V. Rohweder, Superintendent of Safety, Duluth, Minn.  
M. Scanlon, Conductor, Proctor, Minn.  
J. Shea.

*Elgin, Joliet and Eastern—*

W. F. Congdon, Safety Inspector, Joliet, Ill.  
O. F. Gnadinger, Superintendent of Safety, Joliet, Ill.

*Florida East Coast—*

W. W. Scott, Safety Agent, St. Augustine, Fla.

*Great Northern—*

C. L. La Fountaine, General Safety Supervisor, St. Paul, Minn.



*Gulf, Colorado and Santa Fe—*

J. G. Fitzhugh, Safety Supervisor, Galveston, Texas.

A. E. Hutchinson, Safety Inspector, Galveston, Tex.

*Hocking Valley—*

E. R. Cott, Safety Agent, Columbus, Ohio.

*Illinois Central—*

S. S. Morris, Chairman, Safety Committee, Chicago, Ill.

*Kansas City Southern—*

M. T. Fulton, Supervisor of Safety, Kansas City, Mo.

G. W. Smith, Safety Inspector, Pittsburg, Kans.

*Kansas, Oklahoma and Gulf—*

R. R. Stevens, Assistant Superintendent of Safety, Muskogee, Okla.

*Long Island—*

T. P. Brennan, Safety Agent, New York City.

*Louisville and Nashville—*

R. L. Pilling, Supervisor of Safety, Louisville, Ky.

*Minneapolis, St. Paul and Sault Ste Marie—*

L. P. Green, Superintendent of Safety, Minneapolis, Minn.

*Minneapolis and St. Louis—*

O. F. Johnson, Safety Supervisor, Minneapolis, Minn.

*Missouri, Kansas and Texas—*

J. V. Butz, District Superintendent, Smithville, Tex.

C. F. Colby, Safety Agent, Dallas, Tex.

J. F. Smith, Safety Agent, Dallas, Tex.

J. L. Walsh, Superintendent of Safety, Dallas, Tex.

*Missouri Pacific—*

R. H. Dwyer, Superintendent of Safety, St. Louis, Mo.

*Michigan Central—*

A. C. Hartley, Supervisor of Safety, Detroit, Mich.

*Nashville, Chattanooga and St. Louis—*

F. Whittemore, Superintendent of Safety, Nashville, Tenn.

*New York Central—*

W. L. Boslooper, Safety Agent, Detroit, Mich.

B. H. Dayton, Safety Agent, Albany, N. Y.

F. L. Diehl, Safety Agent, Elkhart, Ind.

M. A. Dow, General Safety Agent, New York City.

C. B. Floyd, Assistant General Safety Agent, New York City.

J. W. Johnston, Safety Agent, Chicago, Ill.

F. P. McGirr, Safety Agent, Buffalo, N. Y.

*New York, New Haven and Hartford—*

E. M. Harris, Safety Inspector, Fitchburg, Mass.

*Norfolk and Western—*

C. H. Blakemore, Chairman, Safety Commission, Roanoke, Va.

D. W. Graff, Safety Agent.

*Northern Pacific—*

Fred M. Metcalfe, Superintendent of Safety, St. Paul, Minn.

*Omaha Railroad Co.—*

G. L. Wright, Supt. Safety Bureau, St. Paul, Minn.

*Oregon Short Line—*

J. C. Clark, Assistant to General Manager, Salt Lake City, Utah.  
 M. S. Cole, Apprentice Instructor, Pocatello, Idaho.  
 E. J. Grady, Conductor, Pocatello, Idaho.  
 R. F. Higgs, Car Foreman, Salt Lake City, Utah.  
 H. M. Karstad, Locomotive Engineer, Pocatello, Idaho.  
 H. L. Kemitt.  
 D. K. Rawlings, Safety Agent, Salt Lake City, Utah.  
 C. D. Waring, Yard Master, Pocatello, Idaho.  
 Ralph Whitehouse, Brakeman, Pocatello, Idaho.

*Pennsylvania Lines—*

S. Bready, Assistant General Instructor of Service and Safety, Wilmington, Del.  
 J. O. Byle.  
 T. H. Carrow, Supervisor of Safety, Philadelphia, Pa.  
 E. S. Chapin, Safety Inspector, Philadelphia, Pa.  
 J. T. Coleman, General Instructor, Service and Safety, Philadelphia, Pa.  
 Wesley Conner, Division Safety Agent, Pittsburgh, Pa.  
 A. L. Cunningham, Division Safety Agent, Pittsburgh, Pa.  
 T. J. Curtin, Assistant General Instructor, Safety and Efficiency, New York City.  
 W. F. Duffield, Division Instructor, Camden, N. J.  
 W. H. Fassett, Vice-Chairman, Service and Safety Department, Philadelphia, Pa.  
 D. W. Freas, Assistant General Instructor, Service and Safety, Philadelphia, Pa.  
 J. M. Hoy, Safety Agent, Chambersburg, Pa.  
 H. E. McGinness.  
 R. M. Moorehead, Safety and Service Agent, Williamsport, Pa.  
 P. F. Neff, Safety Instructor, Tyrone, Pa.  
 B. T. Shook, Assistant Train Master, Altoona, Pa.  
 S. C. Spengler, Assistant General Instructor, Service and Safety, Harrisburg, Pa.  
 R. B. Richardson, Safety Agent, Columbus, Ohio.  
 P. J. Sweeney, Chairman, Safety Committee, Harrisburg, Pa.

*Reading System—*

J. T. Pratt, Safety Supervisor, Reading, Pa.  
 S. B. Zartman, Superintendent, Safety and Labor, Philadelphia, Pa.

*St. Louis and San Francisco—*

G. L. Ball, Superintendent of Safety, St. Louis, Mo.  
 C. H. Baltzell, Superintendent, Ft. Smith, Ark.  
 J. B. Claypool, Supervisor of Insurance and Safety, Springfield, Mo.  
 T. F. Gaines, Supervisor of Safety and Insurance, Springfield, Mo.

*Southern Pacific Lines—*

H. M. Mayo, Superintendent of Safety, Houston, Tex.

*Southern Railway—*

D. H. Beatty, Superintendent of Safety, Washington, D. C.  
 C. R. Staples, Supervisor of Safety, Lexington, Ky.

*Terminal Railroad Association of St. Louis—*

H. E. Watkins, Superintendent of Safety, St. Louis, Mo.

*Toronto, Hamilton and Buffalo Railway—*

W. J. Orr, Safety and First Aid Officer, Hamilton, Ontario, Canada.

*Union Pacific—*

L. A. Abercrombie, Assistant Safety Agent, Omaha, Nebr.

D. B. Allen, Inspector, Omaha, Nebr.

C. E. Brooke, Conductor, Evanston, Wyo.

G. O. Brophy, Superintendent, Kansas City, Mo.

J. A. Cranor, Safety Inspector, Denver, Colo.

I. W. Davis, Assistant General Car Foreman, Cheyenne, Wyo.

W. E. Debler, General Inspector, Omaha, Nebr.

L. B. Garey, Safety Inspector, Cheyenne, Wyo.

John F. Grodzki, General Safety Agent, Portland, Ore.

P. Groome, General Safety Agent, Omaha, Nebr.

H. C. Hunter, Omaha, Nebr.

W. F. Hunter, Switchman, Marysville, Kans.

Wm. Jeffers, General Manager, Omaha, Nebr.

A. Johnson, Section Foreman, Kansas City, Mo.

J. F. Kenney, Assistant Safety Agent, Omaha, Nebr.

W. S. McGuire, Locomotive Engineer, Cheyenne, Wyo.

F. J. Merrill, District Foreman, Ellis, Kansas.

T. J. Miles, Conductor, Denver, Colo.

B. C. Murphy, Train Rules Examiner, Marysville, Kans.

T. J. Roach, Locomotive Engineer, Denver, Colo.

O. H. Swan, Locomotive Engineer, Council Bluffs, Ia.

J. Trevaskis, Safety Inspector, Omaha, Nebr.

R. S. Turner, Signal Supervisor, Green River, Wyo.

D. A. Young, Conductor, Grand Island, Nebr.

*Wabash—*

J. A. McNally, Safety Inspector, St. Louis, Mo.

D. G. Phillips, Superintendent of Safety, St. Louis, Mo.

Frank Switzer, Chief Clerk, St. Louis, Mo.

*Wheeling and Lake Erie—*

J. T. Briggs, Supervisor of Safety, Canton, Ohio.

*Northwestern Elevated Ry. Co.—*

John Farrell, Chicago, Ill.

## WEDNESDAY MORNING SESSION

**T**HE First Session of the Steam Railroad Section was called to order at 9:30 a. m., Wednesday, September 28, by Chairman Robert Scott.

CHAIRMAN SCOTT: We will now have the roll call by the Secretary.

(Secretary H. M. Mayo called the roll.)

CHAIRMAN SCOTT: The next order of business is the report of the Chairman.

I am going to ask Mr. T. H. Carrow to come to the Chair while the Chairman reads his report.

(Mr. T. H. Carrow took the Chair.)

**REPORT OF CHAIRMAN**

MR. ROBERT SCOTT (Superintendent, Insurance and Safety, Atlantic Coast Line Railroad): As presiding officer, I extend to all present a cordial welcome, with hearty greetings to the members, and solicit from them such aid in our deliberations as their knowledge and experience fully qualifies them to give.

The reports of the Secretary and the various committees will give you full details of the work by our Section during the past year.

It has been a great pleasure to have been associated with the present administration, and I acknowledge with deep gratitude the honor that has been mine in serving you as Vice-Chairman and Acting Chairman for a brief period.

I consider it a misfortune to our Section that Chairman Myers resigned during the year; he was such a magnetic fellow and a tireless worker. We have suffered a distinct loss in having to forego his services since the early part of the present year.

Your Acting Chairman has attempted to direct the work as best he could with such limited experience as he has had in Council matters. It has been possible to hold only one meeting of our Executive Committee during the year, although it pleases me to be able to say that there has been close co-operation between all officers and members of committees.

At this point let me thank every member of every committee for the active support given the work of our Section. It is gratifying to know that such a large number of our members are willing to give their valuable time and talents to the cause.

It is particularly pleasing to learn that all of the important railroad systems in the country have seen fit to continue the work of accident prevention since return to private operation on the first of March. From what can be gathered, some of the lines have actually enlarged upon the plans adopted during Federal control and are carrying the work forward more aggressively than ever before.

One thing that occurs to me to stress is the desirability and importance of giving more publicity to our work; this refers to the activities of the Steam Railroad Section of the National Safety Council, as well as the activities on our individual roads. The general public, also our patrons, should know of the organized efforts being made to hold railroad accidents to a minimum.

Another thing I will mention, and that is the apparent need for members of the Steam Railroad Section to familiarize themselves more thoroughly with the work being done by the various sections of the National Safety Council. I am confident that a more general knowledge of the scope and magnitude of the work will not only be educational but will also be an inspiration to many of us to become more active.

A thought that comes to me is to remind members of the fact that the same question of individual responsibility we are continually pounding into officers and employees of our roads must not be forgotten when it comes to doing the things that ought to be done in our Section of the Council. It, therefore, devolves upon every one of us to shoulder our

part of the responsibility and carry our share of the burden by working diligently at whatever we are called upon to do.

There seems to be urgent need for statistical information regarding personal injuries and their causes, and I am trusting some way may be found to gather data of this kind, embracing at least all of the trunk lines.

Now, I want to make just a few remarks about the National Safety Council, and particularly the Steam Railroad Section. I want to acknowledge gratefully to the Steam Railroad Section the service that it has rendered me. Two years ago I attended my first session at St. Louis. I knew absolutely nothing about organized efforts for the prevention of accidents. That was the place where I took my first lessons in accident prevention and that was the place where I received my inspiration to go back to my road and carry on the work, and I want to tell you, my friends, that I did receive an inspiration there and I believe it is more than worth while for the representative in safety work of every railroad to come to these meetings and meet with the good fellows and get that inspiration and go back home and spread it among the officers and employees of our individual roads.

I don't believe it ever would have been possible for me to carry on the work in any fashion at all that would have been worth while had it not been for my connection with the National Safety Council. I believe that the discussions here have a far greater value than any of us place upon them. I believe that the interchanging of ideas and thoughts, the rubbing of shoulders and the clasping of hands are the things that count, and I will tell you when you get back home you can't forget those things. You carry on your work in better fashion and you are better able to put safe practices into effect.

I am going to take the liberty of relating a story. You have heard stories that come from all sections of the globe; this one comes from the Far East, from where a great deal of the wisdom has come to us. This is a story of a mother who had a son. There was the strongest kind of devotion and love between this mother and son. Eventually, this son, as he grew into manhood, fell in love with a woman and decided to take unto himself a wife. This wife was a very exacting sort of woman. She demanded everything of this husband and she said to him one day, "You claim that you admire me and you claim that you love me and I am going to put you to the test. You have got to show me absolutely that you love me above all else in this world, otherwise, these statements and these claims that you have made to me are worthless. You must go to that mother of yours, you must cut that mother's heart out and bring that heart to me."

What did the son say? He said, "Wife, I can't do that; that would be committing murder."

The wife said, "I care nothing about that. All I care for is to have absolute proof of your love for me, and I demand that you shall bring your mother's heart to me."

The husband went and slew his mother. He cut that heart out of his

mother's breast, and going to this wife with the trembling heart of his mother in the palm of his hand he tripped and fell, and what did that mother's heart say? That mother's heart said, "Son, art thou hurt?"

Men, there is the kind of feeling you have got to have in your hearts if you make a success of this safety work.

When I first went into safety work, I thought it was dollars and cents; I thought it was saving a few fingers and a few toes, but I have found out that it is a far greater thing than that. We talk about the rights of capital, the rights of labor and the rights of humanity, but there is a greater right than that—the right of the Creator, the One that made you and the One that made me, and that is the kind of love you have got to have in your hearts if you are going to succeed in that work.

ACTING CHAIRMAN CARROW: Gentlemen, you have heard the Chairman's report and its appeal; what is your pleasure?

Mr. T. R. McCAMPBELL (Cleveland, C. C. & St. L. Ry.): I move that the report of the Chairman be accepted as a part of the minutes of this session.

(The motion was seconded and carried.)

(Mr. Scott resumed the Chair.)

Mr. MARCUS A. DOW (General Agent, New York Central Lines): The President of the National Safety Council, and perhaps the most loved man in safety work in this country, probably would have come into this Sectional meeting in preference to any other meeting of the convention today except for the fact that he has been taken sick and I understand has been taken to his home. I am sure that every member of this Section feels way down in his heart that Ralph C. Richards ought to be with us here in this meeting, and I am sure that you are all deeply apprehensive for him in this sickness which has suddenly overtaken him.

I would like to move, Mr. Chairman, that the Steam Railroad Section extend to Mr. Richards our expression of deep sympathy and the wish that his sickness is not serious and that he will soon again be able to return to his desk and take up the range of safety work as usual. I would like to make that a motion.

(The motion was seconded and unanimously carried.)

CHAIRMAN SCOTT: The next in order is the report of committees. Has the Bulletin and Publicity Committee anything to report?

#### REPORT OF BULLETIN AND PUBLICITY COMMITTEE

Mr. ISAIAH HALE (Safety Superintendent, The Atchison, Topeka, and Santa Fe Railway System): We have managed to supply the National Safety Council with enough material to get out the requisite number of bulletins, and in behalf of the incoming Committee, I am going to urge upon you gentlemen separately to do something more this next year for this Publicity Committee than you have done this last year. If you will send the subject for one bulletin that will be all that can be expected of you and will enable this Committee to carry on the work as it should be carried on. They want something new, something with a punch in it,

and I urge you to come to their relief this year and help them as you can help them.

CHAIRMAN SCOTT: Thank you, Mr. Hale. I feel that your Committee is entitled to a great deal of thanks for the work done during the year. I quite appreciate what it means to get material together for bulletins.

The next is the report of the Committee on Accident Causes and Remedies. Mr. J. E. Long is the Chairman.

#### REPORT OF ACCIDENT CAUSES AND REMEDIES COMMITTEE

Mr. J. E. Long: Shortly after the members of this committee were designated, all of the members with the exception of one and the Chairman, left the field of railroad safety work for other lines, making a change in personnel necessary. The Committee was finally organized with the following members: Mr. T. H. Carrow, Supervisor of Safety, Pennsylvania System; Mr. T. Hartenstein, Assistant to General Manager, Lehigh Valley R. R. Co.; Mr. F. W. Mitchell, Supervisor of Safety and Examinations, New York, New Haven & Hartford Railroad Co.; Mr. D. H. Beatty, Superintendent of Safety, Southern Railway System.

The first and only meeting was held in the office of Mr. Carrow at Philadelphia on July 27, with all members present excepting Mr. Hartenstein, who was unavoidably absent.

At that meeting arrangements were made to have four papers prepared, and plans made to have them discussed.

Upon taking the matter up with the Chairman of the Program Committee, however, it was learned that the program for this Congress had been completed, making it impossible for us to carry out our proposed arrangements. We were also advised that arrangements had been made to have papers prepared by other members of this section, covering the subjects we had planned. Under the circumstances we decided it would be best to abandon our contemplated program.

The members of the Accident Causes and Remedies Committee however, expect to be prepared to enter into the discussion of the address to be made by Mr. Arthur Ridgeway of the Denver & Rio Grande on "Maintenance of Way and Motor Car Accidents," the address by Mr. J. McNally of the Wabash Railroad on "Shop Accidents," and that of Mr. Baltzell of the St. Louis & San Francisco on "Transportation Accidents."

The recommendation was made in last year's report that this Committee communicate with the Statistician of the Interstate Commerce Commission for the purpose of obtaining a statement of accidents classified by detail causes. This recommendation was carried out and the Director of the Bureau of Statistics, Interstate Commerce Commission, advised us that this information was not as yet available but that Accident Bulletin No. 74, covering the last quarter and the year ended December 31, 1919, was in the hands of the printer. He was unable to state definitely when this publication will be finally issued. Your Committee suggests that all members of the Steam Railroad Section obtain copies of this Bulletin as soon as issued for the purpose of studying it, with a view to

utilizing, as far as possible, the information contained therein, for the prevention of accidents.

With reference to the recommendation contained in last year's report, relative to the development of detail causes of shop injuries, the Committee feels that in view of the difficulty of developing these causes and particularly on account of the fact that Train and Train Service Accident causes have not been fully developed or utilized, it would be well to defer action on the full development of detail shop causes until next year. A brief analysis was made of 179 reportable personal injuries to shopmen on one of our member roads and this study of the accident causes developed that the injuries occurred in the following manner:

#### ANALYSIS OF PERSONAL INJURIES TO SHOPMEN

- 45 Injured account of being struck by falling tools or material with which they were working.
- 28 Injured while using tools, subdivided as follows:
  - 20 Self inflicted injuries (not due to defects)
  - 3 Struck by tools in hands of other employees
  - 2 Defective hand tools
  - 2 Use of air hammers, drills, etc.
  - 1 Use of jacks (not defective)
- 17 Injured by falls, subdivided as follows:
  - 6 Falling from engines or cars standing
  - 6 Falling over scrap, air hose, couplers and other removable obstructions
  - 2 Falling from ladders account of ladders slipping
  - 1 Falling from scaffolding
  - 1 Falling over rails
  - 1 Killed and 1 Injured account of falling into engine or ash pits
- 15 Injured while handling material
- 14 Injured by slipping accidents, subdivided as follows:
  - 3 Slipping on snow or ice on or between tracks
  - 2 Slipping on aprons of engines
  - 9 Slipping from miscellaneous causes
  - 9 Injuries to eyes from flying particles
  - 4 Injured account of stepping on nails
  - 3 Injured account of shaker bar slipping from lug
  - 3 Injured account of ropes, chains, or cables slipping or giving way
  - 3 Injured account of handling fire rakes
  - 2 Injured while getting off standing cars or engines
  - 4 Injured while using Machinery, subdivided as follows:
    - 1 Unguarded machinery
    - 1 Cleaning, repairing or adjusting while in motion
    - 2 From miscellaneous causes
  - 2 Injured account of being struck by objects thrown from cars, engines, platforms, etc.
  - 2 Injured account of being struck by tools or other objects falling from shelves, scaffolding, platforms, etc.



- 1 Injured account of climbing over, under, or between cars or engines
- 1 Injured account of explosion of gas
- 1 Injured while using squirt hose
- 1 Injured account of being struck by engine
- 24 Injured in miscellaneous ways not otherwise specified

A further study as regards the length of service of the men injured, developed the following facts:

74.3 per cent occurred to men whose duration of service ranged from 1 to 42 years

7.3 per cent to men in the service from 6 months to 1 year

9.8 per cent to those in service from 2 to 6 months

1.3 per cent to those in service from 1 to 2 months

5.3 per cent to those in service from 2 weeks to 1 month

2.0 per cent to employees in service less than 2 weeks

From this analysis it will be noted that the majority of these shop accidents occurred to the older men in the service rather than to the new men. Possibly these figures as to length of service are not generally applicable to all roads nor do they apply to employees injured in Train and Train Service Accidents.

In conclusion, I wish to express my appreciation for the valuable assistance so cheerfully given by the other Members of this Committee, without which this report, even though incomplete, would not have been possible.

(On motion the report was seconded and carried.)

CHAIRMAN SCOTT: Next we will have the report of our Secretary, Mr. Mayo, who has served us so well during the year.

#### REPORT OF SECRETARY

SECRETARY MAYO: I didn't write a report. I want to say this, however, that during the twelve months of my official capacity it was a rather mixed pleasure. When they turned this job over to me, when I got back home I wrote Mr. Whittemore that I hadn't the slightest idea what to do. He picked up a whole lot of stuff that had accumulated that he didn't know what to do with and shot it down to me, and for a while I felt very much like the man who was called in to attend the funeral of his old friend. He came into the house and looked down at the remains and said, "Poor old Clancy. He didn't believe in heaven and he didn't believe in hell, and here he is, all dolled up and nowhere to go."

I don't know who is going to succeed me to this very interesting office, but I do want to make an appeal in his behalf to all of you and particularly you who are old in the service and who have had experience, to come across and help him out. Send him material you get out every month with an occasional letter or suggest some line of thought or action that has proved interesting in your section. He is going to need it because your Secretary has many other things to do. I wanted to get up a monthly letter each month; I always had the inclination but didn't always have the opportunity. You can make the life of the Secretary much more endurable and his assistance to the Section far more valuable,

and you will do the members of the organization a great deal of good by letting him have what you have in your dome and don't be afraid to let it get out.

I want to thank you for the various letters I have received from a number of you and I sincerely trust that my successor will give you more than I gave you, because I only gave you fifty-fifty and I ought to have given you one hundred per cent.

Mr. C. R. STAPLES (Southern Railroad): I move that the report of the Secretary be accepted, and that the advice laid down by him be followed out.

Mr. E. S. CHAPIN (Pennsylvania Lines): In seconding that motion, I want to say that I have a great deal of sympathy for our Secretary. I don't believe there is one man here but what got out something on his railroad that would be of value to this Section, and if we would just have Mr. Secretary placed on the mailing list and let him have the bulletins or whatever is published it would be a great deal of help to the Secretary and to the Section.

(The motion to accept the Secretary's report was carried.)

CHAIRMAN SCOTT: Has the Program Committee anything to report, Mr. Clark?

#### REPORT OF PROGRAM COMMITTEE

Mr. J. C. CLARK (Oregon Short Line): I have no formal report to offer. I would like to call attention to the fact though that there are only three subjects listed for discussion at the round table meeting Thursday afternoon. This doesn't mean that there are only to be those three subjects brought up for discussion. We want any one who has any particular problem he wants to talk over to bring that problem up. Mr. Harry Adams is to be Chairman of the round-table meeting and he will be very glad to receive topics for discussion from any man here.

I feel that there is no report necessary so far as the program is concerned; the program speaks for itself. We have gotten away a little bit from the ordinary practice of the last few years at least and brought in more speakers from outside.

CHAIRMAN SCOTT: Gentlemen, you have heard what Mr. Clark had to say about handing in anything you wish to have discussed at the round table. Let's not forget that.

In connection with the very able work that Mr. Clark has done in the preparation of the program this year, I want to say that it is no small task to get up a program for a meeting of this sort, and I think Mr. Clark is entitled to a great deal of credit for the very able program which he has prepared.

(On motion the report was accepted.)

CHAIRMAN SCOTT: We will now have the report of the Committee on Membership. Mr. Whittemore is Chairman.

#### REPORT OF MEMBERSHIP COMMITTEE

Mr. F. WHITTEMORE: At the close of last year, the membership of the Steam Railroad Section consisted of 129 railroads with a mileage of 216.

000, there being only two or three important lines in the entire country that had not joined hands with us in our efforts to build up a branch of the National Safety Council which would be an everlasting credit to the railroad Safety men. This year, after passing through one of the most critical periods in the history of our railroads, the membership totals 124, representing 215,800 miles of track. The lines cancelling their membership are as follows: Charleston & Western Carolina R. R., Atlanta, Ga.; Duluth, South Shore & Atlantic Ry., Marquette, Mich.; Ft. Worth & Denver City Ry., Ft. Worth, Texas; Grand Trunk Lines in New England, Island Pond, Vt.; Temiskaming & Northern Ontario Ry. Commission, 25 Toronto St., Toronto, Ont., Canada; Toledo Terminal Railroad, Toledo, Ohio; Union Terminal Railroad, St. Joseph, Mo.; Wichita Valley Ry., Wichita Valley, Tex.

As will be noted, all of these are small lines and have cancelled their memberships either because they are being operated by large trunk lines, who hold membership in our organization, or their safety departments have been abolished. While of course the loss of these lines is to be regretted, it is very encouraging to note that none of the larger lines are included in this list.

#### NEW MEMBERS

The following new members have been secured: Colorado & Wyoming Ry. Co., Denver, Colo.; Yazoo & Mississippi Valley R. R., Chicago; Gulf, Mobile & Northern R. R., Mobile, Ala., with a total of 1,900 miles. In addition to the new members, 48 railroads whose membership expired this year have renewed, and we are confidently counting on the remainder of you members to send in voucher covering renewals immediately upon receipt of notice of the expiration of present membership.

The growth of the Steam Railroad Section during the past six years has been as follows: 1915, 27 members; 1916, 63 members; 1917, 87 members, 1918, 103 members, 1919, 129 members, 1920, 124 members.

In accepting the Chairmanship of this Committee, I advised the Chairman of our Section that while I and the gentlemen selected to serve with me would gladly put forth our best efforts to increase the membership of the Steam Railroad Section, I felt that we would be quite fortunate if we were able to hold the ground gained last year, when the Safety Section of the Railroad Administration was standing staunchly behind this organization and rendering every possible assistance. The Membership Committee during the past few years, under the able leadership of Mr. Blakemore of the N. & W., has been unusually successful and that we have been able to keep our forces up to full strength through such an uncertain year as 1920 is a tribute not to the efforts of any individual, but to the Steam Railroad Section of the National Safety Council and the high ideals for which it stands. At the beginning of this year not only the safety men but all other railroad officials and employees anxiously watched developments several months, for there appeared on the horizon unprecedented conditions and the future of railroad associations, such as ours, could not be guessed at amid the noise and excitement about March first. Indeed, some of the associations, which were local propositions, were

now is safety work. We have gone through a very strenuous period when we, all of us, including the officers, have lost sight of a great many details that go to make up a good railroad. We find on the Union Pacific proper that our accidents in the last few months have grown tremendously. They have grown for a reason. We have any number of new men in the service that we found necessary to employ. These men have to be educated, and I feel responsible myself to a certain extent for letting some of the details get away from the officers.

I am going to suggest to you some of the practical things in connection with safety work as I see them, both from the view-point of the operating officer and from the view-point of the man in the service. The thing we are suffering from on most railroads, and I am speaking very frankly, is

#### ALOOFNESS OF OFFICERS

the dignified aloofness on the part of some officers. We are overlooking the fact that every man in the service (and that goes down to the call boy; I am just a little partial to that fellow) is after all a factor in the railroad. In handling these safety meetings there isn't enough interest put forth on the part of the average officer to get in touch with the man to find out what he is thinking about. I have in mind particularly this one point: We have thrown down the bars to the men, asking them to make suggestions and recommendations along safety lines. We are going to get, of course, a good many suggestions that are not practical and at times some that may appear more or less ridiculous. That is to be expected. We have let a habit grow on us that when a suggestion of that kind is offered, we simply lay it aside and say it isn't practical and let it go at that. The thing we should do is to call this man in, or go to see him and tell him why the suggestion he made wasn't practical and why the committee decided it wasn't workable. We have attempted all along to follow a policy of calling the man in or going to see him and explaining to him why his suggestion wasn't practical, but we are going to go a little further and, as far as is consistent, we are going to call the men who make suggestions to the meetings and get the benefit of their view-points and get their reasons why they made the suggestions. To accom-

#### SAFETY MAN ON EACH SUPERINTENDENT'S STAFF

plish that, it is our intention to place a safety man on each superintendent's staff, holding that man responsible for safety matters on his particular division. We have many inspectors on our railroad but they are working at random now, none of them feels that he is directly responsible for his particular territory or particular plant.

We are working on the idea of having a man on each division with the rank of a trainmaster. I don't know how practical that will be on each railroad as most of the railroads have a different system of handling their divisions, but I do feel that if we are going to get the best, each and every railroad will have to adopt a more detailed method of handling safety matters. Our trouble is we usually wait until we have a serious accident and then wake up to the fact that it is necessary to do something. It re-

minds me of a story I heard some time ago, which will illustrate my point, of an old Irishman in the track gang at one of these little country towns, that went to the picture show once a week. It only changed its reels once a week. This old gentleman went to this picture show and there was thrown on the screen a passenger train going by and a lady going in bathing. The scene showed the lady starting to go in bathing and then the next scene showed her in the water. This old Irishman came every night. Finally, the manager said to him, "Of course, we are interested in having you come, but I want to say to you that we only change our reels once a week." He said, "That's all right; I understand." The manager said, "But would you mind telling me why you come every night? We are interested in knowing what our patrons like."

"Well," he said, "you know I work on a railroad and that passenger train is going to be late some day." So it is in these safety matters. We are continuing to attend the meetings and not getting results. We are going to be too late some day and we are going to have a serious accident that might have been avoided.

In our organization in the Western territory, and it is perhaps no different from what we have on most railroads, it has been our endeavor to select men who are practical, particularly men who can and do talk the language of the average railroad man. I believe there is a mistake made in having too many statistics at our meetings. Figures are usually dry and they don't appeal to the men. My thought is, if we can, to select certain accidents at our meetings and go into details with the men as to how the accident happened, how it can best be prevented, and, where we have shops or big terminals, take the committee out in the yard and explain how the accident happened and what we should do to prevent a repetition. In other words, we have to reach the fellow now on the ground and make him appreciate the fact that we are depending on him for results. There isn't any operating officer or any set of officers that can run a railroad and run it satisfactorily unless every man in the service is loyal to that railroad and loyal to the officers. We are not going to get that loyalty by talking *at* men; we are going to get it by talking *to* them. The mistake that is made by most speakers is that they talk *at* their men.

#### LABOR ORGANIZATIONS

I am referring now particularly to men who are members of organizations—labor organizations—(and I want to say in that connection that I am in sympathy with any labor organization that is properly run; if I were a man in the service there isn't a question about where I would be. I would be in the organization) and in this connection I want to suggest to you men who are in these organizations (the fact that you are members of the Safety Committee is evidence *prima facie* that you are the average at least and perhaps above the average) that it would be well to discuss these matters in your meetings. Let's have the men understand that the operating officer has his difficulties and the more we help this fellow the easier it is going to be for all of us. I can say very frankly in our territory that we are having the best co-operation. Our men out there are everything that could be expected, and on the other

hand, we are attempting to be a little more than fair with the fellow who makes an honest mistake. I am opposed to drastic action in correcting irregularities unless such action is absolutely necessary. It is a mistake to lose an old man in the service when it can be avoided. The best answer to our troubles now is the fact that we have lost too many old men in the service. So speaking to you men who are officers, let's not overlook the fact that any man can make an honest mistake, and if it is an honest mistake, let's give him credit for it and keep him in the service.

CHAIRMAN SCOTT: There is one announcement I should like to make at this stage of the proceedings, it is in connection with the Nominating Committee. I think most of you who were present at the Congress last year will remember that it was decided by resolution on the floor that the services of the Nominating Committee would be dispensed with. By doing that, a precedent has been established in the Steam Railroad Section. You will find on the program for this Section that the Nominating Committee will make its report Friday morning. I should like to announce that as a result of this precedent that was established last year we will have no Nominating Committee this year, unless this body feels that it should be otherwise, but that the election of officers will take place on Friday morning and that the nominations will be made from the floor.

Now, the next on the program is "Safety and Time Service", a talk that we are going to have through the goodness of Mr. Webb C. Ball, General Time Inspector of the Bureau of Railroad Time Service, of Cleveland. There is nothing more important than the question of time when it comes to the operation of railroads, and I look forward with much interest, and I am sure you do, to hearing what Mr. Ball is going to tell us. Mr. Ball.

### SAFETY AND TIME SERVICE

WEBB C. BALL, GENERAL TIME INSPECTOR, BUREAU OF RAILROAD TIME SERVICE, CLEVELAND, OHIO

Self-preservation is the physical expression of "Safety and Time Service" when referred to as a human instinct—but too often disregarded in this age of life's restless activities.

To give an account of the ways and means by which the standard "System of Safety and Time Service" has been developed to make railroad standard watches and clocks play their all-important part in the safety movement of the country is the purpose of this paper.

The railroad standard watch of today is justly recognized as one of the most important "safety appliances" required in train operation. In these days of highly complex organization, it is called upon to perform a service of safety every hour and minute both day and night, and it is as constant and necessary as regular pulsations of one's heart and lungs. No more faithful or dependable companion for mankind was ever invented or devised by the hands of skilled men.

I won't go far astray when I say this faithful little machine is abused and cuffed around without any regard to giving it a square deal by careful

handling, or some encouragement for its faithful service in the way of a little oil and cleaning once a year, or eighteen months at farthest.

Lay out a dozen or fifteen railroad standard watches, and it is very easy to tell by the condition of the watches the character and habits of their owners and as to whether or not they are dependable in the performance of their duties. It inevitably follows that a man careless and indifferent with his watch, evidences the same characteristics in his daily life and vocation.

The importance of the standard timepiece to the traveling public and to the railroads is illustrated if you call upon your imagination to picture what would happen if some phenomenon were to play havoc for a half-hour period once or twice a year with the delicate mechanism of the millions of watches and clocks throughout the world.

Again, let your imagination picture an attempt to give railroads Safety and Time Service by means of the crude sun dials of the cave man, the water clocks of the Babylonians, and the hour glasses of the Greeks, and the many prototypes of clocks and watches found throughout the Middle and Early Modern Ages.

To bring the illustration nearer home, imagine the railroads being run today by means of those two famous Connecticut products, "Ely Terry's wooden clocks," and the long-wind Waterbury watch, the latter the subject of as many jokes as are "Tin Lizzies" of today.

We railroad men know by glancing at our watches, in which we have confidence, what the standard clocks and watches in Boston, New York, Atlanta, New Orleans, Chicago, Denver, San Francisco, and Winnipeg at this very moment are telling our fellow workers and the traveling public. We are also reasonably certain as to the exact present location of express trains speeding on their course over the systems we are here representing. Thirty years ago, before the present system of Railroad Time Service was inaugurated, such certainty was impossible. The trainmen were allowed five minutes leeway at junction and passing points for errors in watches.

The best watch was 18 size, 15-jeweled, flat hairspring, single roller brass escapement, garnet jewels and not adjusted except with a punch and hammer—they classed with old-time hand brakes and wood-burning engines. Fortunately, in those days there were comparatively few trains running daily in each direction.

Today the standard demanded is such that I feel safe in maintaining that few, if any in this room depend upon watches below the standard for "old watches" now in railroad service, namely, 17 jeweled, single roller, lever set, Breguet hair spring, patent regulator, and adjusted to three positions.

I am quite willing to wager, though we are not subject to time service rules, the majority have watches that meet the present requirements—19, 21, and 23 jeweled, steel escape wheel, safety double roller, 16 size, open face lever set, adjusted to five positions, plain Arabic standard dials.

## TRAVELING PUBLIC DEMANDS PUNCTUALITY AND SAFETY

The traveling public demands punctuality and safety. The increasing popularity of the extra-fare trains tempts me to modify the statement, as the primary demand seems to be "speed," but with speed, it expects safety, then punctuality.

A valuable means for this purpose is the surprise tests of the trainmen's watches which are becoming more general, as they reveal to the official to what extent the time service rules and instructions are being carried out.

Railroad people who carry standard watches and submit the same for periodic inspection as a rule appreciate their responsibility and accordingly live up to the rules of the service. On most lines four men on every train are subject to prescribed watch inspection rules—the engineer, the fireman, the conductor, and the rear flagman, and as a further safety measure, some lines require tower men, train dispatchers, station masters, and the section foreman to carry standard watches.

The duties of the watch inspectors, of whom there are several thousands throughout the United States and who are located at all important railroad points, are best described by considering the system of watch inspection more in detail. When this system was inaugurated, it was first of all found necessary to make an inventory of all watches carried by men in train service to determine the number that could be used with any degree of safety. As this work proceeded, the bigness of the undertaking began to reveal itself. It was necessary to carry on several constructive features of the work, which included the selecting and instructing of watch inspectors at Division points, preparing forms for reports, and sending out printed directions for the guidance of inspectors and trainmen.

One of the first things done was to adopt a printed schedule specifying the makes and grades of watches that possessed the qualifications demanded by railroad service. Bear in mind that in those days watch standards and grades were not followed as closely as they are today.

The defects and weaknesses of watches were made the subject of many conferences with manufacturers, who appreciated the dangers pointed out, and recognized the opportunity of securing a hitherto undeveloped field. The inevitable result was that the American railroad watch was improved to meet the progress and improvements in railroad service and safety.

With their increasing responsibilities the various railroad officials found it advisable to raise the requirements to insure the greater safety of the traveling public and meet other transportation problems. The requirements at the present time call for the comparison of the trainman's watch twice every month with standard time and the thorough inspection of each watch twice a year—thirty seconds per week being the limit of variation allowed.

A few days prior to the semi-annual inspection period, the Superintendent sends to such of his employees who are required to carry standard watches, an order to present them to an authorized company watch-



inspector. If the employee's watch is standard and in good order, the watch inspector issues "blue card" certificate to the employee and at same time issues and sends regular certificate to the Superintendent and duplicate to the General Time Inspector. These certificates have blank spaces to fill in the number, make, and grade of watch.

Simultaneously with each periodic inspection and semi-monthly thereafter, employees submit their watches to the inspector for comparison with standard clock. The ratings of watches are recorded on employees blue comparison cards by the watch inspector, which are carried by employees until the next periodic inspection, when they are turned over to the watch inspector, who issues new blue cards and sends the old cards taken up to the General Time Inspector. The blue cards also show the number, make, and grade of watch and date it was put in order. These blue cards are standard in form and color.

When an employee secures semi-monthly comparison, he signs a form on which he writes the date and rating of his watch, corresponding to record made on his blue card by the watch inspector. This form for comparison record is mailed to the superintendent on the fifteenth and last day of each month. This enables the superintendent to ascertain which employees are respecting the rules and which are delinquent so he can take suitable corrective action.

#### EMPLOYEES REQUIRED TO HAVE STANDARD WATCHES EXAMINED PERIODICALLY

Employees are required to have their standard watches carefully examined and put in good order every eighteen months. At such times the watch inspector provides the employee free of charge with a standard loaner watch in first-class condition and equal in grade to his own.

With this watch the inspector issues a standard loaner "pink card," upon which comparisons are recorded while his own watch is being put in order. The supply of loaner watches that inspectors carry for this purpose represents a considerable investment and is wholly accommodative. Some inspectors carry as many as one hundred such watches. The pink loaner cards are standard in form and color.

When watch certificates and comparison cards are received in the office of the General Time Inspector, they are very carefully scrutinized for errors, omissions, and irregularities, after which they are placed in file.

It is the policy and practice to compile the data thus gathered and furnish each operating official with a typewritten bound copy. A comparative summary covering the entire system showing the number of employees required to carry standard watches and the number of watches inspected is also prepared and sent to the head of the operating department—superintendents also get copy of same summary besides the detailed report of their respective divisions.

According to late reports the employees of the Baltimore & Ohio Railroad are carrying 11,950 standard watches and submitting the same for regular inspection. On the New York Central the number is 11,487. On the Baltimore & Ohio, 900 standard loaners were carried during a six months period, a total of 16,675 days, an average of nineteen days for

each watch carried. The corresponding figures for the New York Central are 1,190 standard loaners carried 24,363 days during six months period, an average of 20.4 days for each loaner watch carried.

| Railroads                         | Watches | Loaners | Days   | Average |
|-----------------------------------|---------|---------|--------|---------|
| New Haven Railroad.....           | 5,376   | 674     | 12,895 | 19.1    |
| Illinois Central & Y. & M. V..... | 11,096  | 665     | 13,557 | 20.3    |
| Union Pacific .....               | 5,694   | 361     | 7,402  | 20.5    |
| Chicago, R. I. & P.....           | 5,441   | 465     | 8,421  | 18.1    |
| Southern Pacific Lines.....       | 8,376   | 865     | 22,263 | 25.7    |

Records could be given on many other railroads but these few are sufficient to illustrate the extraordinary service of safety rendered..

These standard loaner records may seem large and surprising to some, but they represent the valuable emergency service of safety rendered the public, the railroads, and the employees who use them while on duty and during the time their own standard watches are being repaired and regulated.

In making appointments of local watch inspectors, consideration is given to their experience and workmanship, personal suitability, convenient location, and equipment satisfactory for carrying on the work. It may be well to emphasize the fact that the railroad employee is privileged to go to any jeweler or watch dealer for the purchase or repair of his watch. The rules require him, however, to submit his watch to the inspector who determines whether it is standard, whether it has been repaired satisfactorily, or whether the loaner watch he may be carrying is standard and keeps accurate time.

Furthermore, every safeguard is taken to prevent discrimination of any kind on account of trade prejudice. Any advice given employees as to repairs or the purchase of a new watch must be determined by the all-important factor of safety to the service.

#### INSPECTOR'S STANDARD CLOCK

Equal in importance to employees' standard watches but more fundamental is the reliability and accuracy of the inspector's standard clock or chronometer by which he keeps correct time and compares the employees' standard watches. Standard time is obtained daily by inspectors when it is sent from Washington Naval Observatory over the railroad or Western Union wires—some inspectors have ticker service installed in their offices or stores to give them the correct time every hour from Western Union Master Clocks.

Supplementing standard watches and the inspectors' standard clocks in the maintenance of correct time are the standard clocks located in train dispatchers' office and other offices where train registers are kept. These are designated by a blue enamel sign and white letters reading "STANDARD CLOCK."

These clocks are customarily placed in charge of the chief operator who receives time daily by wire from Washington Naval observatory. A record of the daily rating of standard clock is made on printed form which also provides spaces for showing when the clock is set or regu-

lated. Clocks having a variation of more than ten seconds are set to correct time and regulated.

A few figures and facts will give some idea of the vast field now covered by "Time Service." The number of watch inspectors approximates four thousand, located at terminals, lay-over and turn-around points, extending from Boston to San Francisco and New Orleans to Winnipeg.

These four thousand inspectors employ an average of two watchmakers each, totaling about twelve thousand expert mechanics whose principal duty is to look after the railroad men's standard watches.

There are in round numbers two million employees in occupations subject to time service rules and regulations. The average therefore for each inspector is five hundred employees, the maximum being two thousand and the minimum being ten. The watches of these two million employees are actually inspected twice a year and are compared with standard time twenty-four times each year. These figures show that four thousand watch inspectors handle each employee's watch twenty-four times each year, or an annual total of forty-eight million times, a most wonderful service of safety rendered humanity and commerce.

As the watch inspectors serving the different railroad systems are regarded as part of their respective staffs, meetings of inspectors from entire systems have been held annually. These meetings are called together for the purpose of getting acquainted, discussing new instructions, comparing notes and improving the service in whatever way possible along uniform lines.

The difference between the minimum standard railroad watch today and the best grade thirty years ago, in itself reveals the improvement that has been made in the mechanical constructions of watches during the last few years, an improvement which can be accepted as the watchmakers' contribution to the safety movement.

For this mechanical improvement in watches and for their co-operation in making possible standardization of grades, special credit must be given the watch manufacturer. An instance of their co-operation was given a year ago last January when the number of railroad watches scheduled was reduced from 85 to 22.

To make this reduction possible several of the watch companies reduced their number of standard railroad watches from twelve to three. Many of the \$5 grades were dropped and will no longer be manufactured. It is therefore reasonable to expect that the few grades retained will receive special attention and further improvement in their finish and adjustments.

#### PLAIN FIGURES ON DIAL

Another very important factor of safety is the dial, that part of the watch which quickly and surely reveals the correct time to the engineer, the conductor, and other trainmen. As this information is often required at night when lights are dim and obscure, it is needless to emphasize the importance of dials that give the hour and minute without any confusion of fantastic figures or freakish designs.

The figures should be twelve plain upright Arabic figures to indicate the hour points and the twelve five minute division points in the dial circle should be distinct "squares," "diamond" or "round" "dots," with the four intervening minute dashes not quite so heavily marked but distinct for easy reading. The hour and minute hands are also real factors of safety in reading time easily and correctly, the difference in shape between these two hands must be clean cut to insure reading their exact location on the dial.

Another feature about the standard dial is the position of the stem or winding crown. This should be opposite the twelve, not as with a hunting case watch opposite the three. The use of such closed-face models that have been converted into open-face watches without changing the position of the stem, has proved disastrous to life and property as a result of false reading of the time indicated. A serious error of fifteen minutes can easily result from a confused reading of such "side-wheeler" watch dials.

Inasmuch as the effectiveness of this inspection system depends upon the constant and intelligent co-operation of railroad officials, trainmen, and watch inspectors, it is with pleasure that I here record an instance evidencing this support on the part of trainmen.

An interesting case of such co-operation recently occurred when an engineer in one of our large cities discovered that the loaner watch a companion was carrying, was his old discarded watch, which he had traded in to the inspector. He immediately made special efforts to collect a number of such watches as evidence against the unscrupulous inspector and submitted the same through their Brotherhood Grand Officers to the General Time Inspector. This was good proof of the co-operation that assures safety and success of the time inspection service. The case in question was referred to our office and the inspector was immediately dismissed.

What are some of the results of Time Service as developed and now enforced on our railroads? Its effect is well known in making safe and possible our fast mail service and limited express trains. Wrecks are fortunately very few when we consider the vastness of our railroads and the large number of daily fast trains. A study of wrecks reveals the gratifying fact that few are due to defective time pieces. The Time Service System was twenty years old when the National Safety Council was organized so that we may boast of having been pioneers in the Universal Safety movement and of having made a real contribution in practical safety methods.

When the Government took over the railroads during the war, the Director General immediately set out to simplify and standardize equipment and methods. The instructions as applied to the Time Service and Standard watches were not changed in any way whatever, except to demand a stricter observance of the rules and to simplify the same through the reduction of the schedule for new standard watches.

Today railroad time and railroad watches are recognized as standard wherever safety or any other consideration requires accuracy in time. Throughout the United States the banker, the business man, the lawyer,

and the manufacturer go to the jeweler and ask for railroad standard watches—they want the best.

Railroad standard watches received a tribute during the war that should not pass unrecorded. When General Wood returned from France, he brought back word that our officers were not equipped with satisfactory watches in spite of the fact that extreme accuracy in timing the advance of the infantry during the barrage fire was essential for safeguarding the lives of our men.

The convenience and fashion of the wrist watch had unfortunately made its appeal to our officers at the sacrifice of correct time. The outcome of the recommendation of the General was that we were called upon to help meet the situation by visiting many of our cantonments and we had the satisfaction of providing more than 15,000 officers with American made standard watches just before the signing of the Armistice and these watches were turned over to our soldier boys at manufacturers' prices as a contribution toward winning the war.

Mention should be made of the co-operation given by retail jewelers and watch dealers who almost without exception have acquainted themselves with the requirements of Time Service and railroad watch inspection and have met the same on a fair co-operative spirit in their business dealings with railroad men.

#### OFFICIAL BUREAU OF RAILROAD TIME SERVICE

For the purpose of perpetuating and further improving the safety and standardization of watch inspection and the administration of the Time Service, "The Official Bureau of Railroad Time Service" was chartered in the United States and Canada in 1918. This Bureau has its principal administrative office in Cleveland with branches in Chicago, San Francisco, and Winnipeg and has a present organization of about sixty people schooled in this work. What this Bureau intends to accomplish can best be given by quoting verbatim the third Article of its Charter:

"The purpose for which said Bureau is formed is NOT FOR PROFIT OR ANY MERCHANDISING WHATSOEVER, but to reduce the element of danger in the operation of railroads caused by inaccurate time pieces, and to increase the factor of safety to the public by general supervision of the standard time pieces necessary to the safe and efficient operation of the railroads; to keep records of the performance of said time pieces under standard forms and uniform rules and regulations; to appoint and educate local watch inspectors for the purpose of inspecting and caring for the standard watches of railroad employees, and the standard clocks of the railroad companies; to see that such watches and clocks are properly inspected; to make and maintain a standard system of watch and clock rating and regulation for railroad employees and railroad companies and in general to exercise careful supervision of railroad time service."

In football, baseball, and other forms of sports we admire the excellence of effective team work. In this team-work every player is within hearing and seeing distance of his fellows. Greater than this is the national team-work of our railroads with thousands upon thousands of

employees, thousands and thousands of miles apart, working together in absolute co-operation by virtue of clocks and watches upon which they rely for correct information as to how their fellow workers in this great national team-work are keeping step, and thus faithfully and loyally performing their part in safeguarding human lives and valuable property in meeting the very necessary requirements of social and business traffic.

CHAIRMAN SCOTT: I think we have had a very interesting session here today and to all of those who did not have an opportunity of saying something, I wish to assure you that you are going to have full opportunity to get rid of that full head of steam that you brought with you before this Congress is over.

We have with us today a gentleman who came to Milwaukee upon invitation from the Chairman of this Section. I refer to Mr. George Bradshaw, and if he is in the room I would like for him to stand and let the people see that he is here.

We welcome you to our Congress, Mr. Bradshaw and hope you will remain throughout the sessions. (Applause).

ADJOURNMENT.

#### THURSDAY MORNING SESSION

**C**HAIRMAN SCOTT: Our first number this morning is "Co-operation with Railroad Labor Organizations," by Mr. Isaiah Hale.

#### CO-OPERATION WITH RAILROAD LABOR ORGANIZATIONS

ISAIAH HALE, SAFETY SUPERINTENDENT, THE ATCHISON, TOPEKA AND SANTA FE RAILWAY SYSTEMS, TOPEKA, KANS.

When it was suggested several weeks ago that there be discussed on this occasion the subject assigned to me, there was still a good deal to be said about it, notwithstanding the fact that I had endeavored to keep you gentlemen advised from time to time of developments following my initial letter to the Presidents or Grand Chiefs of the four so-called major railroad labor organizations. Even though a partial realization of our hopes has come, developments have been so widely discussed that I am embarrassed at finding myself expected to talk on a subject with which you—or at least many of you—are already fully acquainted. I shall therefore but briefly touch on this particular topic, and use the time allotted to me on another very near my heart and which I humbly offer for what it may be worth.

I shall not repeat any of the reasons leading up to my initial letters to the Big Four Chiefs. We were unfortunate about that time in being confronted by seemingly more than our share of injuries for which there was no excuse or reason; I felt forced to believe that if we were ever going to convert a certain type of men we must do so through some agency or by some means other than by mere persuasion—or any other

means previously used. While it is true that the ritual of the several organizations then, and now, provide for a discussion on safety, at each regular meeting, I had reason to believe such discussion was largely perfunctory and was not a potent influence in getting that individual interest which the organizations, the railroads, and the men so much needed. As proof of which I would remind you that it is the exception rather than the rule that an organization man will take exceptions to the operations of his partner, regardless of how irregular they may be. Our serious injuries seldom come from the *first* failure of men to comply with safety rules. Remembering that these failures must be regularly noticed by the offender's "Brother", *why is such "Brother" not entitled to recall the time when he stood before his lodge, held his right hand high and took an oath before his God that he would protect his brother in every way he possibly could, even going so far as to pledge help to his brothers' dependents, in case of their need or distress?* Do not misunderstand me, I have no wish to belittle that oath, not at all. it is uplifting and ennobling, and all that really makes life worth while, *if organization men would live up to it, but they don't do it, and never have done it—and to that extent their obligation is idle talk.* Thousands of their members have made such admission to me and down in your heart *you know* it is true. Railroadng could be revolutionized if organization men would live up to the letter and spirit of their obligation.

I was strengthened in my resolve to do something, if possible, to bring this about, by knowing that the average organization man readily will do for his organization things he might be some little time in making up his mind to do for any one or anything else. I chose the Big Four as the organization to which to make my *first* appeal because of their organization insurance. In the two years and nine months preceding my first letter, these four organizations paid out \$21,504,844.00 in settlement of what they term "claim benefits". That a very considerable proportion of this total is paid out on accident causes gave me a basis for my argument. I suggested that they forget entirely the sentimental, the humanitarian side of safety, and be thoroughly selfish—to look on my suggestion only from the standpoint of the money they could save on injury claim payments. At least two of these gentlemen had previously told me of certain of their past achievements, but I made bold enough to say to them that while they are rightfully proud of anything they did to bring about a more general observance of Rule G, in securing various safety appliances, etc., yet they would do well to remember that the brightest jewel they will put in their crown of accomplishments will be placed there when the power and the prestige of their organizations is put behind a determined and wholehearted effort forever to put a stop to the shameful disregard by the average man for the safety of either himself or his fellow workmen.

I received a most cordial response from each of the four gentlemen, all carrying a hearty assurance of their willingness to do anything humanly possible to further the safety cause, and all breathing the fervent hope that an appreciable reduction in injuries might in some manner be brought about. Our mutual friend, Warren S. Stone, Grand Chief of the Engineers was, if anything, more outspoken than the other gentlemen

in his desire to do some constructive good along safety lines, and I feel that to Mr. Stone personally I am largely indebted for the very rare privilege which was mine—a few weeks ago—of outlining my suggestions before

#### OUTLINED SUGGESTIONS BEFORE EXECUTIVES OF LABOR ORGANIZATIONS

the executives of the sixteen railroad labor organizations, then in session in Chicago. I told the sixteen executives that all I would have them do is to put "Brother" into Brotherhood. I told them frankly they would never have anything that approximates a Brotherhood until they reached the point where they put a higher value on a human life than on a dollar; till they reached the point where they spent at least a fractional part of as much time trying to safeguard their brothers, in trying to perpetuate their service, their homes, in trying to keep them here to care for and protect their families, as in trying to secure them some concession on a working schedule.

At this meeting one of the executives asked me what assurance I could give the organizations, provided they undertook the safety education of their men, that the management of American railroads would clean up their properties, safeguard conditions, and spend money liberally in furthering safety work—and, as an aside, safety, in the minds of some men, still begins and ends in spending money. I told them that while I felt sure the management of our railroads would go to any reasonable length I could give no assurance to what extent this might be, but said: Supposing the railroad managements were not in favor of the safety movement as we know it today, were not willing to spend a dollar on it or recognize it in any substantial way, does that not only emphasize the need of that greater individual interest and care which I insist your men must show?" In a word, the more hazards that confront a man, the more necessary it becomes for *him* to watch *his* step. It is a fact that railroad service today is just as safe or as dangerous as a man chooses to make it.

I recall telling the Executives of the Shop Crafts of an occurrence at one of our shops, where a young man was milling out driving boxes and in

#### DISREGARDED INSTRUCTIONS AND LOST HAND

spite of bulletin instructions that "The wearing of gloves around moving machines is strictly prohibited," in spite of the further fact that his foreman had repeatedly objected to his wearing gloves, he continued to wear them. Finally, one day, the tool of his machine caught the gauntlet of his glove and he not only suffered an injury that required the amputation of his hand, but he had it torn off the stump at the wrist and left it in his machine. I frankly told the shop executives, so I do not hesitate to repeat it here, that it is not at all to the credit of their organizations that they have made it extremely difficult for the railroads to enforce their safety rules; that while this young man did not say so in so many words he virtually told his foreman that if he wanted to cripple or kill himself he was going to do it—and his organization backed him up in it—a fact of which they ought to be heartily ashamed. I might add that if the railroad company had done nothing more for this particular man



following his disability than his organization has done, the man would have been in greater need than he is today. It was at the brow of this hill that one of the executives made his stand and wrote me that he saw in my suggestion an attempt on the part of the railroads to pass the buck of responsibility for personal injuries over onto the organizations. I frankly told him that the responsibility for injuries was not one which the Brotherhoods could fairly say all lies with the Railroads any more than the Railroads could fairly say it all lies with the Organizations—responsibility must be jointly assumed, because all that a railroad might do to improve and safeguard conditions would go for naught if the individual reserves to himself what he regards as his God-given right to do anything in any way he wants to.

The Executive already referred to later on also stated with some apparent feeling that I had been in the railroad game long enough to know that the stuff I was talking "was bunk, pure and simple"—and rather cruelly referred to my suggestion, so humbly made, as a "hobby I was riding to death". By this time I had lost some of my *humility* so I told him that I had outlined my suggestion, as originally made, to thousands of organization men on our own line, and scores on other lines, and had yet to meet the first one who had not heartily concurred in it and expressed the hope that it might meet with the approval of their executives; I asked him by what right, without a trial or even serious thought, he dubbed my suggestion as "bunk" and intimated that the thousands of men who shared my opinion were also fools; I told him that if he didn't know it, he ought to get out and mill around the members of his organization and he'd find that among them there is slowly, but none the less surely, crystallizing a sentiment that it ought to be as much the function of his organization, for instance, to undertake the education of its members, not alone along safety lines, but in other ways, to make them more efficient and proficient, to give them high ideals, to make them better neighbors, better husbands and fathers, as it is to grieve them an additional spring in the cushion under them; I told him, and again I quote: "Your predecessors did not see this vision, and you give little or no promise of doing so, but as sure as there is a God in Israel, some day—it may not be tomorrow or next year—but some day a man will follow you as Grand Chief who *will* see it, a man who will write his name across the scroll of the world's industrial history and the light of whose achievement will not only serve to darken the shadows cast by the lost opportunities of the past, but will forever point the way toward a new era in railroading, an era when all men will understand the value of an efficient, able-bodied co-worker and realize and appreciate the real worth of a friend—when brother will at last be put into Brotherhood."

#### MEETING OF EDITORS AND RAILROAD SAFETY OFFICERS

Thence I will jump over a period of six weeks, and am pleased to report that at Chicago on Saturday last, as many of you know, Messrs. Cease, Pease, and McNamee, Editors of the official publications for the B. of R. T., O. R. C., and B. of L. F. & E., respectively, met a number of the railroad safety officers. These gentlemen, speaking not only for them-

selves, but for the editor of the official publication of the switchmen, made it clear that they were very desirous of establishing a safety department and asking, in order that it might be interesting and exert a helpful influence, that at least for a time the railroad safety officers furnish them monthly any "copy" of heart-stories and details of avoidable injuries to organization men which might have come to their notice or happened on their several properties. (Here followed a detailed account of how this "copy" might be accumulated, etc.)

That this is a long step forward none will deny; it is a big, generous, voluntary act on the part of these editors, speaking for their Organizations, and will forever stand as a monument to their sagacity, their fairness, and their far-sightedness, which will endure long after less generous contemporaries have been forgotten. And even at that, I am pleased to believe that this co-operation by all concerned, which has but a single purpose, will prove but a stepping stone, not a resting place.

There is, however, one factor which, to me, has never seemed to enter into our safety work to an extent it should. Were I a psychologist I might more aptly present my views, but even without a mind that belongs to a five foot shelf of books I hope I may make myself clear. Frankly I do not believe any of us have talked optimism, good cheer, and good fellowship to the extent we should. The fundamental of Safety is a desire to live; in a word, the desire to live must be stronger in an optimist than in a pessimist. It is obvious, therefore, that what we need is not only a greater concern about our individual welfare, but more optimism—more good cheer, more good fellowship, more contentment. Pray do not misunderstand me to mean that to approach contentment we should teach ourselves to sit serenely down and be satisfied. Some one has said: "We should ever be content but never satisfied till we have made the most of our opportunities."

Our railroads have never before had so many young employees as now, and since our most fruitful field is likely among those young men and women, it should be not only our duty but our privilege so to train these immature branches as to shape properly the mature tree. Some one has said, "One of the greatest gift the Gods can bestow is the gift of Good Cheer; the ability to smile, to enjoy the laughter of others, to spread the contagion of happiness wherever you go, makes one not only a welcome guest but an actual blessing. We are so intent on making a living, so wrapped up in our selfish selves we forget we owe the world at least the courtesy of a smiling face and each other the inspiration of a cheery word and a friendly handshake." Robert Louis Stevenson once wrote "A happy man or woman is a better thing to find than a five pound note; their mere entrance into a room is as if another candle had been lighted," and, incidentally, if the man ever lived who knew the value of Good Cheer, that man was Robert Louis Stevenson, for *his* supported him through forty years of varying fortunes but unvarying ill health.

#### EFFECT OF MENTAL ATTITUDE

One doctrine I am firmly convinced we should also preach to our new men is that "Without any question, our thoughts more than any other

one agency directly fix our status in life. The mental attitude which we hold toward our work or our aim has everything to do with what we actually accomplish. If we go to our work with the attitude of a slave lashed to his task, and see in it only drudgery, if we work without hope, see no future in what we are doing beyond getting a bare living, if we see no light ahead, nothing but poverty and hard work all our lives, if we think we were destined to such a hard existence, that the Fates have been unkind to us, that the good things of life were all meant for somebody else but not for us, we cannot reasonably expect to find anything else than just what we are looking for."

"If, on the other hand, no matter how poor we may be today, we can see a better and brighter future; if we believe that some day we are going to rise above humdrum work, that we are going to get out of the basement into the living room of life where comfort and happiness await us; if our ambition is clean cut and we keep our eye steadily on the goal which we hope to reach and feel confident we have the ability to attain, we will surely accomplish something worth while. I never knew a man who believed in himself and constantly affirmed his ability to do what he undertook, who kept his eye steadily on his goal and manfully strived to reach it, who did not make a success of life. There is no other one thing which will bring so much value into one's life as that of always carrying an optimistic, hopeful attitude of really expecting that things are going to turn out well with us, not bad; that we are going to succeed, not fail; that we are going to be happy, not miserable. But if we are always putting a low rating on ourselves, constantly marking ourselves down, we may be very sure that we will never meet anybody else who will take the trouble to mark us UP, to put a higher valuation on us than we put on ourselves." I am firm in my belief that we would do well to preach this doctrine to our men—both young and old.

The greatest obstacle to our progress along this new path is the innate, if not ingrowing, selfishness which, to a varying degree is in us all. As an illustration of two types I might tell you that I attended a meeting of one of our local safety committees, along about April last. There were two shopmen members of this committee who had been paid two hours time for sitting in the meeting the one hour which took them up to 3:00 P. M., their regular hour for quitting work. At 3:00 P. M., while I was speaking, they all but broke up the meeting in getting out. I have no funny notions about myself or my very humble position; I do not expect, nor would I have our men show me any more respect than I am willing and glad to show them, but, frankly, only getting to that part of the line twice each year. I really felt that as an ordinary courtesy they might have delayed their exit the five or ten minutes necessary to let me finish. At close of the meeting their foreman told me they left at 3:00 P. M. every meeting, which never lasted after 3:30 P. M., that they had refused to stay even though he allowed them pay for any time used after 3:00 P. M., frankly saying they would not stay unless allowed time and a half for overtime. When the foreman told them he thought them unreasonable one of the men looked him in the eye and asked "Well, what in h——l is it going to get me?" The fact that we made a reduction of 25 per cent in

fatalities among our employees in 1919 as compared to 1918, that *they* might have played some little part in that wonderful accomplishment, meant nothing at all to those men.

I have ever been willing to see a measure of sanity in the mind, a measure of justice in the heart of every man, and just as I was beginning to wonder if I was wrong, if all men were selfish at heart, I was unexpectedly shown the other side of the shield.

#### ALL MEN NOT SELFISH AT HEART

Boarding one of our overland trains late at night a short time later I found in our Pullman, upon getting up the next morning, two little Italian girls, aged about five and seven; there was pinned to the dress of the elder one a letter which would have brought tears to the Sphinx, could it have read it. Briefly, it stated that four years ago the father of these children left their mother and them in Italy and came to this country to make a permanent home. He located at Cucamonga, a small town on the Santa Fe Lines just east of Los Angeles, and after four years of hard work and self denial and loneliness, such as I sometimes think only a foreigner understands, he accumulated a sufficient surplus to send for his wife and two children to join him here. The family left Italy on December 2, landed at Ellis Island December 24, and Christmas morning, while the church bells across the bay were ringing out their message of Christmas cheer, the mother of these two little girls died, and with her death all knowledge as to who they were or where they were going was lost. It was necessary for the Steamship Company to correspond with the Italian government in order to secure this information, and I would remind you that while this was being done these two babies were batted around the bull pens on Ellis Island for three months and a half. They were well on their way when I met with them in Arizona. On this car I also met the wife of a Superintendent on the Chicago, Milwaukee & St. Paul Railroad, a very charming woman, who told me, in speaking of these children, that she had never seen such tender care and solicitude shown any one in whom they had no direct interest as had been shown them by the Pullman conductor and porter, with whom we were riding. She stated she offered to get the youngsters ready for bed the first night out of Chicago, but this young man seemed to want to do it, and she told me that certainly no father ever made his own babies ready for bed and did it more modestly than did this young Pullman conductor; she stated further that six or eight times during the night she saw him come to the upper berth occupied by these children, which was directly across from hers, pull the straps more closely together so they might not fall out, and cover them up so that they might not get cold. When we came back onto the train after eating breakfast at Seligman, Arizona, a gentleman, whose face was bronzed with out-door exposure and whose clothes bore evidence of desert life, went to the news stand after leaving the dining room, and I subsequently saw by the price tags they carried, he had paid a dollar each for a little boy and little girl doll. When he took these into the car and gave them to these Italian children they clapped their little hands and jumped up and down for the very joy that

was in their hearts, this probably being the first real kindness shown them in a long time, which they understood, and when this gentleman, whom I afterward learned was a miner, turned around to leave them he seemed half ashamed that I caught him with a tear in his eye, and he said to me "My God, brother, I have spent a thousand dollars many a time that did not give me half as much pleasure as those two dollars."

Of what I want to remind you is, that when the thought first came into the mind of that miner that he might give these children a little happiness he did not, like our shop man referred to, say to himself "Well, what in the h——l is it going to get me," and he confessed to me five minutes later that the greatest happiness that had come to him in years had come through showing a kindness, *through doing something for some one else.*

I have told this little story to a good many of our men. I have said to them that it is not at all likely they will ever find themselves on a Pullman car with two Italian children going to Cucamonga, California, or that they will ever have a chance to buy such children a doll, but I have reminded them that all of them every few days, and many of them every day, have a chance to show a very much greater kindness to the children, perhaps the two little girls, of some man with whom they work, by getting the man to stop some irregular practice of his which may some day rob his children of his protecting care, and stated that whether or not they are going to do so depends entirely on whether they have the view-point of the man who wants to know what such an act is going to get them or whether they have the view-point of this Arizona miner.

As much as I dislike to inject myself into this story I cannot resist the temptation to say that about a year ago, in one of our meetings, an engineer said to me: "You were out here once, Mr. Hale, and literally tore into us fellows." I told him I was mighty sorry to know it and asked him how long ago that was, and when he told me seven or eight years, I made a confession there which I am willing to repeat here; and that is, I have barrels of the milk of human kindness in my system today where eight years ago I did not have ounces, and I have it simply because I am just beginning to realize the value of an able-bodied, co-worker, and just beginning to appreciate the real worth of a friend. To this extent I am not selfish—if I may have sown in your mind a seed that may in time grow into a thought that will bring you as much comfort as mine has recently brought me, I will gladly share it with you and be very happy in so doing.

#### TIME TO HELP IS WHEN HELP IS NEEDED

In conclusion I have long contended that the time to help a man is when he needs your help. I'm not sentimental, it is seldom I resort to poetry as a means of expressing myself, but one verse of a favorite reads:

I'm not much on philosophy—I don't know all the creeds,  
I don't know what's inside the books my next door neighbor reads,  
I haven't studied ancient tongues, my English isn't good,  
I know I say a lot of things that scholars never would,

But this is my experience, an' so I pass it on:  
The time to be a friend to a man is when he's needing one.

As a first move in this self-treatment, let me suggest that you learn to smile. A smile is described by some rhymester as

The thing that goes the farthest toward making life worth while,  
That costs the least and does the most, is just a pleasant smile,  
The smile that bubbles from a heart that loves its fellow men,  
Will drive away the clouds of gloom and coax out the sun again,  
It's full of worth and goodness, too, with manly kindness blent,  
It's a worth a million dollars and it doesn't cost a cent.

And the end is Success, and success may be something entirely different from what you think it is today. Edgar Guest says:

Success is being friendly when another needs a friend,  
It's in the cheery words you speak, not in the coins you lend;  
Success lies not alone in skill and deeds of daring great,  
It's in the roses that you plant beside your garden gate.

Success is in the way you walk the paths of life each day,  
It's in the little things you do, in the little things you say;  
Success is in the glad Hello you give your fellow man,  
It's in the laughter of your home and joys for others that you plan.

Success is not in getting rich and rising high to fame,  
It's not alone in winning goals which all men hope to claim;  
It's in the man you are each day through happiness or care,  
It's in the cheery words you speak and in the smile you wear.

Success is being big of heart and clean and broad of mind,  
It's being faithful to your friends, and to the stranger, kind;  
It's in the children whom you love, and all they learn from you,  
Success depends on character and everything you do.

CHAIRMAN SCOTT: I am sure every person in this room must have felt the inspiration that came during Mr. Hale's talk. I was very glad indeed to see the spontaneous rising of everybody in the room to show appreciation for what Mr. Hale has given us here today.

It is possible that some of you may have some questions to ask Mr. Hale as to what is expected of you when you get back home. In other words, shall the Steam Railroad Section have a committee that will collect these news items for these periodicals or shall we be expected to send the items direct to the editors of these papers?

#### DISCUSSION

MR. HALE: While it was tentatively agreed at Chicago Saturday that we should individually send to these editors a monthly contribution, it seems to me it might be very well, after giving it more mature thought, if

this Section would delegate one man—not a committee, because of the difficulties and delay in getting committees together—who will check up and follow up the laggards and put a puncher behind the man who does not respond and let him assemble this data and send it to the editor.

MR. L. G. BENTLEY (Chesapeake & Ohio): I move that you appoint such a representative to collect and check these items for the monthly journal.

CHAIRMAN SCOTT: You refer to checking the items; do you have in mind censoring these items before they are given to the press?

MR. BENTLEY: To collect these items and keep a check on them.

MR. H. A. ROWE (D., L. & W.): I had the pleasure of attending that meeting Saturday at Chicago and I know that the editors will be very glad indeed to receive the communications from the various safety men, and they suggested that the items be forwarded direct to them.

I am not disagreeing with Mr. Hale, understand, but I am just simply expressing my little thought on the matter, that in addition to sending monthly copies to the editors, we send one copy to a designated person, and we can never find a person with more dynamic force to supervise that than Mr. Hale, and he can keep check on these and find out whether each one of us is doing our fair and square duty in the matter.

Possibly the Chairman may feel a little reticent about nominating or appointing Mr. Hale now and I would suggest that that be the business of the next Chairman to appoint Mr. Hale, if he can see his way clear to do so, as the person to whom these news items should be sent.

MR. HALE: I would be very glad indeed to serve you but I am away from home two or three months at a time and because of that factor, it would not be advisable to have me because when I am on the road I am not so situated that I could handle it as it should be.

MR. JOHN T. BRODERICK (Baltimore & Ohio Railroad): Personally it doesn't seem to me at all necessary to appoint any one to handle that matter; it is a responsibility and a duty that should rest upon the individual roads to see that it is done, and they should certainly have enough interest in it to handle the matter direct. I wouldn't care to burden Mr. Hale or any one else with a responsibility or duty of that sort.

MR. E. R. COTT (Hocking Valley Railroad): If we have somebody in this organization who is responsible to see that we come up to our full requirements, and, as Mr. Bentley says, keep a check on us and see that we are doing our duty, why I think we shall get farther, and I feel that it is so important a matter that we dare not leave it to the individual members, not that I feel that any one of you might fail, but all of us have the habit of carelessness where we say we will do that tomorrow, and I second Mr. Bentley's motion that the Chair appoint a committee of one who shall have this in charge.

MR. BRODERICK: Personally, I am inclined to believe that it would be unwise for anybody to edit or determine what should or should not be sent in.

MR. COTT: It was agreed over at that meeting that it would be impossible for them to use everything that we might send them if everybody did his part. I do not mean that the party whom you might appoint under Mr. Bentley's motion should act as a censor; they have agreed to do that

job themselves; in fact, they want to. What I mean is what Mr. Bentley said, to keep a check on us and see that the items reach the members regularly.

I just wanted to correct that impression that he is not to censor these items but to see that they are collected and forwarded.

MR. BENTLEY: Since hearing the gentlemen speak, I believe that the important function that devolves upon this gentleman that I moved to appoint lies in keeping up enthusiasm and in keeping a check on these articles, not so much as in collecting them and distributing to the various magazines. Therefore, I feel that my motion should have been along the line of Mr. Hale's suggestion that he should keep a check and know whether each railroad was doing its part; not in any sense to act as a censor on material being submitted. I would like to word my motion in that manner.

MR. HALE: The trainmaster, Mr. Ceas, who did most of the talking at this meeting, made it very clear that they wanted to establish this safety department in their magazine. It was only to get it started and get into it the things that should go into it to make it effective that they asked for this help from the railroads at this time. It is manifestly evident, as Mr. Cott says, that they can't use all the stuff that we send them; they are going to cut it down and take out only such things as appeal to them, and I still think that we should have some sort of a check, not so much on this copy that goes to them, but to see that every man is responding. They are going to edit this stuff we send them and, as I said before, they will throw out a lot of stuff which is unsuitable and which they cannot run because of the lack of space.

I might offer a suggestion to the Chair, if I might, to appoint Mr. Cott, who is from the state of candidates, to this one particular job.

MR. W. A. YOUNG (Oregon Short Line): I wish to state at this time that I was a delegate to the convention which convened in this city last week, representing the International Association of Supervising Mechanics on the railroad, and they went on record as favoring the safety first movement, and I am sure they will be glad to receive and print in their magazine anything pertaining to the safety movement on the railroads.

CHAIRMAN SCOTT: It seems to me that this matter has been thoroughly cleared up and if there is no further discussion at this time we will put the question before the house.

The motion is carried.

We will now take up the next item on the program, which is "Shop Accidents," by Mr. J. A. McNally, Safety Agent, Wabash Railroad.

### SHOP ACCIDENTS

J. A. McNALLY, SAFETY INSPECTOR, WABASH RAILROAD, ST. LOUIS

In dealing with this subject I am not going into statistics but am writing this article from facts gathered from my own personal experience. In my investigation of all shop accidents that come under my jurisdiction I have found that only 7 per cent are due to unsafe conditions, thereby



indelibly impressing upon my mind the most important thing to eliminate accidents is to deal directly with the individual using all the strategic force and diplomacy at my command to break up the other 93 per cent, which are due to carelessness. In my mind there are three kinds of carelessness: Ignorant, thoughtless, and wilful. In the ignorant class we have the man who has had no experience; he should be watched closely and cautioned whenever necessary. The foreman in his department and safety committeeman should especially look out for this class of employees. Then we have the wilfully ignorant man, one who takes no stock in the safety movement, belittling those at the head, who only learns from painful experience the value of the safety movement. Fortunately this class is not large and is rapidly diminishing. In the thoughtless class we have those who from force of habit do things mechanically not seeing or thinking what is liable to happen, and this class is often responsible for the injury to other employees. The wilful class is more or less uncertain and difficult to pick out as opinions differ and statements conflict, but the number of accidents causing death and injuries shows without a doubt that experienced as well as inexperienced men are getting injured or contributing to the injury of others. The Safety Movement is one instrumentality by which these evils can be corrected. Its aim is to promote the "Golden Rule Spirit." Every apprentice boy should be taught the principles of safety from the date of his apprenticeship. He should be made to possess, enlarge, and transmit to his successor all the accumulated knowledge of his predecessor and when once a system of this kind is well grounded a new foundation will be laid and the railroad shop employees will have an additional guarantee for his preservation.

In eliminating shop accidents it is well to take up the evil that causes the largest number of accidents. We find from Interstate Commerce Commission reports, which are authentic, that the use of hand tools, apparatus, etc., are leading the list in injured with 10,467 shopmen injured last year. To cut down this number, I would suggest that a daily inspection be made of all tools in tool rooms, and a weekly inspection of all tools in private lockers. Tool room firemen should see that no defective tools are given out for men to work with. The next item that contributes to a large number of injuries is the collapse, fall, etc., of objects, with 9,613 injured in one year. When men are working overhead a drop cord with a sign reading "Men working overhead" should be placed where it could be readily seen. This would possibly cut down the number injured in this manner. Nearly every month some one is injured by heavy wrenches left on running board being knocked off or otherwise falling on men below. All concerned should discourage the practice of leaving such tools on running boards or benches where they are liable to fall and injure the workmen.

A number of cases have been reported by the I. C. C. where shop employees have been killed and injured crossing tracks, or crawling through or over cars. When necessary to cross the tracks follow the traffic rules by crossing at right angles. This gives one a better view

in either direction, besides it lessens the distance in the danger zone. If your business does not require you to be on tracks, stay off. Places where Hurdy trains are operated, men should get on and inside of coaches before it starts and stay there until it stops. Many men are killed each year attempting to get on and off moving trains. Stay off of the platforms, in case of collision you would be crushed between platform and end of car. In looking over the bulletin boards, employees should pay special attention to the safety signs. They were put there for the benefit of the employees, hence comply with their warning.

#### THE EMERY WHEEL

A word about the emery wheel. Despite the fact guards have been applied, and goggles furnished, accidents still continue. Men should approach a stone with one thought in mind—this is a dangerous article and I must be careful. Never try to grind out a wrench or any other object that is the same width of the stone or you may be a successful candidate for the hospital. Foremen should understand it is not enough to tell a man what methods are unsafe, but he should be told why it is unsafe and furthermore a safer method in doing the work.

Discard the gloves and rings working around machinery. You may not look quite so handsome or keep your hands as clean, but they will be of more use to you with five fingers on each hand. Run the fellow off who insists on distracting your attention from the machine you are running. This same fellow will not contribute materially to your support if you are injured.

When chipping protect eyes by using goggles and protect the other fellow by putting a shield in front of the work you are doing.

Calling attention to hydraulic jacks, never use nuts or any other metal to build up between the jack ram and barrel in order to support the load caused by leaky jack. The pressure brought to bear often causes these articles to fly with the speed of a bullet. Defective jacks should never be used but sent in immediately for repairs. I also wish to mention in connection with that, where shops are not equipped with electric cranes and wheels are taken out by jacking up and blocking under, that blocks for both sides be of same thickness and number,—number one on the floor, number two next and so on. A man should follow right up with blocks as engine is being raised or lowered, also a wooden wedge to be ready to slip under in case jack gives way. Never depend on jacks alone to hold weight of cars or engines. When putting in washout plugs, relief valves, or any other water or steam-tight connections you should remember many men have been killed or injured due to some thoughtless workman sticking a plug in a sheet without tightening it up. Of all the unpardonable sins this is one of the worst. If you cannot complete the job leave it out entirely, in this way you will not add to the long list of men injured by the deplorable practice of entering a plug a thread or two by hand and leaving it in that condition.

Carrying a bar, ladder, or any lengthy material on shoulder in horizontal position is a dangerous practice. Meeting some one in doorway or

cloud of steam or smoke in roundhouse, the result would be loss of an eye or face disfigured. Get the safety habit; carry them like the soldier carries his rifle.

Removing and replacing driving springs especially around roundhouses is dangerous work and should be given proper attention. I know of one man who was killed as the result of driving a block out from between spring and frame without taking up weight of engine. All employees should be taught never to remove blocks from springs or gibbs from hangers without taking weight off of springs. Be sure to finish your job well before leaving it, perhaps the nut you failed to tighten, the cotter key you left out or the one you failed to spread may be the primary cause of a serious wreck in which some one is killed or injured, and perhaps some of your own family.

#### A WORD TO THE CAR MEN

*The Blue Flag.* It is of the utmost importance that all concerned keep in mind that life or limb depends on the strict compliance with Rule 26 Standard code, also other instructions pertaining to the movement of cars undergoing repairs. Foremen in charge can and should take this matter up at their various meetings, pointing out the importance of keeping signals in good condition, properly displayed, and reporting to the proper official any case coming under their observation where the Blue Signal is not respected.

Flue blowers and boilerwashers and their helpers are often injured on account of their inexperience in handling this work. For this reason it is necessary that the foreman in charge, before permitting men to do such work, should instruct them personally as to ways and means of doing their work in safety to themselves and others. The same rule should apply to all new men coming on the job in any craft. Foremen should explain to them the purpose of the safety organization.

*Hostlers.* Men are still being injured or killed by movement of live or dead engines on account of hostlers not giving necessary warning. To move an engine without sounding bell or whistle is an exceedingly dangerous practice. No one should be permitted to handle engine except those who are fully acquainted with its mechanism. When leaving an engine they should see that throttle is shut tight, reverse lever on center, and cylinder cocks open.

There have been several accidents the past year on the use of oxygen and acetylene. I am offering the following rules for their use:

1. Handle all oxygen cylinders with care and avoid dripping them any distance.
2. Keep all acetylene cylinders away from fire.
3. All cylinders should be kept in upright position, firmly fastened to avoid tumbling over.
4. Before attaching the regulator to the oxygen tank "crack" the valves so it can be opened very slowly. A sudden opening which is difficult to avoid when the valve is stuck may cause a severe shock to the regulator which may produce very high heat due to

sudden compression and so cause an explosion, particularly if any oil, grease, or other fuel substance is present.

5. Under no condition should oil or grease be used to make up the joint. A special lubricant is provided for this purpose by some manufacturers. If this is not available use very small quantity of soap or a very little glycerine.
6. Inspect all regulators and gauges before applying to see that they are free from oils and greases.
7. Different colored hose should be used for the oxygen than for acetylene to prevent danger from interchange. Black hose is used generally on acetylene cylinders as these cylinders are as a rule painted black. Red hose is used in the oxygen cylinders as these cylinders are usually painted yellow.
8. Examine hose at regular periods for leaks by putting it in water when under pressure. This will show small pin hole leaks that sometimes cause a great loss of oxygen.
9. *Burned Hose.* The gas hose connecting the regulator with the torch is often quite long. If the burned hose is flexible rubber it can be doubled on itself and the blaze extinguished. If the hose is of the stiff or armored kind that cannot be kinked, it may be necessary to shut off the gas at the valve. For this purpose a shut off valve should be provided as close to the torch as possible.
10. Blow out new hose before applying to prevent dust being carried to torch.
11. *Oxygen Tank Valve.* Open the valve slowly but completely back of stem with sufficient force to compress the washer that surrounds the valve stem. Otherwise there will be more or less leak. Oxygen is very expensive.
12. *Regulators.* Never drop or jar regulators. Do not turn pressure on regulators without first releasing all pressure from the regulator spring.
13. *Torches.* Use care in handling the torch. The tips and other parts are easily injured. It must not be misused. It is a torch not a hammer.
14. Novices should not be employed until they have been properly instructed by one who is thoroughly acquainted with the apparatus as the gasses are very explosive and the outcome may prove very serious if operators are not properly instructed.
15. Apparatus should be assigned to individuals or skilled operators who at all times would be more familiar with the working of same. Interchanging is a bad policy.
16. Above all else, THE BEST KNOWN SAFETY DEVICE IS A CAREFUL MAN.

I also offer the following Don'ts for shop men:

MECHANICAL DEPARTMENT

Do not attempt to operate a machine unless you are thoroughly qualified in its operation. Do not work with any machine unless authorized by the foreman in charge.

Do not operate any machine until all stops and safety appliances are in position and securely fastened.

Do not clean or oil machinery while in motion.

Do not grind at emery wheels nor operate a machine from which chips are flying without using goggles.

Do not look at electric welding without using shield over your eyes.

Do not go on crane runways without knowing that you are fully protected.

When repairing motor-driven machines see that circuit breaker is out and hang sign on starting box or controller, reading: "Man working on machine."

Do not overload sling chains nor use them with ends fastened together by a bolt.

Do not stand under a load being moved by a crane or other mechanism.

When working overhead, hang a sign: "Men Working Overhead," from drop line in plain view of men on floor. This applies to repairmen working on cranes, line shafting, etc.

Use chipping screens or protectors on machines to prevent chips from flying.

Do not attempt to clamp or chuck job or change gear while machine is in motion.

Do not wear gloves, or clothing with loose sleeves, while operating machinery.

Do not place materials in babbitt pot unless you are positive that same are entirely free from water.

Do not go near or under bar material which is being turned in turret lathe.

Do not jump on or off elevators, turn-tables or transfer-tables while they are in motion.

Do not file right-handed on lathe, as it brings operator too close to chuck or carrier.

Do not use a file without a handle.

Do not allow gears to be exposed.

Do not place fingers under job to ascertain if drill is coming through.

Do not wipe drills or clean in or around motor while it is in motion.

Do not lean over boring bar on horizontal boring machine on a one-half open job.

Do not cut off bolts or rivets without holding a broom or cane to keep heads from flying off.

Do not blow out engines with air until sure that there is no one in the way.

Do not raise or move engine with a crane while any person is on the engine.

Do not move crane without first sounding gong, nor raise the hook above the limit switch.

Do not throw red hot rivets from forge fire to riveters where they may be missed and fall on some other workmen near-by.

In hardening tools in hot lead or barium chloride baths, always be

sure that tools are perfectly dry, as the dampness and moisture on the tools may cause the lead or chloride to splash and injure the workman.

Do not weld pipe or any hollow forging on both ends without first seeing that there is an air hole in one end to allow gas to escape and prevent explosion. This also applies to any forging or casting which is cored in the center and solid on both ends.

In handling material at the steam hammer, always use tongs, and always stand at the side of the forging or piece you are holding, as a piece of iron may fly and hit you if you are standing directly back of the forging.

Cold iron should not be cut under steam hammer.

When about to make a change of dies on forging machines, always be sure machine is stopped, otherwise something might fall on the pedal and start the machine running. The same applies to shears and punches.

Do not put your hands on lifting chains when working chain hoists.

Do not swing a sledge until you are sure there is no one behind you.

Do not throw large quantities of water on forge fires, as it is apt to make gas and cause cinders to blow out in your face.

Do not use files or hardened steel for drift pins.

Do not shift belts by hand.

Do not tighten washout, arch tubs, or other plugs in boiler under pressure.

Examine carefully all tools, machines, and appliances you are required to work with, and if there is anything which in your opinion is defective or unsafe, call the matter at once to the attention of your foreman, and make out safety card.

Use care when handling long material when view is obstructed and thus avoid striking and injuring a fellow workman.

Do not stand on foot-board of an engine when the engine is handling a tender or another engine without a coupler.

Do not change injectors or fire up a boiler until you know the boiler has plenty of water.

Before moving an engine, walk around and examine it and ring the bell as a warning.

Do not leave an engine standing without opening cylinder cocks, setting brake, and placing reverse gear in center position.

Do not remove gauge cocks while engine is under steam.

Do not tighten injector nuts when injector is working.

Do not disconnect injector pipes before bleeding off the pressure.

Do not unnecessarily move handle of brake valves.

In starting injectors care must be exercised to see that no one is near overflow.

#### CAR DEPARTMENT

Do not go under a car or between cars for the purpose of making inspection or repairs without first knowing that you are fully protected.

Do not go under a car which is jacked up unless the weight of the car is resting on the horses provided for that purpose.

Do not use steel bars in place of jack handles, and do not allow jack handles to remain in position after completing the jacking of a car or engine.

Do not allow tools or material to remain on cars after work is complete, as these are liable to fall off and injure some one.

When old lumber is laid aside, see that points of nails are turned down or, preferable, bent over, to render them harmless.

Do not jack a car or engine unless substantial blocking is placed under the jack and wooden shim on top of it to prevent slipping.

Do not jack a car without first blocking the wheels.

Do not smoke, nor use a lighted torch or lantern, around or near a tank car or a car bearing flammable cards.

Do not use ladders that are not equipped with anti-slipping device.

Now that the wage question is settled, the men are getting back to normal. Let's all renew our efforts to stop accidents. Let's all go forward with an unshakable purpose and a firm resolve to do our part, and by so doing gain for ourselves that coveted distinction and just reward of a grand and noble work honorably rendered.

Now, there may be several other suggestions to make, but, as a rule, they won't look at all those suggestions. They are just like a child, they have got to learn all the words before they are able to talk intelligently, and that is one reason why I put those "don'ts" in there.

Now, as a rule, all roads have had more or less trouble in the last year, some of them with an increase in accidents, and I believe it is due a good deal to the conditions that existed. The wage question distracted the men's minds but now that that is settled, the men are getting back to normal and it is our duty now to renew our efforts in this safety movement. Let's go forward with an unshaking purpose and firm resolve to do our part, and by so doing we will gain a reward for the grand and noble work honorably rendered.

CHAIRMAN SCOTT: Before we take up the discussion of this interesting paper, I should like to change the order of business just a little bit and take up the next item on the program, which is an address by Mr. Samuel O. Dunn, Editor, "Railway Age," Chicago. I doubt if there is a man in the room who is not a reader of the "Railway Age". I doubt if there is an office on any railroad but what receives this publication each week. I think it is a great honor to this Section that we should be able to have the editor of this most estimable magazine come and address us today on "Economic Phases of Railway Safety Work". This is one side of the question that has not been given a great deal of consideration by the Steam Railroad Section, but I think it is well that we, as safety men, should know something about all sides of the question, and I know of no one who is better prepared to tell us about this side of it than Mr. Samuel O. Dunn, and I have the pleasure of introducing to you gentlemen today Mr. Dunn.

## THE ECONOMIC VALUE OF RAILWAY SAFETY WORK

---

SAMUEL O. DUNN, EDITOR, "RAILWAY AGE," CHICAGO

---

Railroad transportation always has been recognized as a hazardous industry—hazardous to those working for the railways, to those using their service, and to those having occasion to go upon or cross their properties. If I remember my history correctly, on the first occasion when a steam locomotive drawing a train was run in England, a prominent statesman who had been active in securing the construction of the railway was killed.

In consequence of the clearly recognized hazardousness of the industry, efforts constantly have been made since the first railway was built to reduce the hazards and increase the safety of operation. Until within the last decade these efforts had met with greater success in some other countries—notably France, Great Britain, and Germany—than in the United States. The accident record of our railways long was bad by comparison with that of the railways of almost any other leading country, and the worst of it was that it did not improve much. Accidents increased as the mileage and the amount of business handled increased. Those who studied the problem realized that this was principally due to two causes. One was that most of our railways were hastily and poorly built into new and undeveloped territories, and the character of their construction made the prevention of accidents very difficult. The second and most important reason was that our railway officers and employees had the characteristic American tendency toward recklessness, the tendency to "take a chance" regardless of consequences. This tendency of employees, who in this respect were merely typical Americans, was so strong that even after the physical properties of many railways had been greatly improved and safety appliances of numerous kinds had been installed it was found extremely difficult to get employees to protect themselves and the patrons of the railways by properly using the facilities at their disposal.

About ten years ago the railway accident situation grew so bad that it became the subject of much agitation and of great concern and consideration by railway executives and operating officers throughout the country. One of the results was the starting of what was called the "safety first" movement. The real father of this movement on the railways, as I believe is generally recognized, was Mr. R. C. Richards, general claim agent of the Chicago & North Western Railway, who is now president of the National Safety Council. It was on his initiative that the management of the North Western began the formation of local safety committees all over its lines, composed of both officers and employees. The example set was rapidly followed by railways in all parts of the country. Not only were hundreds of safety committees organized, but many railways created safety departments in charge of able men whose duty it was to study all the conditions which tended to cause accidents and to devise remedies for them. A very extensive propaganda was carried on among employees to educate them regarding their own interests and the interests and rights of the railways and of the public concerning this matter.



## INCREASE OF SAFETY ON RAILWAYS

The results of all the work which has been done within the last ten years in installing safety devices and in educating officers and employees upon this subject are strikingly reflected in the statistics regarding railroad accidents. The latest statistics available regarding railway operations and railway accidents for an entire year are those for 1918. In the eight years from 1910 to 1918 the amount of freight handled increased 70 per cent and the number of passengers about 30 per cent. It is a remarkable fact that during these years there not only was no increase but a marked reduction in the number of railway employees and of passengers and other persons carried under contract who were killed. The number of employees, both on and off duty, killed in 1910 as a result of train operation was 3,383, while in 1918 it was only 2,781. The number of passengers and other persons carried under contract killed in 1910 was 421, while in 1918 it was only 342. This makes a total of 3,804 employees and passengers and other persons carried under contract who were killed as the result of the operation of trains in 1910, and a total of 3,123 in 1918. The number of employees killed in railway industrial accidents in 1910 was 421, while in 1918 it was 418. There was even a marked reduction in the number of trespassers killed. The figure for the number of this class of persons killed in 1910 is not available, but we know it was about 5,000. In 1918 it was only 3,255.

It is surely a high tribute to the efficiency of those who have carried on safety work for the railways that this record can be exhibited. Lest some of my friends who believe in government control should claim that the good results obtained in 1918 were due to government operation, I will say in passing that in 1917, under private operation, the number of both passengers and employees killed was less than in 1918.

While, however, gratifying progress has been made on the railways, I need hardly tell you that the number of persons annually killed and injured upon them is still much too large. The total number of all classes killed in 1918, including trespassers and those killed at highway crossings, was almost 10,000, while the total number of all classes injured was almost 175,000. When we discuss the need for safety measures we usually discuss them on the assumption that they are needed almost entirely to prevent the loss of life or the pain and suffering occasioned to their victims. Undoubtedly that is the most important point of view from which the subject should be considered. I am going to venture today, however, to call your attention to the fact that safety work has economic phases which are of very great importance.

## ECONOMIC EFFECTS OF ACCIDENTS

Almost every accident has some economic consequences. By that I mean that it either results in some destruction of property, or temporarily, partially, or completely destroys the value of one or more persons as producers. The amount of property destroyed each year in railway accidents, including both the property of the railways and of their patrons, is very large. The destruction of a large amount of property is the

destruction of the results of the work of a large number of men, and it causes directly and indirectly a diminution of the amount of necessities, comforts, and luxuries available for the use and consumption of the public. It is obvious that if all the property and all the commodities produced by men's work were immediately destroyed we should all be speedily reduced to starvation and misery, no matter how hard we worked. The destruction by accidents or otherwise of a smaller amount of the things produced by the labor of our brains and hands has similar effects which are great in proportion to the amount of the destruction.

Likewise, every accident which results in a man being killed or maimed reduces the total production that otherwise would be obtained. When a man who has just reached his prime as a worker suddenly is cut off society loses a large part of the work that has been done to rear and develop him. It gets only a partial economic return for his economic cost. When a man is compelled to refrain from work because of an accident society loses the product which would have been obtained from his exertions if he had been able to stay at work. As I have said, the number of men injured in railway accidents in the year 1918 was 175,000. If those men lost an average of four days each the total loss of working time aggregated 700,000 days, which was equivalent to the complete loss of the work of 27,000 men for one month.

To measure the results of railway accidents in economic terms of lost production, and lost opportunity for consumption on the part of the public, may seem a coldblooded way to treat the subject; and as I already have indicated, I recognize the fact that the main purpose for which safety work should be carried on is to prevent the cutting off of the lives and the pain and suffering of the victims. But to measure the results of accidents by economic standards is by no means so coldblooded as it may seem. When a man in the prime of life, with a family dependent upon him, is cut off or loses a limb the economic consequence to his family is the destruction or reduction of his income. The amount of deprivation, pain, and suffering occasioned to the families of the victims of accidents is surely comparable with the effects upon the victims themselves.

#### INDIRECT ECONOMIC EFFECTS

It is not, however, the immediate families of the victims who experience all the economic effects. The welfare of society as a whole demands not only a fair division among all classes of what is produced but the largest aggregate production of necessities, comforts, and luxuries that is compatible with reasonable conditions of work for those who do the work of society. Now, every accident by which a man loses his life, or even is temporarily disabled, reduced the amount of production that can be secured for the general good.

Railway safety work has the direct effect of reducing the amount of property destroyed and the number of persons killed and injured, and if its economic value were to be measured merely by these direct and obvious effects it would be worth far more than it costs. From an economic point of view, however, its indirect effects may be and probably

are more valuable than its direct effects. In the first place, every derailment, collision, or other train accident which occurs not only affects the trains directly involved, and the persons upon them, but also affects the operation of a large part or even all of the railroad upon which it occurs. It throws passenger trains off their schedules, delays freight trains and has other consequences which reduce the amount of traffic that can be handled and adds greatly to operating expenses. The number of collisions upon our railways in 1918 was 8,715, the number of derailments 13,568, the number of boiler explosions 239, the number of other locomotive accidents 275, and the number of miscellaneous train accidents 1,898. This made a total of 24,695 train accidents of all kinds. The damage to railway property reported as a result of these accidents was \$20,954,350, but the reduction of earnings and the increase in operating expenses indirectly due to them caused an aggregate loss exceeding by many times the value of the property destroyed. -Whatever tends to reduce accidents necessarily tends to reduce these very large indirect effects which are due to them.

#### CAREFUL WORKER IS EFFICIENT WORKER

The economic effects of railway safety work are even greater and more comprehensive than what has been said already would indicate. The principal cause of railway accidents is and always has been the failure of officers and employees to exercise reasonable care in the performance of their duties. Safety work, when properly and effectively carried on, so constantly and forcibly brings home to officers and employees the necessity for being careful in every thing they do that it changes and improves their entire attitude and habits with reference to their work. It results, when they have a thing to do, in their thinking not merely of getting it done in some way, but of doing it in the right way. Now, this improvement in their mental attitude and habits is one of the main things needed not merely to reduce accidents but also to increase their general efficiency. Usually whatever tends to make a man more careful in his work also tends to make him a more efficient worker—that is, a worker who in the long run will do more and better work than he would do if he were not careful. The effects produced by the constant inculcation of the principles of safety upon the general efficiency of the operation of the railroads cannot possibly be measured either in increased passenger miles and ton miles handled per employee, or in terms of reduced cost of handling a given number of tons one mile or passengers one mile, but that increased care by employees in doing their work does tend to increase the general efficiency of operation is beyond question.

#### SAFETY WORK AND INDUSTRIAL RELATIONS

There is one other indirect effect of safety work, and especially of the work of safety committees, to which I think attention should be called. The greatest industrial and social problem of our time is that of establishing better and more satisfactory relations between the owners and managements of large business concerns, on the one hand, and their employees, on the other. I believe that the principal reason why employers

and employees in so many of our great industries are divided into warring camps is that many business concerns have become so large that their owners and chief officers and their employees seldom come in contact with each other except when they are brought together by controversies regarding conditions of employment and wages. The owners and chief officers of the concerns and the employees have been pushed so far apart that neither class has an adequate understanding of the problems, the functions, the motives, or the desires of the other. The suspicions and antagonisms arising from this situation have a direct tendency to reduce efficiency in all industries, including the railroads, and they will never be allayed until employers and employees of large industries come to a better understanding with each other. They will never come to a better understanding with each other until new points of contact are established between them to take the place of the points of contact which have been destroyed by the substitution of vast industrial concerns for comparatively small concerns in which employers and employees worked closer together. I know of no means which actually has been tried on the railroads which is better adapted to re-establish points of contact between employers and employees, and bring about a better understanding between them, than safety committees. When officers and employees work together on safety committees they soon learn that the problems with which they are dealing are problems of mutual concern the solution of which will be equally advantageous to the railways and to the men. The employees who serve upon these committees are almost certain to get a better knowledge of the problems of railway operation and develop a more friendly attitude toward the managements and to communicate this knowledge and friendly attitude to many of their fellow employees. This again is bound to have a tendency to promote efficiency in the operation of the railroads.

On the whole, therefore, I firmly believe that the safety work being done on the railways is not merely from a humanitarian point of view, but also from an economic and social point of view, one of the most important kinds of work being done on them. From a purely economic standpoint no railway management can afford to hesitate to spend all the money that is necessary to have safety work adequately and ably done. It is, on the other hand, a kind of work which from a purely business point of view no railway management can afford to neglect. While great progress has been made in this kind of work within the last decade, it is only necessary to mention the fact that 10,000 people were killed and 175,000 injured on our railways in 1918 to emphasize that there is great need for safety work on the railways to be carried on more comprehensively, energetically, and ably than it ever yet has been.

MR. JAMES SULLIVAN (Chicago & Northwestern): I just received a message I think you all will be glad to hear that Mr. Richards is much better. (Applause)

CHAIRMAN SCOTT: We will now take up the discussion of Mr. McNally's paper and while this discussion is going on, I am going to ask Mr. Broderick of the B. & O. to take the Chair.

(Mr. Broderick took the Chair.)

## DISCUSSION

MR. CHAPIN (Pennsylvania Railway): One point that I feel strongly about in Mr. McNally's paper is that the shops should be kept clean. In one of our shops they had a system whereby all scrap material was always placed in one place at the head of the track. It was pointed out to them that the sweeper would only take material which was at the head of the track. This resulted in two things: The workman when he put down his material knew he would find it there, no matter how much the floor was cleaned, and another thing, the collection of scrap was very much easier. The sweeper kept the track space swept up of dirt and dust only and let the material which was to be reapplied stay where it was. They whitewashed the pits which increased illumination and helped to make the men feel that they were in a good place to work. I happened to be in this shop at noontime and papers and refuse from lunch boxes were placed in refuse cans. I have known the day when it was all dumped into the pit to be shoveled out by the cleaner.

Another thing, with those of us who have woodworking departments, the problem of safety treads has not been an easy one. Rubber, canvas or things of that kind may tear or rip or stretch. In some of our shops we give the tread a coat of paint, put sand on top of that, let that dry and give it another coat until you have three layers. Let that be your safety tread, and when it wears down, paint it up again. It doesn't take but a few minutes, it is cheap, serviceable, and does the trick.

MR. CHARLES JEHLIK (Chicago & Northwestern): I make it my business to see that all tools are put in good condition before they are given to the men. I see that the men have enough goggles for grinding purposes and other things. I send for those hard fellows in the shop who do not want to do what safety calls for and I tell them what safety is.

Keeping the aisles clean: I made a recommendation that the foreman go to that gang boss and say, "Read rule 736 to them." I get after all the men that I see who are not doing what is right.

I want to tell you that when you run a locomotive department, as a safety committeeman, of twenty-four engines and twenty-four stalls, attend to your own work and see that things are right so you don't lose your own job, and attend to your safety committee work aside from that, you are doing your work not for itself but for humanity, and if I have a man in the locomotive department that will not do what the safety committee wants him to do, the organization backs me, and that is Local 478, and he has got to do what is right or he cannot work. If the man can't read the language on the bulletin board, I will go to him and give him the language he wants and give him to understand what safety is; and they are going to be taught safety first by all means.

MR. SCOTT: This is merely in the way of relating a thing that has reduced shop accidents on the Hocking Valley. We have, I am pleased to report, for the first eight months of 1920, a reduction of forty-eight per cent in shop accidents. Last year in November I got out a circular to the general chairmen of the brotherhoods on our line requesting that I might meet with them and secure their co-operation for furthering

safety, and the first fellow that took me up was the president of the federated shop draft and he was one of the fellows, of course, that I wanted to reach. They set a day for me to be with them and I nearly worked my head off that night on an address. I felt that I must not make a single mistake or I might be lost and here was the opportunity which I had been looking for. I recall before going down to the meeting that night I went up into my room and shut the door and had my notes in front of me and I expect I made the room ring. I went down to the meeting and was surprised to be invited into a very small room. I assumed, of course, that I was going to address a mass meeting and there were just thirty-two men present. Well, that kind of took the pep out of me. I was taken around the room and was introduced to the gentlemen and then the president stood up and said, "Gentlemen, you will recall at our last meeting I read to you a communication from Mr. Scott, and it was agreed that we might extend to him an invitation to be present. You will remember I requested each of you to bring a list of complaints here in regard to safety and I will start here and go right around the room." The first fellow pulled out a sheet of paper and he started in and showed me where the Hocking Valley fell down on safety. I took my notes and tore them up; my address was gone. We went around that room. You know Elbert Hubbard said some people have three kinds of trouble: All they have now, all they have had, and all they ever expect to have. That was the case there that night. They brought up all the troubles they had had, all the troubles they now had, and all the troubles they expected to have. I never had such a great experience in my life. That meeting lasted until twelve o'clock that night. I understood, as I never did before, the viewpoints of those men. I was able to set them right on some things. I made a list of their complaints and went to the General Manager the next morning and said, "Here is our chance to prove to these men that we mean absolutely what we say," and we did. Since then we have had the most wonderful co-operation from the shop men, because we had that opportunity to prove that we meant just what we said.

MR. M. S. COLE (Oregon Short Line): The gentleman who just spoke hit the nail on the head. We have been mingling among our men in the shop. As an instructor, I work more with the younger boys and the younger men. We can't expect to do very much with the older men seeking employment from the other roads. When you can reach the apprentice individually, you can train him in his work and in safety first. It requires patience and it requires conscientious effort. We have eliminated, I think I can safely say, more than forty-eight per cent of our accidents in the shop.

#### ELIMINATED THE PRACTICAL JOKER

I might go back to Mr. McNally's paper. He mentioned the practical joker but he made no suggestions for his elimination. I think we can say that the superintendent of our shop very thoroughly eliminated the practical joker in the shop in this way: Two accidents occurred through just merely thoughtlessness on the part of the man who perpetrated the

joke, not knowing about it at the time as he did not intend to cause any injury, but the man who perpetrated that joke had to pay the man who suffered from the joke for every hour that he missed from his work. He had to pay him out of his own pocket, and that eliminated the practical joker in that shop.

ACTING CHAIRMAN BRODERICK: The time is rapidly passing, so we will proceed with the next paper. Mr. C. H. Baltzell, Superintendent, St. Louis and San Francisco Railroad, Fort Smith, Arkansas, will speak to us on "Transportation Accidents."

### TRANSPORTATION ACCIDENTS

C. H. BALTZELL, SUPERINTENDENT, ST. LOUIS AND SAN FRANCISCO RAILROAD,  
FORT SMITH, ARK.

My subject covers such a wide territory it is difficult to know just where and how to commence. Of course one of the principal things that we should know is whether we are becoming more careful or not.

I have checked up a number of statements, from various departments and organizations and want to present something briefly to you. For instance, B. of R. T. organization dating back to 1884 up to and including 1919, shows the greatest number of men killed in collisions to be 83 in 1903 and 1904 with a gradual decrease each year up to 1919, which shows 19 men killed. The greatest number of fatalities from making couplings are registered in 1916, 1917, and 1918, a total of 176; previous three years, 123, while 1919 shows a total of 34. In 1905 and 1906, 321 were killed by falling from trains, while the year 1919 shows a total of 78. Getting on and off trains, the largest number of fatalities was 37 in 1903 and 1904, while in 1919 three men were killed. In 1911 and 1912, 426 men were killed by being run over in switching, and in 1919 there were 121 killed.

This would indicate that men in that organization have taken advantage of the safety work and are more cautious, thereby greatly reducing the fatalities in their department.

It appears to me that railroad men generally are using more care, thinking of the danger that surrounds them and thereby greatly reducing the hazards in their work. I know on my own division for 18 months there was not an employee killed. This splendid record was broken by a fireman using a shaker bar, beating on the side of the ash pan and asking the engineer to move the engine; but in some manner the shaker bar was engaged in the spokes of a driving wheel. The shaker bar was whirled from his hands, struck him in the back of the head, and killed him instantly.

In the past nine or ten years safety committees throughout the country and safety workers generally have been extremely active in reporting and correcting unsafe conditions which in many cases were promptly handled and the hazard removed, but in my opinion the big work for all division safety committees as well as the employees, is to be alert and active in correcting unsafe practices. This is a matter that if handled in an ear-

nest, sincere manner, and never letting up on the proposition, is bound to secure best results.

The Transportation Book of Rules points clearly to rules and regulations that have been framed for the benefit of the men. Unsafe practices are frequently indulged in without a word of warning to the man doing these things until only too often it is too late to save that man from a serious personal injury or fatality. From actual experience we do not know how much good can be accomplished by taking some action on the ground in the observance of unsafe customs and practices. For instance, you take the man that has been in the habit practically all of his railroad life of adjusting couplers with his feet or hands just about time cars are to be coupled; in my opinion the proper way to handle that man is that every time another employee or division officer observes this dangerous work is to call him off to one side quietly and in an earnest and sincere manner tell him of the danger that he is running. It is all a matter of education.

It is true that in many cases men will persist in continuing these unsafe practices, but there is one thing about our safety work; in order to win we must never get out of patience, must never give up the hope or thought that a man can be brought to his better senses, and if enough attention and patience is displayed you will finally reach this man and make a believer out of him and his influence and actions in eliminating this dangerous work will have a mighty good effect on others. There are hundreds of ways on a railroad for employees to get hurt and killed and I have made it a rule and practice in handling my safety committee and division officers to instill in their minds the one thought to be constantly on the alert and lookout not only for dangerous conditions but unsafe practices.

I think every committeeman should feel his responsibility in regard to these matters. When he observes unsafe work and fails to take proper action, and later on the man indulging in that kind of unsafe work is crippled or killed, I want each committeeman that has observed these conditions to feel that to a certain extent he has contributed to the personal injury or fatality by his failure to do the thing that he had a right and the opportunity to do by getting to that man and talking with him about it. If the influence of one committeeman is not sufficient it is better to double up several good earnest workers and keep continually behind the man and you know and I know that with proper handling it is only a question of time when the employee will correct these bad habits. On the other hand, I think it is a fine thing to be continually talking to the men about cultivating good safe habits, to be thinking of the things they are doing, to realize and to appreciate the danger that does surround them, firmly fixing safe habits in conducting their work, which is far better than any rules, because habits firmly fixed do not have to be watched. In other words, habits are safer than rules, as Dr. Frank Crane in the "American" for July says: "One habit is better than a dozen rules." In the same number of the "American" a splendid article is written on "What fool thing do you do that endangers your life?" What a startling announcement that 80,000 men, women, and children are going to be killed in the



United States in the year of 1920, and about 14,000,000, according to one Insurance Company's estimate, are going to be injured, directly through carelessness, thoughtlessness, or failure to think of the danger that they are running into.

In 1917, 80,000 deaths were due to accidents. Only 22,000, less than one-third of them, were in industry. Other nations refer to America as "Careless America." Think of the appalling automobile crashes at grade crossings throughout the country! You can hardly pick up a paper that does not have an account of an automobile struck on some crossing. "Entire family wiped out," and "five killed, three crippled," are headlines that have appeared. There seems to be an insane desire on the part of many automobile drivers to beat the train over the crossing. I have personally observed them rush across in front of an engine and then stop on the right-of-way and nearly the entire party in the automobile give the engineer the laugh, because of the frightened expression on his face, knowing what a narrow escape they had. But they apparently failed to appreciate or realize the danger they had run into.

#### TRIBUTE TO THE RAILROADS

I saw a splendid tribute to American railroads and the men who run them, which was written by Edwin S. Jackson, April 11, 1920, on his fiftieth birthday, as follows:

"A railroad is not the unfeeling and relentless devourer of automobiles and little children at grade crossings described by impassioned advocates in crowded court rooms. The whistle of danger is an engineer's use of a piece of machinery, but it is also the echo of a man's thought for his own babies left at home.

"A railroad has been likened to an octopus by those who do not know the flesh and blood and personality of railroads. The soul of a railroad is Fidelity, and if a railroad is an octopus, it is an octopus with a soul.

"A railroad is a disciplined power; owning rails and cars and locomotives; engaging the highest quality of mechanical skill and expert knowledge; but the glory of a railroad is the united adjustment of its living nerves to patience, courtesy, speed, and safety."

I also want to pay tribute to locomotive engineers who, I think, are using their every effort to avoid striking automobiles. A case came up on my division last October. One of our passenger engineers on a fast train from St. Louis to Texas, while running 50 miles an hour near a small station in Oklahoma, came around a curve and discovered only a few hundred yards ahead of him three little children—one boy and two little girls all under the age of 6 years—playing on a bridge. I have never seen a man so filled with emotion as was this engineer, whose name is Arthur Davis, in describing this scene immediately after its occurrence.

#### THE ENGINEER'S STORY

"Mr. Baltzell," he said, "when I saw those little children out on the bridge and my train running at full speed and knew it was impossible to

stop the train and avoid striking them, I would have turned my engine over had it been possible to do so to keep from striking those little children. About that time a little twelve year old girl by the name of Agnes Standifer, who lives close to the bridge, hurried up the side of the 12-foot fill, ran out on the bridge almost directly in front of this fast train, took the little boy, stepped to the side of the bridge, dropped him to the foot of the bridge—fortunately no water was at this point—then stepped quickly to the little girls, got one under each arm, stepped to the edge of the bridge, and dropped off with them just as the engine rushed by."

It was a splendid display of presence of mind on the part of Miss Standifer. No one was hurt, but if that engineer lives to be 1,000 years old he will never fully recover from the terrific shock and strain that he received going through those few seconds.

I have always strongly believed that the public generally should be taken closely into our confidence and the safety work spread among the country people, small-town people, as well as throughout the large cities. Much good can be accomplished by the Division Safety Committee, which meets each month, by holding their meetings up and down the division at various points and making a community affair out of it. The business session could be held generally from 8 o'clock until noon, concluded at that time, and the afternoon devoted to a general get-together meeting with a safety thought carried as far as possible among these good people.

There is no question that observation of unsafe practices with corrective action has not been given the attention that it should have. It is very easy to slip back in matters of this kind and after division committeemen and other employees as well as division officers fail to take proper action when observing irregularities, it is only a short time until these irregularities fail to attract even their attention and there is where the danger lies. On the other hand, if our young committeemen especially, can be educated in proper manner to take some action on the irregularities and unsafe practices that come to their observation it is the most wonderful way of sharpening and strengthening their minds as well as enlarging their capacity to do things; and if they will stick to this plan they will begin to see lots of things that never attracted their attention before, thereby greatly improving themselves in many ways.

I believe that Transportation Accidents can be greatly reduced by red hot campaign on train rule meetings for each and every division held for one hour each week, even if but one rule is discussed at a time and kept in mind; that when unsafe practices are observed that some action will be taken in a sincere manner to induce that man to eliminate the bad practice, and get him to form good safe habits.

#### HOPPING TRAINS

The "boy hopping-train" habit is extremely dangerous and an active crusade has been going on for a number of years on the Frisco railroad, which has certainly shown results. It is the common talk of train and engine men as well as yardmen and others, that you don't see as many boys hopping the trains as formerly. Certainly the figures showing a de-

crease in personal injuries and fatalities under this heading are very encouraging.

You cannot take a boy by the back of the neck and scold him and perhaps tell him that he must not hop trains and get the best results. Take him off quietly, talk to him like he was a man, point out the danger, then leave it to his own judgment and honor, and nine times out of ten you have converted that boy and he will use his influence with other boys against this dangerous habit. We cannot afford to lose any of these young fellows, neither through disability nor death. I believe that the utmost consideration must be shown boys throughout this country. There are 10,000,000 boys throughout the United States between the ages of 12 and 19 and we need every one of them to make strong, healthful, self-reliant Americans.

Another important item is to make strong effort to induce men to take proper rest when off duty to prepare for next run or hours of service. So many men fail to do this, increasing liability of Transportation Accident. The most dangerous time is when a man is so sleepy and tired that he does not care nor does not think of his personal safety. The women folks at home can greatly assist in keeping this thought before the bread winner.

I am a strong believer in athletics for railroad men. I believe it makes them more healthy, happy, and efficient; besides it has a mighty good effect in causing them to take better care of themselves. Athletics played a big part in winning the World War, and it surely will play a big part in straightening out this upset world.

One big item in Transportation Accidents is the proper handling of train orders. Every man on the Division should use his personal influence to see that orders are handled according to the rules. One bad habit in which a number of operators indulge is telling the conductor or others the contents of his train orders, often misleading the conductor and others. Let the conductor read the order to the operator and operator check it carefully. Rule 210 is of the utmost importance.

Harmony and team work contribute a great deal to the interest in Safety First. Every effort should be made at all times to promote the feeling of friendship and the thought to be on the lookout in a helpful manner for the other fellow; and to eliminate entirely all selfish motives and work together for betterment and efficiency.

MR. HALE: Mr. Chairman, may I ask Mr. Baltzell if the Frisco Railroad saw to it that this wonderful heroic action of this wonderful heroine was brought to the attention of the Carnegie Commission and did she get a medal as she was entitled to?

MR. BALTZELL: I wanted to tell you some more about that. When I brought that to the attention of the committee, every man promised to do something for that little country girl. They bought her a beautiful locket properly inscribed and they told us this was to be presented to her on Christmas Eve. I said to this engineer, "Arthur, we are going to Albany Christmas Eve for this presentation." He said, "Well, I have a little Christmas tree at home." I said, "So have I, but listen, Arthur, when they get as old as you and I, Christmas trees and things of this

kind is what we do for the other fellow." He said, "Sure, I will go," and we went, and I shall never forget it. There was a little country school house, a little Christmas tree, and you never saw so many doll babies and tin horns as there was down there. We put that thing over in a wonderful way, and just think of the effect that we made in that community in the interest of safety first. What I want to do is to get a scholarship for that little girl so she can go off to some big school and have all her expenses paid, and that is the thing that is going to be done for her.

MR. HALE: Mr. Chairman, I want just to leave this word. If you can make a man understand that by his safe actions he is the real profiler, you will get somewhere. I had a roughneck switchman come to me following a talk something along the lines of my talk this morning and he said, "Hale, I didn't just get your talk last night. I guess I was a little dense and I was tired but I have been thinking it over this morning since my mind is cleared up and I know what you mean and I am strong for you and I want to shake hands with you." I said, "Now what do you understand me to mean?" He said, "Well, I am working down here in the yards as a switchman and I see my partner pull some bone and I go over and say, 'Boys, listen to me. You stop doing that. One of these days you are going to do that and it is going to cost me three dollars and twenty cents, and, damn you, I have no money for you.'" When you can make a man realize that he is going to pull some bone and it is going to cost him three dollars and twenty cents, he will see to it that the man quits.

(Mr. Scott resumed the Chair.)

CHAIRMAN SCOTT: Mr. Baltzell's paper is open for discussion.

#### DISCUSSION

MR. V. PARTIN (Ann Arbor Railway): Regarding automobile accidents, and with particular reference to the automobile driver driving up to the crossing and, after the engineer has possibly made an emergency stop of his train, giving the engineer the laugh, I want to let you all know how a case of that has been handled on the Ann Arbor Railroad. This particular engineer was coming down the track with a freight train and some parties in an automobile acted as though they were going to attempt to cross the track directly in front of the engine. The engineer made an emergency application of the brake. The automobile stopped and as usual they gave the engineer the laugh. He got down off the engine and tried to reason with them but he could not. He said, "All right, I'll take the number of your machine, turn it in to my superintendent and let him handle the matter with the Secretary of State." He took the number of the machine and sent it to me with the circumstances. I took it up with the Secretary of State who referred me to the chief of police in Flint. After taking it up with the chief of police in Flint, I found that the man had moved to Owosso. I then referred it to the chief of police at Owosso. The chief of police located these parties, called them into court and last week had turned the case over to the prosecuting attorney.

In connection with employees, it is easier, I believe, to train the man that is just entering the service than it is the old head who believes that

he knows it all. I would suggest that when you employ a new brakeman or a new fireman off the farm, have a small pamphlet of safety first rules and when he starts out to learn the road, let him take that along with him. He will read that several times.

NEVER ADMINISTER A REPROOF WHILE ANGRY

MR. D. K. RAWLINGS (Oregon Short Line): I was particularly interested in the discussion of the paper of Mr. Baltzell's on the manner in which you approach a man. I like spirit. I have tried to place before all of our committeemen the proper spirit in which to approach a man who has violated some safety rule. In many cases I think that the committeeman could have done much better if he would have walked away and left the man until he was in the proper frame of mind to approach him. I know of one instance where a man approached another man who was grinding on an emery wheel. The man had had a little difficulty shortly before he approached this man with one of the foremen and he was quite mad. When he saw this man grinding on the emery wheel he started in in good plain English to bawl him out. The result was a quarrel between the two men which brought bad feelings. The man turned around and told him in good plain English to go to hell, that he was handling that emery wheel and he knew what he was doing and he had done it for twenty-three years. He left a bad impression. If that man had gone off and got into the right frame of mind and talked with him in the right spirit, he would have been able to get his co-operation and show that man by conclusive arguments that it was necessary for him to stay on his job.

We had an engineer on a passenger train going through a town and a man in a Ford car crossed just ahead of the train. The engineer got the scare of his life. He got off his engine and got the number of the car as it disappeared. He sent the number of the car to our office and we went to the Secretary of State and found out to whom the car belonged and I made a special trip to that man's home that night. I found him with his family eating supper. I told him who I was and he invited me in and I went in and talked with him and his family, explaining to him how he had scared the engineer and how an accident might have occurred by his crossing without looking either to the right or left of that crossing. I received the heartiest response from his wife and family and a promise from him that in the future he was not going to take those chances.

MR. J. T. COLEMAN (Pennsylvania Railroad System): Regarding the question of reckless automobile driving, in the state of New Jersey, the Atlantic Division, placed a check for four days on one of its most important grade crossings and furnished the Highway Commission of the state of New Jersey with the numbers of each automobile that made a violation in passing over this grade crossing and over sixty of the number absolutely refused to obey any instructions or obey the signals. We are furnishing that to the State Highway Commissioners, hoping to bring it to the attention of the individual automobile driver.

MR. BRODERICK: The subject of automobile accidents I think is vital. On the B. & O. we have been carrying on a special campaign of this sort for the last ten months. We think it has good results. We have been

getting the numbers of automobile operators who violated the safety rules in crossing railroad tracks and sending the report to the automobile commissioner or Secretary of State as the case may be, who in turn will bring it to the attention of the automobile owner. It seems to be a question of the public being educated to the realization of the importance of taking proper precaution at railroad crossings. The installation of crossing gates and bells and things of that sort is not going to solve the problem. We had a most aggravating case on our Wabash Branch between Baltimore and Washington a few days ago which shows that the maximum amount of warning doesn't mean anything to some people. We had an automobile driver go through our crossing gates when they were down, the watchman on duty, the wigwag signal functioning, and the warning bell ringing, which meant nothing to him. There was the maximum amount of warning that could possibly be given at a railroad crossing.

MR. JOHN F. GROSZKI (Safety Agent, Oregon Washington R. R. & Nav. Co., U. P. System). I think this is one of the most important questions that is before the railroad men today. As far as our own casualties in our shops and along the right of way is concerned, I think we can manage that very well, but we have got to reach the public on the question of the automobile driver.

We have a very mountainous country. We run through all the smaller chains of the Rocky Mountain range besides the Cascade range. We have curves, we have many crossings and we have a very bad operating condition when it comes to railroad crossings, and we have tried to work on this problem.

We have gone to some trouble, some expense, and taken some time to try to educate the public along the lines Mr. Baltzell mentioned. We have gone to public schools and talked to the children. We have gone to meetings of automobile clubs and talked to them. We have talked before the Automobile Club at Walla Walla, Washington, which is one of the most enthusiastic safety clubs I have ever met anywhere and we have not had an automobile accident there for the last two and one-half years, or anywhere in that vicinity.

Another thing that we have gone ahead with is to try to enlist the newspaper editors in the community. Along our railroad I have got in touch with about 175 or 180 editors of newspapers, both daily and weekly—that includes the daily papers in the larger cities like Seattle, Portland, Spokane, and Tacoma and the weekly papers in some of the smaller towns. We run small press notices about every sixty days and in this little press notice we give two or three very bad accidents that have occurred where an automobile was smashed up and particularly where more than one person was killed, mentioning that in a few lines and then instructing the automobilist how a crossing should be made. My scheme has been this:

#### INSTRUCTIONS TO AUTOMOBILISTS WHEN CROSSING RAILROAD TRACKS

When you approach within one or two hundred feet of a crossing, put your car on an intermediate gear, then when you come to the crossing, stop. After you stop, why then look and listen. If there is no train in

sight and the coast is clear, then proceed. If the crossing is on the level, go across on intermediate, but if there is the least grade, I advise the automobilist to put his car on low gear so he will be absolutely sure to make it. If there is a curve or a cut, I advise the automobilist to get out and look, especially if there are two in the car.

We have kept that up for some time and the newspapers are giving us splendid support. Where the editors were cold and didn't want to give us support, I went down and visited them and asked them to come to our aid. One man in particular wouldn't give us any space at all. One day I got him down to the meeting and I worked our boys to take up the automobile question. The next morning that man gave us two and one-half columns about crossing accidents. What has been the result? Our engineers tell me it has done a lot of good. I want to say that on the old W. R. & M. with about 2,300 or 2,400 miles of railroad through mountainous country with very bad crossings we haven't killed a person at a railroad crossing for a little better than eleven months. That is accounted for, I believe principally, through the newspaper education and we are going to continue that.

MR. MAYO: The time is getting late. I would suggest that we take up this discussion, which is so important, at the round-table meeting this afternoon, and now proceed with the regular order of business and the election of officers.

CHAIRMAN SCOTT: Mr. Adams, will you make note of that?

Do I hear a nomination for the office of Chairman of the Steam Railroad Section for the coming year?

#### ELECTION OF OFFICERS

MR. E. M. SWITZER (C. B. & Q. Railroad): It seems to me, in selecting a man for Chairman of this Section, we should, of course, select some one who has demonstrated his interest in our interest and the interest of this Section, and it is also very important to select a man who is so situated that he has abundant opportunity to attend to the rather burdensome work that I am sure is entailed in the position. I have in mind such a man and I would like to nominate Mr. T. H. Carrow of the Pennsylvania Railroad.

(The motion was seconded and unanimously carried.)

MR. CARROW: I thank you very much for conferring this honor upon me.

I want to see the Steam Railroad Section become a great power in the work of the railroads of this country. I want to see safety men everywhere, intelligent and educated in their line. I am not particular about the language they speak, but I want them to know their business and I think there is no medium in the world so efficient as a session of this sort to bring that about.

I don't intend to speak very long but I do want to give you an idea as to what I think is involved in the true vision of the safety work in the future. You will recall last year in my address I enumerated a great many things to picture the enormous magnitude of the railroad business in this country. Today I invite your attention to the speed at which we

are going, to the increased development that you see on every hand, and, at last, draw a picture in your mind of what will happen ten years from today. The 40,000,000,000 "passenger miles" will in all probability reach a hundred billion and where one person travels today there will be three. I have never seen in my life the inclination on the part of men, women, and children all over the world to travel like there is today.

There are today approximately 9,000,000 automobiles in this country. By the most careful estimate that I can make, there will be 25,000,000 automobiles in the United States in ten years. There are public roads projected in every part of the land that will increase vehicular travel one hundred per cent and the 7,000 deaths and injuries at railroad crossings will be multiplied by three unless we, the people who are responsible for inculcating safety in the minds of the public and bringing to the attention of our officials the great principles of safety, do our full duty.

Now, let me say one thing more. Don't blame the officials; don't blame the employees, but look into your heart and your mind and find out where you have been ineffective and go to it with all the strength that you can assemble and make them understand and feel that safety work is right and that it must survive.

CHAIRMAN SCOTT: Nominations for Vice-Chairman are in order.

MR. D. B. ALLAN (Union Pacific): We have in our country a great transportation system that has been a pioneer in many things having to do with the glory of the Republic. This transportation system was a pioneer in construction West of the Missouri River. This transportation system was not built in a spirit of commercialism but sponsored by the Lincoln who looked on it as a military necessity, it was constructed with the idea that it would preserve the union of the states and as we all know, it was for that reason it was christened the Union Pacific. Gentlemen, the Union Pacific has come into this convention with thirty-five men and we have a candidate for the position of Vice-Chairman. We feel, and justly feel that if the position of Chairman goes to the East, the position of Vice-Chairman should go to the great West and it is my delightful privilege, Mr. Chairman, to present to this convention the name of Peter Groome for Vice-Chairman.

(The motion was seconded and carried unanimously.)

MR. GROOME: Mr. Chairman and Gentlemen, if there is anybody in this room that is surprised, it is myself. I knew nothing about this. It has been forced upon me. The only thing that I can say is that during the coming year I will pray that Tom Carrow won't die or resign his position.

CHAIRMAN SCOTT: The next in order is the election of a Secretary. Do I hear any nominations?

MR. E. S. CHAPIN (Pennsylvania System): Mr. Chairman, the nomination for Secretary is kind of a left-handed compliment to a fellow because you are handing him all the hard work there is. You have to have a man with a lot of pep and one who can handle the hard man. I want to nominate Mr. A. V. Rohweder, of the Duluth, Missabe and Northern.

(The motion was seconded and carried.)

MR. ROHWEDER: Yesterday morning some one said something about the possibilities of my accepting the Secretaryship of the Steam Railroad



Section and just a few minutes after that Mr. Mayo got up and made his report and told about all the hard work he had and the little support he got, but he helped it out a little bit by asking for assistance and I want to ask for the same thing now.

CHAIRMAN SCOTT: Gentlemen, I think you have done well in the selection of your officers for the incoming year...

If there is nothing further, we will stand adjourned.

ADJOURNMENT.

## THURSDAY AFTERNOON SESSION

### ROUND TABLE

HARRY A. ADAMS, CHAIRMAN

Bureau of Safety, Interstate Commerce Commission, Washington, D. C.

THE third session of the Steam Railroad Section was called to order at 2:45 o'clock, by Mr. Robert Scott of the Atlantic Coast Line Railroad.

MR. R. SCOTT: I would like to read to you a telegram just received from Mr. Richards:

"I hope the Steam Railroad Section will have the best and most interesting session in its history and that great benefit to the Safety Movement will result therefrom. I regret exceedingly that on account of my illness I am unable to be present. Please give my kindest regards to all the delegates.

"R. C. Richards." (Applause.)

I have another telegram here from Mr. William S. Wolner of the Northwestern Pacific:

"Please express to the meeting my regret on account of inability to be with you. Northwestern Pacific one hundred per cent officials and employees for safety; forty-three per cent reduction in accidents for August; fifteen per cent reduction for the current year.

"Northwestern Pacific."

As I understand it, the afternoon session is to be devoted entirely to a round-table discussion, and Mr. Harry A. Adams is going to conduct the meeting.

(Mr. Harry A. Adams presiding as Chairman.)

CHAIRMAN ADAMS: This is going to be a very, very busy afternoon, and in order that we may dispatch the business, I hope you will give good attention, and that each gentleman who speaks will confine himself to the subject. There will, no doubt, be subjects coming before the meeting that will require ten to fifteen minutes, but if all take that length of time we shall not be able to finish within the required time.

The first subject on the program is "Use of Statistics in Connection with Safety Work". This discussion will be led by Mr. J. C. Clark.

## USES OF STATISTICS IN CONNECTION WITH SAFETY WORK

J. C. CLARK, ASSISTANT TO GENERAL MANAGER IN CHARGE OF SAFETY,  
OREGON SHORT LINE RAILROAD COMPANY, SALT LAKE CITY, UTAH

There are various uses for statistics. They are sometimes used to conceal facts. They are sometimes used to prove untruths, and occasionally I am told they are used to present facts in such a way that you can intelligently carry on safety work or any other kind of work. Now I am only going to deal this afternoon with the latter phase. Statistics if properly used can be of great assistance to all safety officers. The greatest trouble, I think, at the present time is the fact that different roads are compiling their statistics on a great number of different bases. Some roads in their industrial accidents use the nine hour basis. Other roads use as a basis of comparison the accidents per one thousand men employed. In train service accidents some use a basis of accidents per million locomotive miles. Others use a basis of ton-miles. It seems to me that we should get together and agree on a uniform basis of reporting accidents.

Personal injury has usually been taken as the basis of safety work. I think that we should also take into consideration the amount of damage, but that is secondary to the personal injury feature. Now a good many of the safety officers take into consideration all personal injuries, whether there is time lost or not. A good many of the roads only take into consideration the I. C. C. standard which is to exceed three days lost time. There is a question in my mind as to how we should report for these safety departments. As a rule, any accident regardless of how much time is lost might have resulted in a lost time accident even though there was no time lost. It is a pretty hard proposition to get down to really a uniform basis.

As I take it, this discussion this afternoon is for the purpose of getting the views of the safety officers gathered here, and see if we can't get down to brass tacks. Of course, you can all see the value of having a uniform basis. At the present time I can't compare injuries on the Oregon Short Line with injuries on the D. & R. G., for example, because Mr. Ridgeway uses any injury regardless of whether time is lost or not, and he gets out a table every month showing the percentage of employees injured. I use an entirely different basis, and I can't compare my figures at all with Mr. Ridgeway's. Mr. Ridgeway is in the same territory that I am in, and I would like very much to be able to show my officers a comparison between these lines. So if we get down to a uniform basis I think that we will accomplish a very great purpose.

Another thing that I think we should do if possible is to co-operate, to a certain extent at least, with other industries so that we can make comparison between injuries of employees on railroads with injuries to employees in other industries—the steel industry and a number of others. They have a fairly uniform basis in a good many states due to the fact that the compensation laws, I think require certain standards. But there

is wonderful room here for constructive work, and I am very much in hopes that the discussion this afternoon will develop opinions on some one basis that we can settle on, and in that way get the benefit of comparative statements with other roads and with other industries.

I believe we can accomplish this purpose, and I will suggest, Mr. Chairman, if it isn't out of order, that in this connection we also consider appointing a permanent committee of the Steam Railroad Section to co-operate with other industries representing the National Safety Council to work with them during the coming year and see if we can't get down to a uniform basis of reporting accidents. I believe that would be a good thing.

MR. DOW (New York Central): I move that the subject be referred to the incoming Accident Causes and Remedies Committee for their investigation and report at the next annual meeting. (Seconded.)

CHAIRMAN ADAMS: It is moved by Mr. Dow of the New York Central and Mr. Walling of the Chicago Western Indiana that the subject under discussion be referred to the standing committee of Accident Causes and Remedies. You have heard the question, are there any remarks on the subject? Are you ready for the question?

MR. ROCKWELL (Buffalo, Rochester & Pittsburgh): I think this is a very excellent move, but it seems to me we might get action into this and get some immediate benefit by amending Mr. Dow's motion to request this committee to formulate some plan and put it in operation by January 1. Give the committee power to formulate a plan so that we can get speedy work, and I move that as an amendment to Mr. Dow's motion.

MR. CLARK: I second it.

CHAIRMAN ADAMS: Does that meet the approval of the assembly? If there are no objections we will let that be a part of the motion. Are there any objections? Hearing none, that will be a part of the motion that this committee will meet, act, and report by January 1.

MR. CLARK: I should like to state in that connection I understand the headquarters staff of the National Safety Council will be glad and willing to take care of the clerical work in connection with that. The reports could be made to the Secretary of the Section and he could forward them to the headquarters of the Council, or they could be sent direct to the headquarters of the Council. I have talked that over with Mr. Rosseland and he has assured me they would be glad to take care of any clerical work in connection with a move of this kind.

CHAIRMAN ADAMS: Are you ready for the question? All in favor of the motion as made will signify by saying "Aye". Contrary? It is carried.

MR. DOW: May I have the privilege of the floor for one moment before you proceed to the next subject? I want to put a motion and I want to do it while the temporary chairman is in the chair so as not to cause any embarrassment to the permanent chairman. This morning the Steam Railroad Section very properly, and following the usual custom, elected to office gentlemen who have shown by their ability and their hard work that they were well fitted for the positions to which they were chosen. I do not think that this section wants to adjourn from this convention

without taking some recognition of the very splendid services rendered by the acting chairman, Mr. Scott. I don't know whether any of you realize the difficulties that beset a man who has to take up the reins of the chairmanship of a section of this kind within a few weeks before the annual convention, without having had his hands on the work, or having had experience in the ways of the sectional work up to the time of Mr. Myer's resignation a short time ago. In spite of the difficulties under which Mr. Scott has been working we all know the splendid and efficient manner in which he has gotten this Section together and conducted the meetings, and I want to propose to you that we signify our appreciation of Mr. Scott's services as Chairman of this Section by a rising vote of thanks.

(Rising vote of thanks and applause.)

Mr. Scott: It pleases me very much. Fellow-members of the Steam Railroad Section, to hear these remarks offered by such a prominent and active member of this section as Mr. Dow, and I want to assure you that I appreciate fully everything that has been said. I have done my best so far in the discharge of my duties, and I am very glad to know that my services are appreciated. I thank you.

Mr. Chapin: I think it is only fair that we should also express our appreciation of the difficult duties accomplished by our Secretary, Mr. Mayo.

CHAIRMAN ADAMS: Those in favor please rise.

(Rising applause.)

CHAIRMAN ADAMS. Order of business No. 2—"Competition in Safety Work." This discussion was to have been led by Mr. Ralph C. Richards, who we all know is temporarily out of commission, and I am glad to say that it is not serious. In his stead I am going to call upon a gentleman who was a long time associated with him in the safety work on the Chicago and North Western Railway, a gentleman whom you all know well, and who was your regional supervisor of safety, and now secretary of the Chicago Local Safety Council—Mr. Harry J. Bell.

### COMPETITION IN SAFETY WORK

HARRY J. BELL, SECRETARY, CHICAGO LOCAL SAFETY COUNCIL, CHICAGO

Mr. Richards had made some inquiry about the matter of awards given in connection with competition in safety work. He took the matter up with 76 steam railroads, and out of those railroads 41 were against the plan of making awards; 32 were in favor of it, and 3 were doubtful, so that you see there is quite a divergence of opinion as to the propriety of making awards or not doing so. Personally I know that Mr. Richards is in favor of that plan. I, too, am in favor of it, because experience has taught me, as it doubtless has many of you, that competition is really the spice of almost everything. They say that there is a necessity for competition between railroads which was the reason that railroads were returned to private operation, and perhaps that is true.

Now a good many roads do make awards regularly. That is on some

yearly competitive basis such as a safety banner, a vacation period to the committee on the division of the road or in the shop of the road which makes the best record, etc. Just how much merit there is in those different plans, relatively, you are perhaps just as good a judge of as any one else. It seems to me the theme of what I would like to get before you is the necessity for competition from the standpoint of creating not interest but enthusiasm. Interest in this work, I am coming to believe more every day, isn't what we want—or rather it isn't enough. We must have enthusiasm. We can't go on in our safety work or in our safety committee meetings and do the same thing in the same way endlessly. We have got to change it. We must provide an incentive, and I don't know any better way to provide that than by competition of some kind, and when you have competition it is, of course, natural that an award of some kind be made. Just in passing I would like to say—because that remark makes me think of it—that the Northwestern for years has awarded a safety banner to the division of the road, to the shop of the road, and to the terminal of the road which makes the best record in accident prevention during the year. To the members of the committee on that division or in that shop or in that terminal that win the banner is awarded annual transportation on the system for themselves and families.

It seems to me that that plan is a very constructive one because it gives the men something very tangible to work for, and when there is tangibility about it, of course there is value from a great many standpoints. It seems to me that in thinking about this matter there is a great deal of value in what Mr. Samuel O. Dunn said to us this morning in that wonderful address of his, because of the fact that if we are going to create that interest not only in the men but in the officers of railroads in allowing and authorizing this work to go on as it should go on, as it must go on to succeed, then we have to provide some very definite incentive.

I venture to say that if railroads were to undertake an advertising campaign, and instead of advertising that they have steel cars and automatic signals and automatic stops perhaps, and things of that kind, they would advertise that their road is the safest railroad from the standpoint of prevention of accidents, not only to passengers but to every one who has contact with their property, they would mighty soon get action in accident prevention on the right basis, because then it would be regarded as a fundamental part of the business of every railroad.

I have often thought of the plan of each railroad of large mileage holding an annual safety congress of its own. We have seen that demonstrated during federal control of railroads in connection with accident prevention drives.

I remember going over to Indianapolis. I think it was, about two years ago to attend such a meeting which Mr. Dow held, when two or three members of the Safety Committee on the railroad were brought into Indianapolis to attend a big safety congress for the day. I am sure that a lot of value was obtained from that plan. It seems to me that a very constructive plan of developing competition in safety work should be one whereby each road would hold such an annual congress, and let go to

that annual congress the men on each of your safety committees, or the two or three men on each safety committee who really did the best work as safety committeemen. I think that is an opportunity and a privilege to attend that annual congress that any man would look forward to, and in that method you would develop the necessary competition that you must have in this work.

**AWARD SHOULD BE BASED ON UNUSUAL SERVICE**

I believe that in making any award for a competition of any kind, the award ought to be based not on usual, ordinary service, even though one man on a railroad does that service, but it ought to be for something strikingly unusual. I don't care whether it is for maintaining the safest tractor, for doing the best job of inspecting and repairing box cars, or what not, but it ought to be for something strikingly unusual, because when you make an award for a service which is only casual or incidental or customary, it destroys the incentive in the other men, because they appreciate that something is wrong with the method if a man can get that award without doing something unusual to accomplish the result.

Now, of course, it is well to say that a man, no matter what his job on a railroad, ought to be a safe man. He ought to follow safe practices and principles and things of that kind as a means of protecting himself, and therefore he shouldn't get any reward. But really the award for unusual service after all would be based on not what a man did for himself but on what he did for the other fellows in his department or his division or in his shop. People have said also: "Why make an award for so humanitarian a service as accident prevention service"—and that is all right theoretically, but when you get right down to brass tacks, Gentlemen, you have to look in the face of the fact that we are not getting the best results in accident prevention in many instances because we don't provide the incentive, and whether it is good business or bad business, whether it is proper or improper it seems to me doesn't count so much as the fact that what we are concerned in is the stopping of people being killed in industry, and we must go the most direct route to accomplish that result.

We had up here yesterday from Chicago some twenty high school boys, sent up here to get some enthusiasm out of attending this conference, and believe me, they got it. Those high school boys call themselves not optimists or pessimists but "peptomists". They have been made now so full of pep by reason of having attended this Congress that they are going to put pep into the entire high school aggregation in Chicago, in number some 40,000 boys and girls. Now that wasn't accomplished by our telling these boys about the fact that there was a big Annual Congress on up at Milwaukee with three or four thousand people in attendance, and safety parades, and the town decorated and all that. We brought them here to show them what it was like. Now we gave these fellows something to think about. We brought them up here and demonstrated what an annual congress is like, and because of it we not only have secured a lot of interest on the part of those boys before they came here, but we are going to have lots of it in the time to come.

I don't know of anything in connection with railroading that is going to replace so thoroughly the sometimes reported "lost morale" among railroad men as real accident prevention work. Mr. Dunn in a very wonderful way brought out that point this morning. Now we can't do this kind of safety work that Mr. Dunn and you and I and all of us know ought to be done without enthusiasm.

I don't know of anything that has ever been done in railroad service that developed so much interest and enthusiasm and co-operation in connection with the prevention of accidents as those national railroad accident prevention drives, and the similar "no-accident weeks" which were conducted before that time.

I just wanted to say, therefore, in closing that we must absolutely unequivocally develop on the part of the railroad men of America, not interest—we have that—but enthusiasm. We want lots of it. We want it on the part of the total working force, and I believe that the real method of getting that is by developing competition through awards of one kind or another, and the sooner that we do develop that competition and make our plan as variable as possible so that there will be no monotony, the better results we are going to get in conserving the lives and limbs of the railroad men of this country.

#### DISCUSSION

**CHAIRMAN ADAMS:** In the last national drive I think there were several regions that put up awards. I know of three—the Central Western Region, Northwestern Region, and the Southern Region, but in the Central Western Region the largest railroad that was competing in that drive and that won the first prize was the Union Pacific. We will hear from Mr. Groome of the Union Pacific.

**MR. GROOME:** When it was announced in the Central Western Region that the regional director was going to give three banners for the different groups of railroads that made the best record during that drive and the news was conveyed to the officers and employees of the different lines, I noticed almost immediately a keen competition among the different divisions, the different shops, the different classes of employees, and when we were almost certain that our railroad was leading in the group of railroads that had more than 5,000 employees—and this information was looked for with interest every 24 hours—I advised every officer of the railroad from the Federal manager down just where we stood. Now after it was announced by Mr. Adams that Mr. Holden was going to make this award of a banner, I think we went eight straight days without a reportable accident, which shows in itself that the men did take more interest when they found out that they were being compared, that they had a chance to win something that other railroads were in competition for.

I was constantly in receipt of telegrams and letters of inquiry for several days after the drive was over, wanting to know if we had won the drive, which demonstrated to me anyway that an award of some kind keeps up the interest in safety.

**CHAIRMAN ADAMS:** One of the lines that participated in the national accident prevention drive and won a banner was a road with less than 2,000 employees—the Chicago and Western Indiana—Mr. Walling.

**MR. WALLING:** Personally I have always been a little doubtful about this giving awards for work of this kind, so that when the plan was announced of giving a banner to the roads that made the best record in that no-accident drive, I was a little dubious as to just how it was going to work out. I will have to admit, however, that it did have a very stimulating effect upon the officers and employees of our particular line. We found—just as the gentleman from the Union Pacific has said—that there was a great deal more interest among our men after the notice was given that there would be a banner awarded to the successful road. We found that every day the officers and men along the line were anxious to find out how they stood and how their nearest competitor stood. So I believe that it is a good thing, as Mr. Bell has expressed, that we have interest, but we need more than interest, and that is enthusiasm.

**MR. WHITEMAN (Bessemer & Lake Erie):** I would like to hear from the people who didn't win the banner to see whether or not there was any letting down on the part of their men after they found out that they had lost. One of my friends told me that in putting competition on with his company, as soon as a man found out that the competition took in his line he became interested—they were going to offer a bonus of some kind to each conductor, for instance, who didn't have an accident—but as soon as a conductor did have an accident then he didn't care whether he had any more or not. I would like to know if these people who lost had that experience.

**CHAIRMAN ADAMS:** Mr. Whiteman, it is the chair's intention to put on the affirmative first and then give the negative an opportunity. I would like to call on Mr. Scott, who is in the Southern region and had a great deal to do with the silver cup that was given.

**MR. SCOTT:** I don't know what I can tell you about awards. We tried our best to get that cup but we didn't get it. I thoroughly believe that you should stimulate the employees, to do their best in competition of that sort. I am thoroughly convinced that the award system is all right.

**MR. GROOME:** On the Union Pacific system, we have instructions to report to the vice-president of operations on Saturday morning to discuss a plan for the purpose of going over safety banners to be awarded in connection with safety first activities on the system. Now we don't know exactly what this plan is that the president or vice-president has, but evidently they have some faith in the banners from the fact that I understand they are going to award one to the unit—the Oregon Short Line or the Union Pacific, etc.—that makes the best record in safety for some period—also, banners to the division on each one of those units that makes the best record, and perhaps the shops or terminals that make the best record.

**CHAIRMAN ADAMS:** Mr. McAndrews, the roadmaster on the Chicago and North Western, I understand, has some views along this subject.

**MR. P. J. McANDREWS:** I shall speak to you briefly from the viewpoint



of a man on the road among the men, as to the views of the men on these awards that are granted in competition in safety work. It has been my fortune to have been roadmaster on two divisions which during my period there won the banner, and as most of you know, the roadmaster should and usually does come in contact with more of the employees outside of the large terminals than perhaps any other subordinate official, and we do get the view-point of the men in matters of this kind.

I find that competition stimulates interest in the work. It makes the safety work more intensive, and that is evidenced in the work of the chairman as well as the various members of the committee in performing their duties. On the division which won the banner for the Chicago North-Western Railway, our chairman followed every case rapidly to a conclusion, and no reported case of unsafe practices or unsafe conditions was allowed to lay dormant for any length of time, and the result, we believe, was evidenced in that we made a great record on that division. I find that the members of the committees who have won these awards become very active safety men ever after. Of course, in the progression of membership we may be replaced on the committee, but we never lose interest.

I believe that the annual transportation award on the system to the members not only stimulates the member himself but arouses interest among the members of his family, and in the neighborhood, and has a far-reaching effect in that way. Mr. Bell told you that it was necessary not only to have interest but enthusiasm, and I believe, therefore, that the award of a banner and various other matters that go with it arouse this enthusiasm and keep up the interest until the Safety Committee members reach that state which we should all reach in time of having within our heart that feeling for safety which Mr. Dow told us of so eloquently on Tuesday afternoon, I believe, and which I believe every member of this Section has felt gradually coming to them from year to year as they attended the various sessions.

We are all far better safety men after some years of experience than in the beginning of the work, and I am a firm believer from my observations among trackmen, trainmen, enginemen, and stationmen of the results of these awards, that it does serve to stimulate interest and it does help to lead them along till they get to that stage where they don't need awards any longer and the real incentive then is the inner consciousness, the heartfelt desire to be good safety men.

CHAIRMAN ADAMS: Gentlemen, there is just one other that I should like to call on. The Panhandle and Santa Fe, a part of the big Santa Fe system, won the banner in the Central Western Region for making the best record—that was 100 per cent—of the smaller lines, and I would like to have you listen to Mr. Hale of the Santa Fe.

MR. HALE: I don't know what I can say except to reiterate what Mr. Groome has said and what has been said by a number of others here. I haven't always been a convert to this reward idea but I am getting around to where I am beginning to think it is a pretty good thing. I know in that particular field everybody was very proud of the fact that we won that conspicuous place. I took the banner out to Amarillo and made a formal presentation in behalf of Mr. Adams and Mr. Holden and gave

it to Mr. Parker, our Vice-President and General Manager. He brought the people in from all over the line. We followed this little formal ceremony with a dance in a large hall near-by.

I do not think we should bribe a man to get him interested in safe work, but rather offer something as a reward for faithful service.

**CHAIRMAN ADAMS:** Is there any other gentleman who would like to speak on this subject?

#### **REWARD SHOULD BE BASED ON ACCIDENT PREVENTION RECORD**

**MR. J. C. CLARK (Oregon Short Line):** As Mr. Groome just told you there is something of this nature coming up on the Union Pacific System and since I have had the information that we are to meet Saturday for the purpose of discussing this question, I have been turning over in my own mind some of the problems that will have to be met and it seems to me that there is only one object to be attained, that is to get the enthusiastic support of all the employees and officers. The question is how can this best be accomplished. We can make an incentive for each individual to do his best in safety work by offering an individual reward. About the only way that can be done, I believe, is by offering a reward of some nature for the individual who makes the most practical safety suggestion. That system has been followed on a certain railroad in the United States, not a member of this Council, however. My observation is that it has not worked very successfully, although the record of that line is exceptionally good in safety work. It seems to me, however, that the only logical way to award the banner is to base that reward on results to be obtained. In other words, it should be based on the accident prevention record rather than on the number of suggestions offered. In order to establish the reward on that basis, you have to take it away from the individual and it would have to be offered to the shop or the division or the unit of the system. Now, the question in my mind is which way are we going to get the best results. There is no doubt but what the individual who takes the greatest interest in safety should get recognition but how can you give a reward to the individual and still base your reward on the results to be obtained.

I should like to hear what the experience has been of roads that have tried different plans. Frankly, I am in doubt as to the best plan.

#### **B. & O. METHODS IN OFFERING PRIZES AND REWARDS**

**MR. BRONERICK:** I will try and answer Mr. Clark's question. We, the B. & O., firmly believe in offering prizes and rewards, if not done too frequently. As a matter of fact, we have already arranged for an accident campaign beginning October 18, which will run for thirty days. We shall put it on a competitive basis on the grounds that it will compare with the same period of last year, and we shall give a dinner to 100 men on the successful division. We divided that between our Eastern and Western lines. We also give a banner to the successful division. We also intend to offer twenty-five, fifteen, and ten dollars respectively for the three best articles submitted to our magazine on "Accident Prevention".

tion"; this contest is open to all employees of the railroad. The competition for the dinner and the banner, of course, is restricted to the divisions, and the division having the best showing, of course, is the successful one. We have found that to be very beneficial; as a matter of fact, we had a similar campaign last year. Our management did not deem it desirable to conduct it for less than thirty days because they didn't think the results could be shown in a less period.

MR. H. M. MAYO (Southern Pacific): The question was suggested some time ago on one of the roads as to the individual prizes for suggestions. I understood that when they put that into effect the result was that some of the committees were swamped with suggestions and ninety per cent of them were not of a practical nature.

On a certain railroad that operates this method, and has been operating it for some time, I made a comparison of its figures with mine and in spite of what they were doing with their rewards, the figures on my line were just seventy-six per cent better and we gave no rewards whatever.

I would like to ask if, when a reward is offered for a certain period, there is not a slump after the end of that period.

If we could establish a reward for service rendered based upon actual results covering a period of time when these results would really indicate something, cutting out rewards for individual suggestions but basing upon actuality, there might be something in it, but I question, pardon me for that, Mr. Broderick, whether the stimulation which will follow a campaign like yours would be permanent.

MR. BRODERICK: Last year after the National Safety drive was over we, on our own initiative, undertook to continue the campaign for thirty days longer and we made better showing than we did with the National drive.

MR. H. C. HUNTER (Union Pacific): In answer to Mr. Mayo, I just refer to the year's record in the Central Western Region; the standard of the roads during the National Drive was practically the same as over a twelve month period. I believe that our period should be longer, and those of you who were in Cleveland last year remember that I said I didn't like the short period of accident prevention, that if it was worth anything it was worth carrying on indefinitely.

MR. GRODZKI: During these accident drives the Union Pacific system was split into two regions. The Union Pacific proper was in the Central Western Region and got the banner and our own end was in the North and we got the other banner. During that time the General Manager came in one day and said to me, "Grodzki, I was out on the line this week and every place where my car stopped the trainmen, the brakemen, the switchmen, and everybody came running up to the car and asked, 'How do we stand today, Mr. O'Brien?'" Now, that in itself reflects that men are going to strive for a prize. It is in the blood of every American to try to excel and especially if something is offered. However, in addition to the banner I think we should give some recognition to the individuals that helped to make it a go and a success; like, for instance, Mr. Bell's suggestion a moment ago of giving annual transportation to the employees or the safety committeemen of that particular section that make this

bull's-eye. I think that is something that we should consider in addition to a banner. Moreover, I believe it is and will be of greater advantage to make this reward for a little longer period than thirty days, say make it ninety days or six months.

MR. E. S. CHAPIN (Pennsylvania Lines): Along the lines of the last speaker, I believe the competition would be better by having one set of prizes for this week or this month or this two weeks or this three months and when that prize is won, move on another prize and let somebody else get a crack at that, and then move on and let somebody else get it. The idea is always to have a prize up all the time and get as many people interested in that as you can.

CHAIRMAN ADAMS: I would just like to say one word on that subject myself. During the period of Federal control, the regional supervisors carried on just about as much competition as the individuals did, and Mr. Bell, who is located in Chicago, was a mighty smooth artist at that work. He tried to put one over on me in the National drive and he did put it over for a few days. He had Mr. Aishton agree to furnish two beautiful banners costing \$150 to the two highest roads. On the fourth day from the end of the drive I went to Mr. Holden of the Western Central Region and said, "Mr. Holden, this Northwestern bunch is slipping one over on us. They are giving two fine banners." He said, "Adams, we will give three and go one better." We did give three. One to a road of over 2,000 making the best record, one to a road under 2,000 making the best record and one for the terminal that made the best record. I wired some sixty odd safety men four days before the drive ended and that message must have stimulated everybody because the last three days of that two weeks were the best days that we had during the two weeks' period. We had less accidents those two weeks, so there must have been something that intensified those men.

I think to give a banner is an excellent idea and I believe it should be hung up as the results of the year, and the special campaign of one week would be one simply to spread the gospel and stimulate the work.

#### REWARDS NOT NECESSARY

MR. A. W. SMALLEN (Chicago, Milwaukee & St. Paul R. R.): In regard to the banner and various prizes that have been considered for distribution, I don't agree with you gentlemen that the reason you made such a wonderful record was on account of the banner. I don't think the banner had anything to do with that record at all. That record was made by the loyalty of the men to see their own railroads finish first. I believe they would have made the same record if you hadn't offered anything. The fact that they were in a contest to make a showing in the United States was an incentive for them to make a record.

Have we lost our knack of making the movement attractive? We have been in this business about nine years and it is just here lately that I am beginning to hear talk about giving prizes to committees. Personally, on our railroad I think that by paying the men for all the time they spend at the meeting and also allowing them all expenses that they contract by attending, is plenty of reward if they have the proper enthusiasm.

The banner might be all right for a short while but where you do it for a steady diet it isn't going to be long until it won't be attractive. It shouldn't be difficult to get the support of our men. On our railroad we don't have to do that and I don't believe there are many railroads in the United States that have any better records than we have. There may be a few smaller railroads in the United States that have a better record, but I am now speaking of the large railroads, and we have yet to hold out any inducement to our men other than being truthful to them and doing what is right and proper.

MR. S. BREADY (Pennsylvania Railway): During the accident drive on the Delaware Division of the Pennsylvania, and it is being continued with success now, it took the same period of the year before and divided the dates up into innings, arranging a bulletin in the form of a score board, and for every accident over three days, under that date appeared a zero. For every date in which they had no accidents, they put "1". They carried that out during the entire drive and added the total number for 1918 and 1919 showing which team won. They carried that out with considerable success. The men are very anxious to get to the bulletin board to see what the score is of this month compared with the same month the previous year.

CHAIRMAN ADAMS: We have two more subjects on the program. Is there anything further to say on this subject?

MR. CARROW: I move that we proceed to the next subject.

(The motion was seconded.)

CHAIRMAN ADAMS: I would like to read a message that we just received.

"Wabash representative should give good account of our activities past year. My inability to meet with the session on account of being in St. Mary's Hospital is a very keen disappointment as I had hoped to be present. Best wishes.

"F. Myers."

MR. CARROW: I move that the Chairman of this meeting be directed to communicate with Mr. Myers and convey our heartfelt sympathy on account of his indisposition and our regret at his inability to be here.

(The motion was seconded and carried.)

CHAIRMAN ADAMS: The next order of business is, "Duty of Safety Committee Members." This discussion is to be led by Mr. Marcus A. Dow, General Safety Agent, New York Central Lines.

## DUTY OF SAFETY COMMITTEE MEMBERS

MARCUS A. DOW, GENERAL SAFETY AGENT, NEW YORK CENTRAL LINES,  
NEW YORK

There is something I wanted to say about the last topic under discussion in regard to stimulation in safety work.

We haven't used the system of rewards that has been discussed here but it may interest you to know of a plan we tried out among our safety committee members which consisted in giving the members of all the committees a banquet at the largest city on the railroad. We gave one

on the Big Four at Indianapolis and one in New York on the New York Central Lines. On a certain date we brought every member to Indianapolis, the General Headquarters of the Big Four, and during the hour from nine o'clock in the morning until noon, the committees adjourned to rooms that had been set aside in the hotel to hold their regular monthly committee meetings. At twelve o'clock noon they adjourned to the banquet hall where we gave them a first-class spread. We secured some of the best artists and we gave them an hour of real fun and entertainment. Following that we spent the rest of the afternoon in a sort of safety conference, such as you are conducting here, the General Manager acting as toastmaster, and outside of myself the only other speaker on the program were representatives from each one of the employee organizations. The plan was so successful that we have repeated it on the Michigan Central Railroad and on the New York Central later. It elicited so much favorable comment that last year at the time of the National Railroad Accident Prevention drive we concluded to extend the plan similar so that all the employees and their families could have the benefit of it and so we started out with a series of twenty-nine safety rallies in each one of the large important cities on the system and we took along a singing cabaret and several vaudeville entertainers on the trip and we opened up these rallies with one of our first-class shows, just as good as they pay one dollar to see anywhere, and followed it up with one of our safety lessons including a lecture by myself and picture film and we found that that combination of giving the men a good entertainment followed by the safety lessons was certainly greatly appreciated.

The theaters we employed in all these twenty-nine cities were packed to capacity. We had to turn hundreds away and in some of the towns we were obliged to start the first performance at seven o'clock and hold a second one at nine to accommodate the crowds.

It was so successful that on November 6 I am starting out with the same sort of a vaudeville outfit and we are going over the entire system with another four weeks' tour, holding thirty safety rallies.

Last year I talked to 60,000 employees and their families during those four weeks and this year with additional towns and theaters we have engaged, we expect to reach at least 80,000.

#### DUTY OF SAFETY COMMITTEE MEMBERS

One of the first duties of a safety committeeman is to report unsafe conditions, but I don't think it is necessary for me to say very much about that feature of the safety committee man's work because the first thing that any safety committee man is going to think about is the correction of some unsafe condition that he has in mind which he thinks ought to be corrected.

I am taking for granted that you attend the meetings of your safety committees and help to inspire your safety committee men with your words of wisdom and your instructions as to the methods they should pursue in carrying on their work, so I am going simply to give you one or two illustrations of the way we endeavor to impress our own safety committee men with the thought of service to their fellowmen in con-

## **SAFETY CONGRESS**

nection with the correction of unsafe conditions. I think that the first thing to impress upon the committee members is that unsafe conditions must be reported promptly so that action or correction may be made before some one is injured, not waiting even for the meeting of the divisional safety committee, if it is a glaring hazard and where an accident is sure to happen to the first person to come along and come in contact with it. It doesn't do any particular good to lock the barn door after the horse is stolen, neither can you put a man's leg back after he has lost it, nor can you compensate for pain and suffering of a broken limb by simply fixing up the thing that caused it, and say, "Well, anyway no one else is going to get hurt there." Of course, I don't mean to say that it does no good to correct an unsafe condition after an accident happens—it is necessary to do that to prevent the recurrence of the accident—but you must impress upon the safety committee man from the very first instant of his appointment on the committee that he must lose no time to correct the unsafe conditions, that he must be alert and watch for those conditions and get them corrected before some one is hurt.

### **CORRECTION OF UNSAFE PRACTICES**

The second suggestion is regarding the correction of a specific unsafe practice in which the committee man may observe some of the employees indulging.

At a recent meeting of one of our committees a brakeman was called on and asked what he had done in the interest of safety aside from the correction of unsafe conditions that had been discussed at the meeting. He got up and he told this story: He said that he was down in the railroad yard a few days before and a drawhead was pulled out of a freight car and the conductor of the train wanted to couple that car back onto the train by means of chains, so he signaled the engineer to back up the rest of the train to this car. He didn't want to hit that crippled car too hard and perhaps kick it away a foot or two which would necessitate a second attempt and perhaps consume another minute's time, and so to save that minute's time this conductor went in between those cars just as they were about to come together, stooped down, took hold of the anglechuck on the end of the moving car, intending to turn it so as to stop the train just right without taking the risk of kicking the other car away, thereby running the risk of having his head crushed to a jelly. This brakeman said, "My heart stood still for a moment, then I jumped forward and grabbed him and pulled him out and said, 'Say, old pal, do you realize the risk you are taking of making your wife a widow and your children fatherless?'" The conductor thanked him and swore he never again would take such a chance.

Now, my friends, that is the sort of co-operation on the part of safety committee members that is needed to make the safety work a complete success. You must drive the thought into your safety committee members that the mere slogan "Safety First" counts for nothing unless they realize the full meaning of those words. They must realize that these two words, Safety First, stand for a principle and if they believe in that principle,

if they believe it is good, and if they believe it is better to be careful than crippled, if they believe it is better to eliminate the unsafe practices than it is to make widows and orphans and cause all the attending suffering and hardship and sorrows that accidental injury brings, if they believe in that, then they must rally to the support of that principle, not only by correcting the unsafe conditions, not only by being careful themselves, but by doing a constructive, co-operative, and everyday work in bringing their fellow employees to the support of that principle and that they can best do by talking, talking, talking safety in a forceful emphatic way to employees with whom they come in contact in their daily work.

#### HEART TO HEART SAFETY TALKS

The third proposition is along those same lines, not necessarily waiting until they observe a fellow employee indulging in some unsafe practice to talk to him. We have had a rule for some time in our safety committees requiring every member of a committee, after the rest of the business of the committee has been completed, to get up and give the names and addresses of at least two employees not members of the committee to whom they have given a heart-to-heart talk on the subject of safety since the last meeting. You would be surprised at the way in which that idea has developed among the safety committees on the New York Central Railroads. A short time ago the superintendent of one of the divisions, the chairman of the committee, wrote a letter to all the members of his safety committee and asked them if they would send to him a letter containing suggestions as to how the safety work on the division might be improved and the general tenor of the letters of every one of those safety committee members of the roads were along the same lines, to get after the unsafe practices. Now, a few years ago we would have been astounded if we had received any such bunch of letters from a safety committee, but every one of those members had that thought imbedded in his mind of talking safety to his fellow men, getting them to eliminate the unsafe practices. While the rules of our committees require that they furnish the names of two men to whom they have given these heart-to-heart talks, you would be surprised to know that there are some men who come in with a list of twenty-five or thirty names of men to whom they have talked along safety lines.

The other day I talked over in the general session and said something about creating an atmosphere of safety among the great rank and file of the workers, and it does seem to me that the great majority of accidents to railroad and industrial employees can only be prevented when all the employees and all the officers get together and create an atmosphere of safety, an atmosphere of carefulness, an atmosphere in which the germs of carelessness cannot live, and that is only going to be accomplished by the exercise of leadership on the part of those who have the privilege of leadership, that means the officers, the division officers, the higher officials, the superintendent, the foremen, and it also means the safety committee men because there, in my opinion, is where the safety committee man has the greatest opportunity to do real constructive work in safety, that



is by having the safety man, the superintendent, or whoever instructs him in his work when he starts out, to instill in him a spirit so he will go out and exercise real leadership in safety work.

#### **SAFETY WORK SPOILED BY WRONG METHOD OF APPROACH**

The safety committee man must, however, be very careful as to his methods of approach when he talks to his fellow employees on the subject of unsafe practices. A safety committee man may spoil his work entirely by a wrong method of approach. Let me tell you of one little instance illustrative of what I mean. In a certain yard near a roundhouse, an engine man, a member of the division safety committee, was walking along and he observed a depression near the lead track which he considered was a stumbling hazard and liable to cause injury. He saw a hostler working near-by and he addressed him, if I am able to repeat the language correctly, somewhat along these lines: "Hey, you redheaded-son-of-a-sea-cook, bring a shovel over here and fill up that hole; what do you mean by leaving a condition like that laying around here?" Mr. Hostler, who had a very human interior inside of his grimy exterior answered Mr. So-and-so in three choice familiar words. The engineer realized the mistake he made and went over and got the shovel himself and filled that hole and the hostler saw him do it and he felt very uneasy. About an hour afterwards he sheepishly walked up to this engineer who was in the vicinity and said, "I am sorry I didn't fill up that hole but I didn't realize that you were trying to prevent some one from getting hurt." There is just an instance where a wrong method of approach spoiled the intention of the safety man. The committee men I think should be impressed that in giving their talks it must be done in a friendly manner; there must be no wrangling nor spirit of antagonism in carrying out this work.

#### **CORRECT THE LITTLE THINGS AND REDUCE THE GREAT TOTAL**

Another point that I should like to mention is that the committee man must be impressed with the fact that his duties will consist very largely, if he is to be a successful committeeman, in the correction of little things. When a train is wrecked and a number of passengers or employees are killed in one of those deplorable accidents that occur now and then, we read about them in the newspapers under great glaring headlines and every one is appalled at the great sacrifice of life and limb that occurred in that accident; but I say to you, and you must convey to your safety committee members this same information, that the great majority of injuries to railroad employees do not occur in these so-called big accidents but they are in the single, solitary tragedies that occur day after day, almost hour after hour, with ceaseless regularity and from apparently trivial things that could have been corrected without any great effort on any one's part. A board left lying on the ground with a nail sticking up in it may seem a little matter hardly worthy of consideration, the committee man or any other employee may observe that condition and walk around it and not be injured; but another employee not so fortunate as

he may not see the nail and step on it and badly injure his foot. The part of a coupler left lying on the ground close to a track where it forms a stumbling hazard may appear to your newly appointed committeeman a trivial matter and hardly worthy of his attention because he is looking for bigger game, but suppose some employee should come along riding on a car, perhaps in the dark, alight from the car, and stumble over that obstruction, and fall sprawling under the wheels to be dragged out a helpless cripple, to be for all his days, if he lives, a burden to himself and to his family, a poor unfortunate wreck of a human being who has been wracked by pain and soured by the bitterness of his lot, and all because some thoughtless, careless fellow employee left material lying where he knew it should not be and did not take the time or did not think to remove it. Can that still be a little matter? No, indeed; we all know it would not, but that is the thing that you must impress upon your safety committee member that he must look after the little thing that will come to his attention and observation every day, because it is those little things that go to make up the great total of accidents among the railroad employees.

To sum up then, it seems to me that there are a few cardinal and important points that must be impressed upon the safety committee members as to their duties. First, that they must observe and correct the unsafe conditions; second, that they must report and take up for correction those conditions promptly and before some one gets injured; third, that they must watch for and correct the fellow employee whom they saw indulging in some specific unsafe act which their judgment tells them is liable to cause an injury; fourth, that they must help to create the atmosphere of safety among the great rank and file of the workers by their personal effort, by word of mouth, and then by force that will come from the faithful service of a heart; fifth, that they must remember that it is the little things that they can correct and thereby obtain the biggest results in the aggregate in their safety work.

Make your committee men feel that they had a very definite responsibility in the recent great war. The aeroplane scouts were the eyes of the earth. They were trained to scent danger and they were continually flying back and forth over the enemy lines and back areas watching for the slightest move on the part of the enemy that might send danger on to our troops, likewise is the safety committee member the eyes of the great army of railroad workers, and they, too, are trained to scent danger and they must be trained to be ever alert, quick to observe the danger, whether it be an unsafe condition or an unsafe practice, and get after it and correct it before a fellow employee is seriously injured or killed.

#### DISCUSSION

MR. J. A. McNALLY (Wabash Railroad): Mr. Dow remarked that he was in the habit of having his committee men name the men to whom they had talked during the period from one meeting to another, which I think is very good. We have been following the custom of having our

committee men tell the number of men they talked to but I believe to give the names of the men to whom they talk is better. It is a whole lot like the minister that took up his duties in the congregation that was new to him and his first meeting with them was a mass meeting. He said, "I hardly know whom to talk to and what to talk about, but I am going to ask one question. I want every man in the audience to stand up who has read the 17th chapter of St. Mark." About twelve men stood up. He called them all up around the platform in front of him and said, "I have found out to whom I must talk. You men are the men to whom I will have to talk, because there is no 17th chapter of St. Mark." (Laughter) That is the idea in the safety movement; we want to know whom we are talking to. Is it necessary to talk to the same man continuously or is it necessary to get off that fellow and get onto somebody who needs it?

Here is another incident that happened and there is a man in this hall who will vouch for this. He saw a man shoving a drawbar over with his foot. He ran up to him and jerked him back and said, "Here, that is wrong. shove that bar over with your head."

"Why with my head?", he said.

"Well, use your head for something."

MR. CHARLES JEHLIK (Chicago & North Western): I don't approve of sending a letter to the dangerous man working in the shop. That isn't my motto. My motto is to get right after the man and say, "Here, you are dangerous and you have to do better." Use your diplomacy with this man according to his ability. There is a way to do these things.

I have gotten good results in handling men in the shop. When a new man is hired (and I don't have to be told he is a new man. I keep my eyes open and I can tell he is a new man just the same as anybody could tell I was a stranger in a new part of the country.) I go up to this man and tell him that we want safety first, that I am a safety committee man and the chairman of the investigating committee and I want him to do all he can to help Jehlik get the banner for the Chicago and North Western. Then I say, "Will you do it?" He can't help but say, "Yes". If he says, "No". I will take a committee of three men over there and get him in a corner for about five or ten minutes and we will tell him he has got to, and if he doesn't consent to that, we will report to the superintendent and he will give him the rest and I think he will make a man of him. I think that is the best cure for a new man, a green man that comes into the shop. I don't believe in writing letters to a man when he is in a shop; by the time you write that letter and he gets it, that man may kill a dozen or two. Tell him right there.

If I go down to a terminal depot and see something down there that isn't safe, I will look up somebody that will make it safe. Your place as safety committee man is not only in the position you hold; you can take it home with you; you can give it to your next door neighbor; you can give it to your president or your minister, or bolsheviks or anarchists.

MR. HALE: We have only a minute or two but I really feel it would be a very great misfortune and personal loss to you if you got out of here without having one of my colleagues, Mr. Andy Murphy, Yard Track

Foreman, Kansas City, tell you in two or three minutes why he is a good safety committee member.

Until he sent in his resignation a short time ago he was Vice-President of the National Maintenance Association.

MR. ANDREW MURPHY: I have heard a great deal of talk on safety plans since I have been up here and I am going to say that I have learned a lot. It has been a school of instruction for me.

I want to say something in regard to the prize business as discussed here today. Any man who is a good American citizen and has got the future of the rising generation in his heart ought not to need a prize to make him a safety first man, and ought not to need a prize to make him active in our work. When I find anything that I think isn't safe for my fellow man, I don't wait to go and ask somebody else to fix it, but I do it myself. There is a safety committee meeting every month; I don't have a little book with a little writing and say, "I saw a hole around here and it ought to have been filled up." When Murphy sees a hole, he goes and fills it up.

Our friend Hale came down through our country and you know wherever he goes he always gets the people on his side. He made a great talk on safety, as he always does, and he not only got the Santa Fe employees interested but he got everybody interested, the women, and the children too.

The safety first movement right now is education. The safety first movement will be taught at the family altar, where it ought to be taught; it will be taught in the public schools and it will be taught in the churches. Heretofore, the minister, or the priest, if it may be, laid down the plan whereby you might save your souls, but the safety first movement lays down the plans whereby you may save your body and your soul.

CHAIRMAN ADAMS: If there is nothing more to come before this round table meeting, we will adjourn until nine o'clock tomorrow morning.

ADJOURNMENT.

---

## FRIDAY MORNING SESSION

CHAIRMAN SCOTT: The first number on the program this morning is, "Maintenance of Way and Motor Car Accidents," to be presented by Mr. Arthur Ridgway.

## MAINTENANCE OF WAY AND MOTOR CAR ACCIDENTS

ARTHUR RIDGWAY, ASSISTANT CHIEF ENGINEER AND SAFETY OFFICER,  
DENVER AND RIO GRANDE RAILROAD, DENVER, COLO.

Because of the general character of that class of men which furnishes most of our track labor, and because of the particular kind of work demanded of such men, a high probability of accident among maintenance of way forces is apparently a perfectly natural assumption. These men have no particular vocation, for the wages offered are usually unattractive

to individuals who have made a specialty of any kind of work. Isolation attendant upon the necessity for their distribution along the line of railroad and away from the centers of population contributes very materially toward limiting the available supply to a class of persons who are forced to accept any kind of employment as a last resort in eking out a bare livelihood. The class of men from which maintenance of way forces are necessarily recruited is no less influential in an assumption of high probability of accident among them than a consideration of the character of work which they perform. The materials handled are ponderous, bulky, and exceedingly rough and coarse on the exterior. The hand tools manipulated are necessarily heavy and permit of little latitude of design for convenience and facility of the workman. Moreover, of such kind is the work as to prohibit to a marked degree the use of mechanical devices of a sort to conserve animate energy.

Relatively high probability of accident among these workmen is, however, not a fact and such an assumption is decidedly erroneous, for reliable figures show conclusively that the per cent injured among maintenance of way forces is considerably lower than among railway employees as a whole. For example, a record of two years shows an average of 26 per cent less injuries per one hundred men employed in this department than the average of all the railroad forces combined. Again, the same two-year period shows that in the maintenance of way forces there were 62 per cent less injuries per one hundred men employed, or less than half as many as among all the other so-called unskilled railroad laborers. While this statement is not indicative of the relative immunity from injury of railway maintenance of way forces as compared with other industrial pursuits, it does show that in so far as railway employees as a whole are involved, the maintenance of way men, contrary to expectations, is decidedly less likely to be injured than the average railroad worker.

#### MOTOR CAR ACCIDENTS

To be of any practical value, an analysis of the subject under discussion would seem to demand a segregation of motor car accidents from other kinds in the maintenance of way department. Comparing the two general classes we find that motor car accidents comprise about 14 per cent of the total, and all others, therefore, about 86 per cent. The motor car accidents may be conveniently grouped into four typical classes and their respective frequency compared thus:

|                                 |             |
|---------------------------------|-------------|
| Collisions with trains.....     | 37 per cent |
| Men falling off cars.....       | 32 per cent |
| Derailments .....               | 26 per cent |
| Collisions with other cars..... | 5 per cent  |

An analysis of these four groups leads to the assignment of primary contributory causes as follows:

Collisions with trains—Speed and carelessness

Men falling off cars—Speed, carelessness, and limitation in design of cars

Derailments—Speed, carelessness, and limitation in design of cars

Collisions with other motor cars—Speed

There are thus shown to be three principal contributing factors of which one, speed, is common to all four groups. Perhaps excessive speed in the use of cars can be very largely, if not entirely, attributed to that human instinct common to all mankind which may be described as an almost uncontrollable passion to utilize to the utmost all power and authority vested in the individual. For instance, if a man is given the power of propulsion to travel without inconvenience thirty miles an hour, he will never move at less velocity. The case of the automobile is an illustrious example.

As to the limitations in the design of cars, much may be said. Lightness is the first requisite, for to be of any use at all workmen's cars must be so limited in weight as to be easily handled on and off the track by the number of men they are designed to carry. On the other hand, this very limitation in weight militates against immunity from derailment since many derailments may be ascribed to light weight as a contributing cause. Again, limitation in weight is inseparable from restricted dimensions which necessarily curtail seating and tool carrying capacity both in magnitude and distribution throughout the space available therefor. In fulfilling the fundamental essentials, the designer is also handicapped in properly disposing of the matter of hand holds and grabirons, while provisions for the various forms of tools, separate and apart from their weight, is indeed a serious study. Moreover, the adoption of either the direct or indirect method of drive carries with it a sacrifice of some of the advantage of the other.

The carelessness factor in most motor car accidents is manifested in disorderly seating of men, hasty and thoughtless loading of tools, inattention to car and contents while under way, and wanton disregard of the danger of imperfect flag protection.

#### OTHER MAINTENANCE OF WAY ACCIDENTS

Turning now to a consideration of other maintenance of way accidents in distinction from those attendant upon the use of motor cars, we find the most frequently recurring accidents listed in their order of frequency to be as follows: Struck by flying objects; use of tools not defective; eye injuries; struck by falling objects; use of tools in hands of others.

Among the flying objects which carry destruction in their path may be mentioned spikes not firmly started before a full swing blow of the maul is delivered, nuts cut off track bolts with a chisel or knocked off with a maul, and articles thrown or falling off passing trains.

The unskilled use of non-defective tools such as picks, claw bars, shovels, adzes, and track jacks contributes a very large share of resultant injuries.

Eye injuries originate largely from mushroomed chisel heads, improperly tempered cutting edges, dust and metal scale.

Many of the injuries resulting from falling objects are incurred during the loading, unloading, or otherwise handling materials of one sort or another.

The erratic swinging of picks and mauls and the careless manipulation

of shovels are responsible for a very considerable number of injuries inflicted by tools in the hands of others.

Of all the injuries suffered by maintenance of way employees, more than one-third—35.6 per cent to be exact—are to be found in injured hands and feet, in the proportion of about two in the hands to each one in the feet. A most prolific source of injury to the fingers is in the use of the claw bar when pulling inside spikes. Perhaps the claw is worn and the foreman hasn't taken the trouble or had time to send the bar in for reforming; or perhaps the workman doesn't use care in getting a good bite on the spike; or perchance the spike head is snapped off, but whatever the reason, a wild hard pull often sends the handle end of the bar crashing down on the opposite rail with only a human finger to absorb the impact. Another deep-rooted origin of injury to the hands is to be observed in the many slivers, jagged edges and rough surfaces with which maintenance of way materials abound. Again, maintenance of way materials are of necessity weighty and large in size. Stored in piles or nested in transportation they present no opportunity for a hand hold. The slightest opening between units serves as an invitation to a workman to thrust in his hand and the outcome is often a crushed finger.

Occasionally a man cuts his foot with an adze or strikes it a glancing blow with a maul, but by far the majority of foot injuries occur through the dropping of some heavy object on the toes. Very often this is the result of some spontaneous action of one or more of his co-workers without advance warning. In the handling of railroad materials, the units of which require the combined effort of two or more men, lack of unity of action or movement is almost sure to result in some sort of accident.

#### REMEDIES

A conclusion without a discussion of remedies would be reprehensible. The only absolute cure for excessive speed in the use of motor cars is to render high speed impossible in the design of cars, and notwithstanding the disadvantage of limiting the speed of all cars to a predetermined rate, safety interests apparently demand such limitation.

Through co-operation with manufacturers of cars in the details of design will accomplish much toward a universally satisfactory type of car, and it will surely open a way for a judicious choice of the lesser of any two evils of design.

There is but one wholly effective remedy for curing the most pernicious practice of moving motor cars without flag protection, and that is to require such movements to be conducted under the standard train order system. We are forced to the conclusion, however, that because of the delicate questions involved, this plan is impossible of adoption and that there remains the only alternative of enforcing a rigid requirement of adequate flag protection. To accomplish the desired results, this requirement must be exacted under the most stringent discipline and even trivial violations thereof subjected to extremely careful scrutiny. Perhaps there is no more effective means to the end sought than in justifying these severe disciplinary measures by emphasizing without stint the constantly impending danger involved in unprotected car movement. The unsys-

tematic loading of men and tools, primarily due to simple thoughtlessness, can generally be eliminated by patient and specific admonition.

The most potent instrument in combating the persistent menace of other maintenance of way accidents is available in the form of a prudently administered campaign of education; in fact it is about the only recourse. There is in this suggestion no intended implication that these men of brawn are necessarily of inferior mentality, for no one human is superior to any other outside their respective spheres of mental activity. It means simply that thus far no educational opportunities have been available. Briefly stated, they have never been told. Herein lies the golden opportunity, for first teachings are always lasting in developing character-forming habits. It may be that verbal dissemination of information through personal contact between officer and men seems the proper course to adopt, or it may be considered advisable to use the medium of the printing press, but whatever plan is adopted, the whole propaganda must be administered in homeopathic doses so to speak. Any complete set of rules and regulations, or even any compendium of advice, if at all comprehensive, would appear so formidable as to be repugnant to the men and thus defeat the very purpose of the promulgation. Nor can the ultimate end be accomplished at one fell swoop. Education, like the formation of character, is a process of evolution and involves the element of time in its assimilation. No astonishingly precipitate results, therefore, should be expected, but rather should commensurate returns be looked for only after months or years of effort. The essence of the safety work consists in the meeting on common ground of the teacher and the taught. Any other attitude is sure to be productive of a failure worse in its effect than entire absence of interest. Success is assured only to the extent that patience, forbearance, and kindness pervade all activity in this direction.

Finally, the "tide in the affairs of men" is at flood. Education in safety matters opens the door for the promulgation of "Americanism", for the development of good citizenship, and for service in humanity's cause.

#### DISCUSSION

CHAIRMAN SCOTT: You have heard this very valuable paper from Mr. Ridgway, and he must be an authority on this subject, or he could not have presented it to us in the manner in which he has done.

I am going to take the privilege of undertaking to direct this discussion so that we can get as much out of it as we possibly can. We are all here to get ideas. We can go back home full of enthusiasm and inspiration, but we must have ideas to put this thing over.

We have heard this paper of Mr. Ridgway's on "Maintenance of Way and Motor Car Accidents." He tells us that fourteen per cent of the accidents are attributable to causes of that sort. Now, let's see if we can't get something out of this paper and take it back home and cut down the fourteen per cent.

#### SAFE SPEED FOR MOTOR CARS

Let us take up first the subject of speed. Mr. Ridgway has told us that we must co-operate with the manufacturers to see if the speed of



these cars cannot be reduced, because if they are geared up to sixty miles an hour the man who is operating the machine is going to run it sixty miles.

Now, let's have a full and free discussion. If any man in this room has a thought or idea that he can give us let's have it.

MR. E. S. CHAPIN (Pennsylvania Lines): Whatever you decide here that you would like to have incorporated into your engines or motor cars, I should be glad to place it before the Engineering Section. That is the kind of work the Engineering Section is looking for.

MR. W. A. YOUNG (Oregon Short Line): I note in the remarks that a great many accidents are due to falling off of motor cars. We on the Oregon Short Line have adopted the safety hand rail which I am sure will be a great benefit to all employees. I think as a means of safety it ought to be universal throughout the United States that the safety rail be put on motor cars.

MR. McNALLY: I have had considerable experience for the last sixty days with motor cars, in view of the fact that I have gone over almost the entire Wabash system, and I find a good many of our accidents are due to speed, and that is a good thing for the Engineering Department to consider.

These grabirons on the motor cars are a very good thing and we are equipping them now as fast as we can. The only serious accident we have had this year was the death of one of our section men. Unfortunately, this car was the only one on the division between Kansas City and St. Louis that did not have the grabirons on it.

We have on the back end of the car a little slot to put the toe of the jack in to keep it from falling off. We also put a tool box on the side of the car. I don't know how many of you men will approve of that but we have found it has done away with tools falling off and derailing the car. The box is not quite as long as the car, it reaches about half-way over each wheel. That gives you a chance to carry all your tools on the outside of your car and gives plenty of room for the men to ride.

Another thing, it is necessary to educate men on flagging. We had an engineer turn in a card and letters all in view of the fact that he got a flag that caused him to go off the track where they had a rail up. This man stood on the track with a red flag in his hand, with no stick on it, waving it like this when he could see the engineer in the white of his eye. His body acted as a background and the engineer couldn't see anything until he was right on him and the consequence was he went around the curve and went off. Fortunately, no one was injured.

We had another complaint from an engineer where a section man had given him the high ball with his red flag. We asked this foreman if they instructed their men how to flag when they sent them out. "Sure, we always send out an old man," he said. I said, "If you are in the least doubt as to whether these men know how to flag, have them go down the track and show you what they are going to do when a train comes down the track." It is necessary for these men to have a flag on a stick at all times, also torpedoes, and they should give an engineer the full benefit of the flag clear across the track.

MR. W. J. ORR (Toronto, Hamilton and Buffalo): All our men are supplied with first-aid boxes and I instruct them in safety and first aid before I place the box with them and they are supposed to carry those boxes on the cars.

CHAIRMAN SCOTT: I should like to get some information for the benefit of myself and others here with reference to the rate of speed that is permitted under the rules of some of the larger systems represented here this morning.

MR. TABERT (Chicago & North Western): We, on the North Western, have a rate not to exceed twelve miles per hour.

MR. ADAMS: If you recall, last year we took up practically a half day in discussing the speed of motor cars. It was a subject in which much interest was manifested and there was finally a resolution put through that the Steam Railroad Section, or the Executive Officers of the National Safety Council would handle this some way with the manufacturers restricting the gear to a speed of fifteen miles an hour. It occurs to me that something should have come from that action. Now, if we are to meet annually and discuss the same subject over and over and then not put it to a final conclusion, it seems to me it is "love's labor lost."

MR. RIDGWAY: I should like to ask the gentleman from the North Western how he restricts the speed to twelve miles per hour?

MR. TABERT: We have our cars adjusted that way.

MR. W. E. DEBLER (Union Pacific): We have a speed limit of twenty miles per hour where the track is not obstructed in any way from the view of the operator, and as far as accidents are concerned on our railroad, a very small percentage are due to excessive speed. I don't believe that motor cars should be turned out by a manufacturer that will only produce fifteen miles per hour. There are times with a speed of twenty miles per hour you can get away from a train or some accident which would occur if you did not have the speed. As far as motor cars are concerned at the present time, I don't think that they are able to go much over thirty or thirty-five miles per hour with a gang. They will do that light, but with a gang their horse power is very limited, and I would suggest that the matter of speed be discussed along that line.

#### SERIOUS MOTOR CAR ACCIDENT

MR. A. V. ROHWEDER (Duluth, Missabe & Northern): The matter of speed on motor cars out in our territory has been discussed several times. We had perhaps one of the most serious motor car accidents, in fact two of them, this year in which five of our employees were killed on one road and it wasn't due to speed.

The gentleman that just spoke brought out a point that I think ought to be considered. Out in the Western country where you have long fills and hard places to take a car off and you are ahead of a train, if you can get twenty-five or thirty miles an hour out of a car you perhaps can get to a place where you can take the car off conveniently, especially where you have only two, and in some cases only one man on the car, due to the shortage of help.

Another thing, you will find if you gear a car down the fellows can change the speed readily when they get next to it.

Undoubtedly, it will be of some value to give you briefly an account of the accident in which we had four employees killed and eleven people injured. It occurred in this way: On July 26, Sunday night, there were two motor cars on our line and the portion of the line on which the accident happened is single track. One bunch of the fellows had been up to a ball game, a distance of about thirty-five miles, and they were coming home. It was a clear moonlight night and they were going at a pretty fair rate of speed. The other bunch was a bridge gang who had been over on the main line repairing a bridge and were returning to their terminal. About 10:30 or 11:00 o'clock they came together head-on in a cut. It was found that the accident was due to two causes. Neither car had a light on it, and there is a rule prohibiting the use of motor cars for any other than company business by employees.

We had always expected every man in the section gang, or any one else operating a motor car, to use a hand lantern, and we found upon investigation after the accident that in a large number of cases that lantern would go out, due to the vibration of the car. We are now equipping all motor cars with a presto light tank, the same as on the old original Ford, with a red light to the rear and a white light to the head end. We found that that was the only practical way in which we could be assured of a light on those cars. We have also put on a metal flagging equipment case containing torpedoes and a flag.

CHAIRMAN SCOTT: We all know that resolutions are fine things, but we want to know if there is any railroad represented here that has by educational methods or mechanical devices been able to limit the speed at which the motor cars are being operated on his railroad.

MR. JOSEPH T. PRATT (Reading System): All cars purchased by the Reading do not exceed a speed of twenty miles an hour.

MR. R. L. FILLING (Louisville & Nashville): The L. & N. runs fifteen miles an hour. It is an educational feature. They educate the men in that line and have issued instructions to all section men having charge of motor cars. I don't think it is advisable to change the speed on any car, any more than it is to remove the whistle from an engine to keep the engineer from whistling whippoorwill.

MR. CHAPIN: May I ask whether any of the cars are equipped with anything like a speedometer so if the men are told to keep fifteen miles an hour they would know they are at that speed?

MR. T. R. McCAMPBELL (Cleveland, C. C. & St. L.): I think the problem of speed on motor cars is pretty much a matter of education. Now, the M. and W. Department of our railroad regulates the speed of motor cars to twenty-five miles an hour through the rural regions and ten miles an hour through cities and towns and that speed must prevail at highway crossings where the view is not absolutely good. Our superintendents have asked their safety committee men especially on motor car accidents, to report specific violation of speed rules. I believe that is the only solution for the regulation of speed of motor cars. We have grades on our railroad, and I presume other lines have also, where we maintain as low

a speed as twelve miles per hour. It would be a difficult problem for the motor car to reach the top of the grade when only running ten miles an hour at the bottom unless it had a powerful engine.

Some one suggested having a speedometer. We who are old in train service know what we used to do with speedometers and recorders. You can always adjust those things. The man who works with those things soon becomes as familiar with them as the man who manufactures them. I believe the solution is through education.

CHAIRMAN SCOTT: Is there any one here who has anything to say in a general way on this motor car question?

MR. CARROW: I should like to ask, Mr. Ridgway, what effect the safety movement has had on you and what effect you predict it will have on officials of railroads in respect to making them appreciate the importance of paying attention to the details which heretofore, I believe, are generally considered to have been overlooked by those high in authority.

MR. RIDGWAY: Since I have been placed in charge of safety work on our line, there have been thousands of little things of a dangerous nature that have come into my mind that never were thought of before. The same is true of the men. They see a multitude of little things that they never saw before.

MR. CARROW: I want to ask one more question. Do you feel that the time that you devote, or the time that any other officers devote is of sufficient importance to counteract or overbalance the good that is derived from any attention that they might pay to safety work?

MR. RIDGWAY: I can answer that in just one word: Infinitely.

CHAIRMAN SCOTT: It seems to me that we have all profited by this discussion and by the presentation of Mr. Ridgway's paper, and unless there is something further to come before the meeting in connection with it, I should like to know the pleasure of this body with reference to this particular paper.

#### SEASONABLE EMPLOYMENT SHOULD BE DISCONTINUED

MR. P. J. McANDREWS (Chicago & North Western): There is just one little thought that occurred to me in connection with this address by Mr. Ridgway. We have heard a great deal about the old man getting injured and the new man taking his place, leaving a hazard for the rest of the employees. One thing has been carried out in the maintenance of way work that brings about this very result without the men getting injured and that is seasonable employment. In the Road Masters' Association, of which I happen to be an officer, we have been for a number of years recommending that seasonable employment be discontinued wherever possible to do so and it can be done on a large percentage of the lines of the United States. The old practice of the general manager coming down the first frosty morning and laying off all the section men and compelling that section foreman to employ a new crew next year ought to be stopped, because that gives us new men every spring and increases the number of accidents because it has produced a whole lot of inefficiency. Get your men working the year 'round.

**MR. RIDGWAY:** I want to say amen to all that Mr. McAndrews has said. Perhaps one of the most able addresses ever given before the Steam Railroad Section was that of yesterday by Mr. Dunn of the "Railway Age." Mr. Dunn is an enthusiastic advocate of continuous employment.

I want to corroborate what Mr. McAndrews has said to this extent: That there is no one thing that we can do that will reduce accidents in the Maintenance of Way Department more than by giving continuous employment to these men who do our hard labor.

I believe that the influence of this Steam Railroad Section would be felt very materially by the management and by the executives of railways if we could in some way express our opinion to the effect that one of the most efficient ways of reducing injuries of maintenance of way employees would be in continuous employment.

**MR. BROPHY (Union Pacific):** I agree that education is a prevention of accidents, and in regard to the speed of motor cars, I am not in favor of the manufacturer turning out a motor car for us with a limit of speed, as I believe that our section foremen and all our supervising officers understand what safety means in regard to speed. Another question in the operation of motor cars and that is the movement of a car on a double track while a train is passing. All our cars stop and the men get off while a train passes to avoid anything falling from the train and striking them if they were on the car. I have spent a good deal of time on motor cars. I suppose that I covered not less than 500 miles a month and I find that the men out on the track operating cars are operating at a safe speed and under flag protection. That is education.

Speaking about new men coming on and not understanding the methods, every foreman of the bridge and building department on our division has instructions to explain to the new men the first morning they come to work the dangers that they might encounter by unsafe practices in the operation of motor cars or any other tool that they might use, and it is education and confidence of the men in safety operation on your railroad that gets results.

(It was voted that Mr. Ridgway's report be accepted and placed in the Proceedings, with a vote of thanks.)

**CHAIRMAN SCOTT:** I am going to ask our new presiding officer, Mr. Carrow, to take the Chair.

(Mr. Carrow took the Chair.)

**CHAIRMAN CARROW:** It affords me great pleasure to introduce to you Mr. W. P. Borland who will now address you.

**MR. W. P. BORLAND (Chief of Bureau of Safety, Interstate Commerce Commission, Washington, D. C.):** I feel it a great honor and a pleasure to be permitted to address you today upon the safety work of the Interstate Commerce Commission, because it gives me an opportunity to clear up some misapprehensions about the scope and purpose of the safety work of the Interstate Commerce Commission.

The Bureau of Safety of the Interstate Commerce Commission is concerned with the enforcement of law. The scope of its work goes to the proper administration of those laws. Outside of that field it has no duty to perform and just the moment it gets outside of that field it is liable

to get its fingers burned, so we keep clear. We continually get complaints about safety conditions of all descriptions existing upon all railroads of this country over which we have absolutely no jurisdiction. We can do nothing with them whatever because when we get through enforcing our laws, we are done; and the minute we attempt to do something which the law does not empower us to do, why we are liable to get in bad. The only thing we can do when we get these complaints about safety matters, unsafe conditions rather which exist, that come outside of our jurisdiction, is to refer the parties making those complaints to the safety organizations of the various railroads and we hope they will take care of them.

## **SAFETY WORK OF THE INTERSTATE COMMERCE COMMISSION**

**W. P. BORLAND, CHIEF, BUREAU OF SAFETY  
INTERSTATE COMMERCE COMMISSION, WASHINGTON, D. C.**

There are two bureaus of the Interstate Commerce Commission which are directly and primarily concerned with the question of safety in railroad operation, namely, the Bureau of Safety and the Bureau of Locomotive Inspection. The activities of the Bureau of Safety are divided into four sections:

1. Enforcement of the safety appliance law
2. Enforcement of the hours of service law
3. Investigation of accidents
4. Investigation of block signals, automatic train stops, and other safety devices

As its name implies, the Bureau of Locomotive Inspection is charged with the administration of the locomotive inspection law.

### **THE BUREAU OF SAFETY**

The organization of the Bureau of Safety includes fifty-four inspectors; forty-two of them are safety appliance inspectors, ten are hours of service inspectors, and two inspectors whose principal duties are the investigation of signals which have been involved in accidents and of safety devices of various forms which are presented to the Commission for consideration. The services of all these inspectors are utilized for the investigation of railroad accidents, and for other special investigations as required.

### **THE SAFETY APPLIANCE LAW**

The original safety appliance act was passed in 1893 and was amended by subsequent acts in 1896, 1903, and 1910; and under a provision of the act of 1910 the Commission in 1911 issued an order prescribing standards for safety appliance equipment, which standards became fully effective March 1, 1920. The federal requirements for safety appliance equipment on cars and locomotives now cover practically all appliances

which are used by train service employees in making up and operating trains, including power brakes, hand brakes, automatic couplers, grab-irons, handholds, hand rails, ladders, sill steps, running boards, foot-boards, and similar devices as applied to cars and locomotives of different types, the number, dimensions, location, and manner of application of these appliances being specified.

The safety appliance inspectors are assigned to certain prescribed territory; for this purpose the United States is divided into twenty inspection groups and two inspectors are assigned to each group; two of the inspectors are not permanently assigned to any territory but are detailed for services where conditions may require special attention. These men make regular inspection of equipment, the results of which are tabulated and also promptly furnished to each railroad company on whose lines the inspections have been made in order that an accurate check may be had upon safety appliance conditions on each line and if necessary corrective measures may be taken. In cases where the requirements of the law are being flagrantly disregarded, the inspectors secure evidence of violations of the law, upon the basis of which prosecutions are instituted in the federal courts.

In this manner there are inspected annually approximately one million freight cars, and twenty-five or thirty thousand each of passenger cars and locomotives. The following tabulation summarizes the results of this inspection work for the past six fiscal years.

|                 | 1915      | 1916    | 1917      | 1918      | 1919      | 1920    |
|-----------------|-----------|---------|-----------|-----------|-----------|---------|
| Freight cars:   |           |         |           |           |           |         |
| Inspected       | 1,000,210 | 908,566 | 1,100,104 | 1,059,913 | 1,023,942 | 864,775 |
| Defective       | 47,754    | 33,715  | 40,123    | 41,563    | 37,893    | 39,698  |
| Pct. defective  | 4.77      | 3.72    | 3.64      | 3.92      | 3.70      | 4.59    |
| Passenger cars: |           |         |           |           |           |         |
| Inspected       | 33,427    | 27,220  | 29,456    | 25,732    | 23,712    | 19,849  |
| Defective       | 954       | 496     | 252       | 145       | 92        | 153     |
| Pct. defective  | 2.85      | 1.82    | .85       | .56       | .39       | .77     |
| Locomotives:    |           |         |           |           |           |         |
| Inspected       | 38,784    | 31,721  | 37,199    | 33,806    | 30,707    | 23,883  |
| Defective       | 1,575     | 1,161   | 1,003     | 740       | 566       | 570     |
| Pct. defective  | 4.06      | 3.66    | 2.69      | 2.18      | 1.84      | 2.38    |

The express purpose of this legislation is to promote the safety of travelers and employees on railroads, and with respect to employees this purpose is accomplished by establishing proper standards for safety appliances, providing uniformity in this equipment and requiring it to be properly maintained. While it is impossible accurately to tabulate the beneficent results of this legislation, it cannot be doubted that there are thousands of men now actively engaged in useful railroad service who would have been maimed or killed if this law had not been enacted and properly administered. A reference to accident statistics, particularly coupling accidents, is illuminating, as shown by the following tabula-

tion covering the years 1893, when the original law was passed, 1900 when the original law became effective, and 1918, the last year for which statistics are available:

|                                                     | 1893      | 1900      | 1918 <sup>1</sup>        |
|-----------------------------------------------------|-----------|-----------|--------------------------|
| Number of trainmen employed                         | 179,636   | 191,198   | 226,936 <sup>2</sup>     |
| Total casualties to trainmen                        | 20,044    | 18,967    | 44,550                   |
| Total coupling casualties                           | 9,063     | 3,991     | 2,972                    |
| Percentage, coupling casualties to total casualties | 43.33     | 21.04     | 6.67                     |
| Tons carried one mile per trainman employed         | 520,987.5 | 740,589.1 | 1,738,223.1 <sup>2</sup> |

<sup>1</sup>Calendar year; casualties to trainmen on duty resulting from train accidents and train-service accidents.

<sup>2</sup>For year 1917, trainmen employed on Class I roads only.

#### THE HOURS OF SERVICE LAW

The hours of service law, enacted in 1907, limits the hours of service of railroad employees engaged in or connected with the movement of trains to sixteen hours within any twenty-four period, and provides that an employee who has been on duty continuously for sixteen hours shall not be required or permitted to go on duty again until he has had at least ten consecutive hours off duty; an employee whose period of duty has been broken but who has been on duty sixteen hours in the aggregate in a twenty-four hour period must have at least eight consecutive hours off duty before he can resume duty. Train dispatchers, operators, and other employees who use the telegraph or the telephone for transmitting or receiving orders pertaining to or affecting train movements are limited to a maximum period on duty in any twenty-four hour period of nine hours at continuously operated offices, and of thirteen hours at offices operated during the daytime only, except that in case of emergency they may be permitted to remain on duty for four additional hours not exceeding three days in any week. Certain additional exceptions are also provided by the terms of the law; the law does not apply to wrecking crews, or in case of casualty, unavoidable accident, act of God, or where the delay was the result of a cause not known to the carrier or its officer at the time the employee left a terminal and which could not have been foreseen.

There are nine hours of service districts, one inspector being assigned to each group, and one unassigned inspector is detailed wherever his services are required. These inspectors periodically check the railroad companies' records of the time on duty of employees subject to the law, and when circumstances require punitive measures, they procure evidence of violation of the law upon which prosecutions are instituted. Numerous complaints alleging nonobservance of the law in specific practices or localities are received by the Commission, and these complaints



are referred to the hours of service inspectors for investigation and report.

As previously noted, the terms of the law permit so-called excess service under certain conditions, and in conformity with an order of the Commission the carriers furnish monthly reports, under oath, of cases of excess service which have occurred on their lines, together with the reasons therefor. These reports are tabulated and annual statistical tables are published, the instances of excess service being classified according to causes. The following tabulation contains data relative to cases of excess service reported for the past several years.

| Year | Total Number of Railroads Filing Hours of Service Reports | Number of Railroads on Which Excess Service Was Reported | Number of instances of service in excess of the limitation prescribed by law |                     | Total instances of excess service reported |
|------|-----------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------|---------------------|--------------------------------------------|
|      |                                                           |                                                          | Employees in train service                                                   | Telegraph operators |                                            |
| 1913 | 1,194                                                     | 455                                                      | 269,392                                                                      | 31,094              | 300,486                                    |
| 1914 | 1,238                                                     | 419                                                      | 136,631                                                                      | 25,650              | 162,281                                    |
| 1915 | 1,186                                                     | 451                                                      | 63,248                                                                       | 14,013              | 77,261                                     |
| 1916 | 1,189                                                     | 443                                                      | 79,046                                                                       | 19,266              | 98,312                                     |
| 1917 | 1,146                                                     | 487                                                      | 106,740                                                                      | 28,773              | 135,513                                    |
| 1918 | 1,086                                                     | 424                                                      | 206,184                                                                      | 58,237              | 264,421                                    |
| 1919 |                                                           |                                                          | 82,620                                                                       | 67,773              | 150,393                                    |

#### INVESTIGATION OF ACCIDENTS

Under the accident reports act of 1910, the Commission has been investigating and reporting upon serious railroad accidents for the past ten years. The law authorizes the Commission to prescribe the method and form of reports of accidents to be made by the carriers, and provides that it shall have authority to investigate collisions, derailments, or other accidents resulting in serious injury to persons or to property, and make reports thereon, including statement of cause and such recommendations as the Commission deems proper.

Under an order of the Commission, the carriers are required immediately after the occurrence of a collision, derailment, or other accident resulting in the death of one or more passengers or employees on or about trains, engines, or cars, to report the same by telegraph to the Commission. These telegraphic reports are referred to the Bureau of Safety; if a report indicates that an accident is of sufficient consequence to warrant investigation by the Federal Government, or if it appears that an investigation would develop information regarding operating conditions or practices concerning which recommendations looking toward increased safety in railroad operation should be made, inspectors who may be located near

the scene of the accident are assigned to conduct an investigation. Investigations are usually held jointly with railroad officers and, when investigations are made by the state authorities, with representatives of the state commissions as well. When question is raised as to the proper operation of signals or other devices, or when an accident has resulted from a broken rail or failure of other structure or material, engineers of the Bureau who are qualified to deal with these technical problems assist in the investigation and conduct of such tests as may be necessary to establish the cause of the accident.

Reports upon accidents investigated are prepared by the chief of the Bureau of Safety and after approval by the Commission are transmitted in each case to the president of the railroad on which the accident occurred. In the case of the more disastrous accidents, and when operating conditions and practices disclosed by the investigations present lessons of general application, the reports are printed in full and promptly made public. And all of the accident investigation reports are published in condensed form in quarterly summaries of accident investigation reports.

It is difficult to form even an approximate estimate of the far-reaching importance of impartial and thorough investigation of accidents and the publication of complete, unbiased reports. About ninety or a hundred accidents per year are investigated. In numerous instances, operating conditions and practices have been found to prevail which were likely to lead to accidents at any time, and specific recommendations to eliminate these dangers have been made. In some cases, inadequate or ambiguous operating rules have been disclosed, as well as antiquated methods of operation in effect; signals inadequate or not maintained in proper operating condition and in a few instances being flagrantly disregarded; employees occupying responsible positions in train service who have not been properly instructed and examined on the rules; lax supervision, and the safeguards intended to be provided by operating rules not being fully utilized; track not properly maintained; and the maximum speed limits too high for track elevation provided on curves. Investigations of materials which have failed in service have disclosed conditions in rails, wheels, and axles which require thorough study not only of specifications, composition and manufacturing processes but also of the effects of loads and stresses to which they are subjected in service. In respect to rails alone, extended researches have been instituted and are now in progress concerning the conditions which produce transverse fissures, split heads, shattered material, crescent-shaped base fractures, and wheel-burnt rails, as well as to determine methods of detecting and reducing or eliminating these defects.

Much of the value of this work results from the publicity given the reports. Not only are the specific conditions investigated which have led directly to an accident often readily capable of correction, thereby materially increasing the safety of railroad travel and operation on these lines, but inquiries and correspondence, as well as articles and comments which appear in railroad magazines, indicate that these published reports are widely read and scanned with care for the purpose of apply-

ing the disastrous and costly experience of roads on which accidents have occurred to other lines where similar conditions or practices may be found, with a view of taking corrective measures to avert possibility of similar accidents.

#### INVESTIGATION OF SAFETY DEVICES

In 1906 the Commission was directed by a joint resolution of the Congress to investigate and report in regard to the use of and necessity for block signal systems and appliances for the automatic control of railway trains, the scope of this investigation subsequently being extended to include any devices or systems intended to promote the safety of railroad operation. For a period of five years, from 1907 until 1912, this work was conducted through the instrumentality of a board of engineers known as the Block Signal and Train Control Board, while since 1913 it has been performed by the Bureau of Safety.

The method of procedure consists of an examination of plans of each device presented for consideration and the formulation of an opinion which is transmitted to the proprietor; if the device is in use or if an experimental installation is made, it is inspected and, when deemed desirable, practical tests are conducted. In some cases reports regarding the tests of devices are transmitted to the Congress by the Commission.

In round numbers, twenty-five hundred proposed safety devices and systems have been examined, including many forms of devices intended to be used in the construction and operation of railroads, and certain devices, principally automatic train control devices, automatic connectors and brake devices, have been tested under service operating conditions. Block signal statistics are compiled and published annually; these reports indicate that the block system was in use in 1906 on 48,743 miles of road, while on January 1, 1920, the mileage of road operated by the block system had increased to 101,884 miles.

#### BUREAU OF LOCOMOTIVE INSPECTION

The Bureau of Locomotive Inspection of the Interstate Commerce Commission was constituted by an Act of Congress of February 17, 1911, its direct purpose being to promote the safety of employees and travelers upon the railroads.

Its organization consists of one chief inspector, and two assistant chief inspectors, appointed by the President and confirmed by the Senate, whose duties are to direct the work of the inspectors and see that the laws, rules, and regulations promulgated thereunder are fully carried out. This law also provides that the United States and the District of Columbia shall be divided into fifty locomotive inspection districts, and that one inspector appointed by the Interstate Commerce Commission, as provided for in the Act, shall be assigned to each district.

This law was passed by Congress as a direct result of the many serious boiler explosions and other failures of the locomotive boiler and its ap-

purtenances, causing serious injury and death. On March 4, 1915, it having been brought to the attention of Congress that many accidents were due to the failure of many parts and appurtenances of the locomotive and tender, the Act of February 17, 1911, was amended, its provisions being extended to cover all parts and appurtenances of the locomotive and tender.

There are approximately seventy thousand locomotives in service in the United States which come under the jurisdiction of this Bureau. It was recognized that the most effective means of preventing accidents due to the failure of the locomotive and its appurtenances was through periodical inspections, tests, and repairs; therefore, the law requires that such inspections and repairs shall be made at stated periods and a sworn report, covering the condition of the locomotive and the repairs made to all defects found before it is again returned to service.

These reports total approximately 840,000 per annum, and are checked by the district inspectors as well as in the office of the chief inspector, in order to determine whether or not the requirements of the law and rules are being complied with, after which they are filed in the office of the Chief Inspector for reference. A transcribed report of the defects approaching violations of the law, disclosed by the Inspectors of the Interstate Commerce Commission in the course of their regular work, is furnished to the chief operating officer of the carriers, so that they may be fully advised of the conditions of their locomotives.

The rules and regulations require that each locomotive boiler shall be so constructed and maintained that it will have a suitable factor of safety, and that a specification card containing certain calculations, drawings, and other data necessary in determining the safe working pressure be filed for each locomotive boiler before being placed in interstate service. These specification cards are carefully checked by competent mechanical engineers in the office of the chief inspector, to determine whether or not the boiler meets the safe requirements.

The law requires that each inspector appointed under the Act shall make personal inspection of the locomotives under his care from time to time, as may be necessary fully to carry out the provisions of the Act, and as may be consistent with his other duties. His first duty, however, is to see that the carriers make inspections in accordance with the rules and regulations established or approved by the Interstate Commerce Commission, and that the carriers repair the defects which such inspections disclose, and makes it obligatory upon the inspector that, whenever in the performance of his duty, he finds any locomotive or apparatus pertaining thereto not conforming to the requirements of the law and rules, he shall notify the carrier in writing that the locomotive is not in serviceable condition.

It further provides for an appeal from the inspector to the chief inspector, and in turn to the Interstate Commerce Commission, in case the carrier believes an injustice has been done by the inspector.

The following table shows the number of locomotives inspected by the Commission's inspectors under the amended Act; the number found de-

fective; the percentage of those inspected found defective; the number ordered out of service; and the total defects found, for the fiscal years ending June 30, 1917, to June 30, 1920, inclusive:

|                                 | 1920   | 1919    | 1918   | 1917   |
|---------------------------------|--------|---------|--------|--------|
| Number of locomotives inspected | 49,144 | 59,772  | 41,611 | 47,542 |
| Number found defective          | 25,497 | 34,557  | 22,196 | 25,909 |
| Percentage found defective      | 52     | 58      | 53     | 54.5   |
| Number ordered out of service   | 3,774  | 4,433   | 2,125  | 3,294  |
| Total defects found             | 95,096 | 135,300 | 78,277 | 84,883 |

This law requires that in case of an accident, resulting from failure from any cause of a locomotive or tender, or its appurtenances, resulting in serious injury or death to one or more persons, a statement forthwith must be made of the facts of such accidents by the carrier owning or operating said locomotive to the chief inspector, whereupon, the facts concerning such accident shall be investigated by the chief inspector, or one of his assistants, or such inspector as the chief may designate for that purpose, and that the part affected shall be thoroughly examined and a detailed report of the cause of the accident made, and that such reports shall be made public in such manner as the Commission deems proper.

During the nine years that this law has been in effect, the Bureau of Locomotive Inspection has investigated 5,892 accidents, which caused the death of 450 persons, and the serious injury of 6,678 others, due to the failure of some part or appurtenance of the locomotive or tender, including the boiler. The great majority of these accidents could have been prevented by proper means, well known to qualified officials and employees in charge of the operation, inspection, and repairing of locomotives.

A summary of the accidents and casualties caused by the failure of locomotive boilers and their appurtenances only, for the year ending June 30, 1912 (the first year of the existence of this Law), as compared with the accidents and casualties occurring from like causes during the fiscal year ending June 30, 1920, shows the substantial decrease of 47 per cent in the number of accidents; 48 per cent in the number killed; and 49 per cent in the number injured, notwithstanding the strenuous period of reconstruction through which the country has been passing, which very clearly establishes the wisdom of the requirements of the law and rules.

In the work of the Bureau of Locomotive Inspection, attention has from time to time been directed to certain conditions which have contributed to overheated and damaged crown sheets, as a consequence of which a series of comprehensive tests has been conducted to determine the effect of the circulation of water in the locomotive boiler on the water indicating appliances, with respect to their correct registration.

Through the surprising conditions disclosed, and the information obtained, it is expected that material aid will be rendered the carriers in reducing or preventing such damage.

## INCREASED POWERS WITH RESPECT TO SAFETY

The Transportation Act, 1920, materially increases the powers of the Commission with respect to safety matters. Section 26 of the amended Interstate Commerce Act provides in part as follows:

"That the Commission may, after investigation, order any common carrier by railroad subject to this Act, within a time specified in the order to install automatic train-stop or train-control devices or other safety devices, which comply with specifications and requirements prescribed by the Commission, upon the whole or any part of its railroad, such order to be issued and published at least two years before the date specified for its fulfillment. . . ."

The administration of this section of the law is now before the Commission for consideration, and plans for carrying out its purposes are being formulated.

It is probable that a great deal of progress will be made in the near future in the installation of automatic train-control devices on selected lines in specified locations for the purpose of developing these things to prevent these harrowing collisions which we have been experiencing for quite a number of years due to the failure of the engineer probably to obey signal indications.

CHAIRMAN CARROW: A writer whose name I am not familiar with once said that the world doesn't need so much to be taught as it does to be reminded. We have got to the point where the world needs to be reminded, and Mr. Borland's résumé of the Interstate Commerce Commission was very appropriate at this time.

I want to call your attention, in his address, to the remarkable fact that coupling accidents were reduced from forty-three to seven per cent or one injury in every nineteen to one in every seventy-five. You must admit that that is one of the most remarkable improvements that ever has been made in the history of industrial development in this country.

Now, I want to call your attention to a discovery that has been made and is being perfected and when it is perfected it will excel in its effect anything that was ever done by the automatic coupler and that is automatic precaution. When we get the minds of officials and employees of the railroads and in every other line of work so that they automatically keep out of danger, so that they get in tune with a certain sort of atmosphere that deflects them from the course of danger, then we shall even excel the record of the automatic coupler in preventing injury and death.

There are a lot of things that I should like to say about Mr. Borland's address but it isn't for the Chairman to do that. However, there is an indication of a gradual persistent progress in the mechanical and physical development and maintenance of the railroads of this country that should give every man encouragement who is interested in the safety work. Now, when we supplement these wonderful physical developments with the effort that is being put forth with the mind, I have no hesitancy in predicting that the thing we are all working for will be realized.

Mr. Borland's paper is open for discussion.

## DISCUSSION

MR. M. SCANLON (Duluth, Missabe & Northern): In shifting cars into the yard the headlight must be turned on. When we are shifting these cars in, there are men working on other cars and the headlight blinds them so they can't see and they have to stop work. I should like to know if we couldn't get an amendment to that law so that we could put the headlights out so the men could continue to work, because the men are standing on a very small piece of iron and it is very dangerous.

CHAIRMAN CARROW: Your question, I believe, is directed to Mr. Borland.

MR. BORLAND: I didn't make the law and I can't amend it.

CHAIRMAN CARROW: I presume, if I gather your remarks in the beginning of your talk, that your exclusive function is enforcing the law and you take no steps to have the law amended.

I should think that is a rather hard question to answer. I don't know whether this Section is in a position to receive a motion to take some action looking to the modification of that law or whether the Interstate Commerce Commission is in a position to make modification under certain circumstances. Has anybody a suggestion? Mr. Adams, you are versed in the law.

MR. ADAMS: I know of no way that you can repeal or modify any act that the Interstate Commerce Commission has set about to carry out unless it is done through Congress. If there is a particular condition that the gentleman might have on his line, I would suggest that he consult his Congressman, and I might add that he is liable to have a big fight on his hands.

CHAIRMAN CARROW: I would suggest, my friend, that you take the matter up with your superior with a view of his taking the regular course and presenting the matter to the proper official of your state or the United States.

MR. GROOME: I have found in safety meetings that a small proportion of members of our safety committee bring in suggestions wherein they want to create certain conditions that are not permitted by the rules of the Interstate Commerce Commission which are laws. I have steadily stood to the point that we are not in a position to change existing laws of this country. Mr. Adams, when he was regional supervisor of safety in the Central Western Region, had a good many cases of that kind.

I can bear Mr. Borland out in what he has said in regard to the investigation of accidents. I am perhaps the only railway officer in the Steam Railroad Section that served an apprenticeship in the safety section of the Interstate Commerce Commission. I was inspector under Mr. Belnap for five years and I know something of the class of accidents that we investigated. We found in many cases a disregard of the rule both by officials and employees.

## IMPORTANCE OF UNDERSTANDING RULES

In regard to the rules, there is nothing more important than a rule book. On our railroad, the Union Pacific System, we have train rules' examiners on every division. Before any man in the train service, the

engine service, the maintenance of way department, the telegraph service is permitted to go to work, he is very thoroughly examined on the rules. Now, they don't sit down and write the answers to all the questions to be checked up some three or four months afterwards; they must go through this examination and be re-examined until they pass with thorough understanding of the rules. A big accident happened a number of years ago when I was with the Commission, and it was on our railroad, by the way, and not a man that was brought into that investigation would admit that he did not have a thorough understanding of Rule 9, one of the most important in the book. That was brought about by thorough examination. If we would insist on a thorough examination of our men and the best observation of rules, there would not be so many of these rear end and head end collisions that the Interstate Commerce Commission finds necessary to investigate at this time.

CHAIRMAN CARROW: Does any one wish to discuss further Mr. Borland's paper?

MR. F. M. METCALFE (Northern Pacific): I don't think you are giving Mr. Scanlon's question enough consideration. He will have to go back to his men and say the Safety Section didn't do anything that they didn't have power to change the law. Couldn't they get an exception from the Interstate Commerce Commission to waive the rule in that particular case? He will have to go back to his boys and say "I couldn't do anything for you, boys; you will have to have that light in your eyes." I think we ought to give it a little more consideration.

MR. BORLAND: Mr. Chairman, so far as the inspectors of the Interstate Commerce Commission are concerned, they have no power to waive any provision of the law. The duty of the Interstate Commerce Commission is to enforce the law as it is written; that is what we are there for.

Now, with respect to this particular situation, I don't know of any law that requires a situation of this kind to exist. There is a law that requires the electric headlights of certain prescribed candle power which would permit an object the size of a man to be seen within eight hundred feet in advance of the engine. There is no particular law that I know of that requires that headlight to be kept burning in the situation which this gentleman speaks of. If there is such a law, I don't know anything about it.

MR. A. V. ROHWEDER (Duluth, Missabe & Northern): That condition exists up on our line and was brought up in one of our safety committee meetings. It is an Interstate Commerce law, Rule 31. It says that you shall have a headlight displayed, as Mr. Borland said, on the front or rear end of a yard engine. It is the general understanding by our law department that it is necessary under the Act to keep the headlight burning on a yard engine shoving up on a dock. Now our dock is nearly a mile long and is illuminated as bright as day. We have four or five hundred men working on top of those cars all the time. This bright light shining over the top of those cars is one of the worst conditions on the road on account of blinding these dock men and the legal department hesitates in allowing any bulletin to be put out to engine men



giving them permission to shut the headlight off when the engine is moving on or off the docks under existing rulings from the Commission.

Now, the Commission did, some time ago, give permission or modified its rulings on Rule 31 to the effect that in connection with road service an engine or train meeting another on the road could shut off its large electric headlight and turn on the dimmer light so as to cut the blinding effect. Mr. Scanlon undoubtedly brought that up in the hope that this Section would request the Commission for a ruling that would take care of this.

MR. JAS. SULLIVAN (Chicago & North Western): Haven't they got a dimmer on that headlight? All it requires is a headlight.

MR. ROHWEDER: The law requires a headlight of a certain candle power. It doesn't give you authority to cut it down to a dimmer light.

MR. SULLIVAN: They do it in yards, why not at docks?

MR. ROHWEDER: That is in violation of the law, though.

CHAIRMAN CARROW: I know that on nearly every railroad they dim those lights in the yards. I am not speaking as an operating man but I should think that a dock would certainly be in the category of a yard from an operating standpoint.

MR. ADAMS: It occurs to me that Mr. Scanlon might get some relief if he will address Mr. Pack, the Chief of the Bureau of Locomotive Inspectors, and set out his case.

During my term of office as regional supervisor there were a great number of complaints from yard men about this blinding effect; these were handled by Mr. Pack but I don't believe there was any relief secured on account of the law, so it occurs to me the only thing Mr. Scanlon can do at this time would be to address Mr. Pack on the subject, outline his case and ask for relief in the premises.

CHAIRMAN CARROW: It seems to me the thing is settled satisfactorily.

MR. BRODERICK: I make a motion that Mr. Borland's paper be accepted.

(The motion was seconded and carried.)

CHAIRMAN CARROW: The next order of business is not on the program but is one that deserves and merits a great deal of attention. So far as we are personally concerned, the grade crossing situation is perhaps more serious than any other one feature of accident prevention work on the railroads of the United States.

#### GRADE CROSSING SITUATION

MR. BRODERICK: This question has been discussed more or less during this session but perhaps we don't all realize its vast importance. As a matter of information and to show you the trend of things, just a few days ago there was a bill introduced in the legislature of Maryland compelling the railroads of that State to install a special electric signal at every grade crossing in the state, regardless of whether it was a state highway or a country road. The originator of the bill proposed that the expense of this signal should be borne half by the motorists of the state and the other half by the railroads. He estimated that the device would cost between three and four hundred dollars for the material itself and a

like amount to install it, or between six or seven hundred dollars for device at each crossing. His idea was for the motorist to be taxed five cents and on that basis with 100,000 motorists in the state, they would contribute approximately \$50,000 and the balance of the expense would be met by the railroads. We looked into the thing a little bit and it was thought the estimate would be more than double what he said, so you can see where the railroads would get off on a proposition of that sort. Just as a matter of information we have in the State of Maryland a total of 834 grade crossings. We have on the Baltimore and Ohio alone 28 crossings, so we are very vitally interested in that matter.

The automobile club of Maryland was asked to look into the question and express an opinion on the subject. I attended a luncheon of the board of governors of the automobile club and they were more or less interested from both sides. They thought, of course, it was an obligation resting upon the railroads in that connection and they were likewise interested in the motorists, but they passed a resolution to the effect that they did not approve of the proposition and if it was presented they would appoint a special committee to investigate the matter and look into it thoroughly and be in a better position to handle it. It will likely come up in the next session of the Legislature, in 1922.

Gentlemen, you all realize that this matter of automobile accidents at grade crossings is a serious menace. The installation of signals at crossings is not going to prevent accidents.

It seems to me it would perhaps be proper to suggest that a special committee be appointed to handle this particular question. I don't know of anything that this whole Council could do with the idea of helping public safety more than to reduce grade crossing accidents of automobiles. It seems to me it is a serious problem and one that should be given serious thought.

My idea was that a special committee be appointed from the different sections of the Council, consisting of a representative from the Steam Railroad Section, one from the Electric Railway Section, one from the Automotive Section, one from the Industrial Section, and one from the Public Safety Section. If some action were taken in that direction it would put the National Safety Council on the map showing a vital interest in public safety.

#### STANDARDIZATION OF TRAFFIC LAWS

MR. GRODZKI: I am heartily in accord with what Mr. Broderick has said and if I had gotten up before he did I should have said practically the same. The Public Safety Section of the National Safety Council has already, since the Cleveland convention, a committee on standardization of automobile traffic laws. There was a convention in San Francisco the month of August of the National Traffic Officers' Association that started to consider national traffic laws. They appointed a committee that is going to meet in Cleveland some time the latter part of this year, and I believe, it would be the biggest mistake that we ever made if there were not appointed before we leave this Council meeting a committee such

Mr. Broderick mentioned. I believe this committee should get in touch with the other committees on traffic laws. Sooner or later we are going to have universal traffic laws. I find that the traffic laws here on the streets are different from what they are in any other cities. These universal traffic laws are going to be put through and unless the Railroad Section gets in on its share, we are going to fail in one job that we should do from the railroad standpoint.

(Mr. Scott resumed the Chair.)

CHAIRMAN SCOTT: After listening to this discussion, I take it that it is quite generally felt that the incoming administration should look into the appointment of this special committee to deal with the subject of grade crossing accidents. I don't think it is necessary to have a motion to take care of this; I am quite sure that the new Chairman will see that this is well taken care of.

MR. BRODERICK: How shall we know what action is going to be taken on this subject; will any action be taken before this Section adjourns?

CHAIRMAN SCOTT: My understanding of the constitution and by-laws is that the Chairman is empowered to appoint all committees.

MR. BRODERICK: We have talked more or less about this and we are urging that something be done, but we don't know that it will be done.

MR. H. C. HUNTER (Union Pacific): I ask the unanimous consent of this assembly to have the Chairman appoint such a committee as outlined by Mr. Broderick and Mr. Grodzki.

MR. GRODZKI: Could a committee be appointed by the Chairman before we adjourn so that some action might be taken before we leave Milwaukee?

CHAIRMAN SCOTT: Let me explain for a moment. As presiding officer at this meeting, I do not feel that it would be proper for me to appoint a committee that is to act under the incoming Chairman. If the gentleman who just spoke will present a motion in regular order and if it is duly seconded, I will take great pleasure in putting it before the meeting, and if that motion is carried, I believe that the incoming Chairman will see that everything is done that should be done to handle this question in a satisfactory manner.

MR. HUNTER: I will make such a motion as outlined by our present Chairman.

(The motion was seconded.)

CHAIRMAN SCOTT: I believe you all understand the motion. It is that the incoming administration will appoint a committee to deal with this particular subject in a manner which has been outlined. Are you ready for the question?

(The motion was unanimously carried.)

CHAIRMAN SCOTT: Mr. Carrow, will you please make note of that? Mr. J. C. Clark came to me during the early stages of this meeting and said that he and Mr. Talbert would be found, in case we wanted them at any time, in the Public Safety Section. We sent our Secretary to the Public Safety Section to look for them but they are nowhere to be found. Under the circumstances, and in view of the fact that the hour is drawing near when we should adjourn, because I understand that many of our delegates

are leaving on an early afternoon train, I think it is quite in order for us to wind up the business of the Ninth Annual Meeting of the Steam Railroad Section of the Council.

Before entertaining a motion to adjourn, I have just a few words to say. I want to appeal as strongly as I can to every member of this Section to support all of the committees in every way possible in the development of every subject that is assigned to them. I would appeal particularly to you to aid the Bulletin Committee. I know what the Bulletin Committee is up against. I served on that Committee year before last and I know that it is a very difficult matter to put out high class bulletins unless they get the right support from the membership.

Now, one other thought. I know from experience that when a man comes a long distance to attend a meeting of this kind he likes to feel that he is going to take something back home with him. One thing that I have missed more than anything else in this meeting is copies of the papers and copies of the committee reports so that we can take them back home to discuss and to utilize to the best possible advantage without having to wait sixty or ninety days for the proceedings to be published. I would like to have some expression from those in the room as to whether it is advisable to recommend to the incoming administration that at our next meeting we have advance copies of all committee reports and other papers that are to be presented for consideration at the next annual meeting.

MR. M. S. COLE (Oregon Short Line): This is the first meeting of this kind that it has ever been my pleasure to attend. Now, I came here with the purpose or with the intention of carrying back as many notes and ideas that I could gather here at this Council and I am going back full of them. I am going back more enthusiastic for a better safety campaign on our system. I, for one, would be glad to receive an advance copy of all papers and reports. It would help me and I know it would help the rest of the boys who came here with me. I believe we could put over a better safety campaign if we had these advance copies.

I would like to go on record as favoring advance copies. I make that as a motion.

MR. GRODZKI: I second that motion.

CHAIRMAN SCOTT: The motion has been made and duly seconded that we go on record as recommending to the incoming officers that advance copies of committee reports and papers be at the disposal of members at the next annual meeting of this Section.

MR. CARROW: May I amend that motion to have a little leeway? That the Chairman of the Program Committee use some discretion in the publication of them for this reason: That the expense would fall upon the members of the Council and if we published all of the papers, it might be a burden heavier than we could bear. It seems to me there ought to be some leeway.

CHAIRMAN SCOTT: As I understand the motion, Mr. Carrow, it is purely recommendatory. It is not mandatory.

I happen to be a member of several other organizations and at our annual meetings, as a general rule, the man who prepares a paper and

devotes a lot of time to it is very proud of his product and they are quite willing to furnish mimeographed copies of their papers, and I think if we will offer that suggestion it will eliminate quite a lot of expense.

You have heard this motion. Are you ready for the question?

(Upon vote the motion was unanimously carried.)

CHAIRMAN SCOTT: Now, if there is no unfinished business and no new questions to come up, I think this Section should go on record as offering a vote of thanks to the city of Milwaukee and the very able committee that has been looking after us while we are here. What is your pleasure with reference to that?

MR. W. J. OER (Toronto, Hamilton & Buffalo): I would like to move that a vote of thanks be extended to the Chamber of Commerce, or whatever it was that invited the convention here, for the hospitality received.

MR. CARROW: I would like to add to that motion by indicating our special appreciation of our old friend Anderson, who was largely instrumental in putting this thing on the map.

(The motion was seconded.)

CHAIRMAN SCOTT: I had no idea, Mr. Carrow, of letting that escape, because if there is anyone who feels devoted to Charley Anderson, it is the Chairman.

Now, let's have a rising vote of thanks to the city of Milwaukee and to the committee on arrangements and entertainment.

(A rising vote of thanks was given.)

CHAIRMAN SCOTT: I want to assure every member of the Steam Railroad Section of my hearty appreciation of the honor that has been mine to preside at this meeting, and that I have the most kindly feeling for every one of you, and I hope to see you at the next annual meeting of the National Safety Council.

MR. W. L. BOSLOOPER (New York Central Lines): We have had many votes of thanks extended to various men during this convention. Now, if you will permit me, I am going to suggest something out of the ordinary, that, in view of the able manner in which the business of the Steam Railroad Section has been conducted during the meetings of this Congress, we give three cheers for our Chairman, Mr. Scott.

(Three rousing cheers were given Chairman Scott.)

CHAIRMAN SCOTT: Gentlemen, that is the most encouraging thing I have heard since Mr. Dow offered some kind remarks in my favor yesterday afternoon, and I appreciate the good feelings and the three cheers very much indeed.

ADJOURNED.

## **Textile Section**

**September 29 and 30, 1920**

---

**H. L. ROBINSON, Chairman**

Manager, Employment Service Department, Crompton and Knowles Loom Works, Worcester, Mass.

**A. E. CONRATH, Vice-Chairman**

Chief Inspector and General Foreman, International Harvester Company, St. Paul, Minn.

**IDA MAY WILSON, Secretary**

Lowell, Mass.

---

### **WEDNESDAY MORNING SESSION**

**T**HE meeting convened at 9:45 A. M., Chairman H. L. Robinson presiding.

**CHAIRMAN ROBINSON:** Our first point of business is the appointment of a nominating committee and I would like to appoint Mr. Beyer, Mr. Stoll, and Miss Brown. You will meet some time today and report at the meeting tomorrow morning on officers for the coming year.

We feel this year that our secretary has earned her salary. We have not only worked her at our meetings, she has been very constant in attendance, but we also had the nerve to ask if she would present a paper at the Congress. Miss Wilson has been connected with the Bay State Cotton Corporation, but is now a free lance and has had considerable experience in textile mill work. She has had to preach safety to the executives and then sell it to the operatives. She has taken as her subject "Selling Safety to Executives and to the Workmen in a Textile Mill" and I take great pleasure in introducing our Secretary, Miss Wilson.

### **SELLING SAFETY TO EXECUTIVES AND EMPLOYEES**

**IDA MAY WILSON, LOWELL, MASS.**

The textile industry has for so long been considered a low accident hazard that it is difficult to convince some production executives that there is anything important to be done in the line of safety work. It is a general proposition they believe in safety measures, and say that

such measures are all right for machine shops and the like, but unnecessary in a textile mill. When it is pointed out by the accident insurance carrying company that a safety committee properly organized and stimulated, and weekly mill inspections for accident hazards, will lower insurance costs, the idea that there may be something of value in the safety movement, even in a textile mill, is likely to germinate. More than 100 textile mill memberships in the National Safety Council attest the growth of this idea. Accident compensation laws and the nationwide safety campaign of the National Safety Council have given many manufacturers a new outlook on safety work.

#### PREREQUISITES FOR ESTABLISHING EFFECTIVE SAFETY WORK

Prerequisites for establishing effective safety work are the same as for establishing an effective industrial relations department. Every division of the Industrial Relations Department has an important bearing upon safety. The same spirit motivates all sincere effort in safety and in other parts of the industrial relations field. If the mill management is resistent and is sincere in expressing a desire to make working conditions more nearly fair and safe, and workers more nearly content, the task of getting the safety idea over to the manager is comparatively easy. Starting with the promise that a mill has this type of management, we may consider ways of getting the safety idea across.

The first prerequisite is to have in the mill a man or a woman who is keenly interested in the safety movement, and eager not only to arouse enthusiasm but to sustain it by persistent effort. In the larger mills the production superintendent is usually so busy getting out production that he cannot give the necessary time to prepare himself for working out satisfactorily any part of the industrial relations (or service) field. When once he understands its value in helping him to speed production, he will give whole-hearted co-operation. In textile mills of 5,000 or more employees one man should devote his entire time to safety work. In smaller mills the industrial relations or service superintendent assisted by safety committees of executives and employees can do efficient work. But in every mill there should be some one who has ready access to the manager of the mill, and sufficient time to make plans and develop the safety spirit.

Recently a mill man when asked if he had organized a safety committee replied lightly, "Oh, yes, three times so far this year. We keep forgetting to meet, so whenever our accident insurance company gets after us we organize again."

#### ALERT EXECUTIVE NECESSARY TO SUCCESSFUL SAFETY COMMITTEE

This reply shows that there was no one on the job. A well-organized and smoothly-running safety committee that does steady and effective work always has in the back-ground an alert executive who organizes, energizes, and follows up every detail of the committee's work. A mill man recently said of a smoothly-running service department, "Anybody

can read out of a book how to organize committees, install centralized employment, start physical examinations, and do all the rest of such department's work." So can any one read out of a book how to make yarn and cloth from cotton or wool, what machines to buy and how many of each, the machine lay-out, and the number of workers required to operate these machines. Any one can start a cotton mill, but somewhere in the organization it is our theory that there should be an experienced cotton mill production executive, otherwise the man who has built a mill according to rule will suffer failure. It takes more than a book to start to make a successful safety committee.

The second prerequisite is careful planning. Every time a safety committee has to be resuscitated the task increases in difficulty, and the employees take less interest in the organization. Unorganized safety work amounts to little. To make the work successful there must be careful planning in detail, and some one back of these plans to carry them on. A carefully drawn plan of the proposed safety work by one who has made a study of approved methods is an excellent way to convince the executive in charge of the mill that safety work is feasible for his mill.

Not less essential is faithful follow-up of organization plans. The average executive is not different from the average mill employee in that he wants to be shown that the plan is working out. An excellent way to convince him is to remind inspectors of their duties, help in making the inspections and the inspection reports, supervise the investigation of accidents, transmit accurate reports to the insurance company and to the safety committees, place the blame for each accident squarely where it belongs, plan each committee meeting so that it will go on with enthusiasm that will make every member look forward to the next meeting, and to trail committee recommendations to ultimate action. Follow-up well done is itself one of the best ways to get the safety spirit over to executives and employees.

#### CONDENSED REPORTS OF ACCIDENTS HELP

A condensed weekly or monthly report of accidents, their causes and the committees' recommendations for eliminating these causes will help make the man at the top believe in safety as he does in production. And these reports will help the committees to discover the high percentage of accidents that they have agreed were preventable by exercise of carefulness. The reports may be passed down to the superintendent and the overseers, and copies of them may be posted on the safety bulletin board. Summaries of inspection reports may be made by departments and treated in the same ways. Exhibits of the shuttle or other tool that caused an accident with the committees' recommendations for preventing a recurrence of the accident, will prove effective. Presumably even in mills where cotton is studied, but not the workman, and where methods of employment and handling labor are still those of a by-gone century, traditional indifference towards the human factor will gradually be overcome.



## KEEP MANAGER ABREAST OF SAFETY NEWS

It is important to keep the manager and yourself abreast of safety news. Few managers in long established industries want to try untested methods. And they look upon all the things they do not know about as untested. Any innovation meets with opposition from some one, and the manager ought to know enough about it to back it when occasion arises, as occasion surely will. The safety supervisor should see that the manager is familiar with the points in favor of the innovation. The preliminary proof of the value of a proposed change in favor of safety should be strong. "We have never done that" is likely to begin and end any but a progressive mill man's reply to a suggestion for a change of even a trivial character. If certain machines in the mill should be guarded, cuts of new machines of the kind, with guards, will interest him. Such cuts may be found in textile magazines, insurance company's publications, machinery catalogs, and the Textile Safe Practices pamphlet published by the National Safety Council. Facts, methods, and standard practices should be placed before him. Marked paragraphs of safety news from other mills may be culled from the same sources and from the NATIONAL SAFETY NEWS. Newspaper accounts of accidents to textile operatives require no comment to convince managers and men that there are hazards in a cotton mill, and that it is a constructive service to reduce them to a minimum. If a manager does not willingly read anything he can avoid, a typewritten summary of essential facts in the articles mentioned will be more likely to receive attention.

Persuading the manager to do a definite part of the safety work himself will solicit his interest. If a carefully drawn plan for a safety meeting of superintendents and overseers is given him with the suggestion that he call the meeting and preside at it, his attention will be focused on safety, and when once this is accomplished he will get behind the safety movement. If overseers are asked to give a list of names of those in their departments who ought to make good committee members, they will take a measure of responsibility for the success of these men in safety work.

In developing any phase of the industrial relations work, its bearing on safety may be pointed out. This tends to advance the immediate project and to fan the safety spirit. As an illustration, in preparing the soil for sowing seeds of a morning lunch service throughout the mill, both lunch and safety causes are promoted by showing that experiments and studies prove that the hour of the greatest fatigue coincides with the hour of greatest accident frequency. It follows that whatever will renew vigor will promote safety, good will, and production.

## EXPANDING THE HEALTH DIVISION

In expanding the health division of the industrial relations work beyond the narrow confines of first aid, the logical first step is to secure a socially-minded nurse or Red Cross First-Aid graduate who is willing

to develop into wider usefulness. Then it is easy to link health and safety in the mind of the manager by citations dealing with risks involved in employing for machine work men and women with bodily ailments that a physician's examination would have revealed. Proper physical examination succeeded by careful placement, and by the patient painstaking follow-up of the right kind of nurse or First-Aid worker will appeal to most managers as one of the strongest safety measures. If a dentist can discover the cause of a man's partial incapacity for work, why not employ a dentist? If an oculist can learn the cause of continuous bad work, why not have an oculist examine operatives' eyes and correct defects? The work of the mill physician, dentist, and oculist is safety work. The give-em-hell treatment of employees who make mistakes must give way to an attitude of helpfulness shown in preventive measures before any one can take seriously the utterances of mill officials who use their service departments solely for selfish ends. The subject of health is the Old Faithful for the newspaper man, for everyone is interested in health. Seeds of the project to develop the health division of the Service Department are sure to lodge eventually in fertile soil. Why not sow at the same time seeds of the safety idea? Obviously, all intelligent health, hygiene, and sanitation work is safety work.

#### CENTRALIZED EMPLOYMENT IS SAFETY WORK

Centralized employment as a means of saving the time of product men, and upgrading the personnel, is safety work. In laying before an open-minded mill manager reasons why thousands of progressive companies throughout the country have successful centralized employment, the industrial relations superintendent can advance this idea by showing the Safety values in proper interviewing; right placement; detailed information regarding wages, rules and privileges; proper introduction to the job; and friendly, frequent follow-up. By these methods in a centralized employment bureau the employment supervisor should be able to eliminate many risks both to the mill and to the new employees.

And so we might continue with all other divisions of the industrial relations work—wage adjustments, settlement of grievances real and fictitious, shop committees, honest insurance administration, review of discharged and released employees' reasons for leaving, Americanization, housing, training schools, mutual benefits, co-operative stores, promotion of recreation and home welfare work. Each in a very real way is safety work. To further any one of these, its safety aspect may be considered to the advantage of both causes.

#### SAFETY WORK IN MILL NOT UNDER RESIDENT MANAGEMENT

So far we have considered ways to get the spirit into mills where there is a resident management sincere in promoting service features. Unfortunately many safety men work in mills of another type—the type that enlists the services of a safety man merely because the insurance company demands it. Or perhaps the mill is not under resident management, a

the agent has a service or safety man hurtled into his mill from the office of the general management for reasons not easily deciphered. This complicates and delays, but in itself does not preclude success, provided that the agent is fair, and the holding company sincere. A company is known by its representatives, and if it continues knowingly to retain a single dishonest representative, the sincerity of the general management does not exist except in officials' adroit use of words in public utterances. If a company's representative is either a human shark or a jellyfish, the operatives' need for safety work is great, for the policies of the agent are sure to be reflected in the executives throughout the mill. The safety man will need to have unquenchable faith in his work, and the pluck and the courage of ten. He can win the employees and find his reward in what he accomplishes for them; he cannot perform the miracle of changing an unprincipled person into a real man. The appeal must be lowered and restricted to the agent's self interest in reducing insurance costs, working hours lost, machine idleness, and labor turnover. The safety spirit will not live in a mill where the mill agent is incapable of understanding or feeling it.

In getting the safety spirit to permeate the operatives, the methods are the same as those for an open-minded manager. Most employees are open-minded on the subject of safety. Just as they instinctively like any one who takes care of their injuries after an accident, they like anything that tends to keep them from hurting themselves. The manager, superintendents, and overseers are usually former operatives who have come up through the mill. There are probably employees who could take their places if they were given the opportunity. There never has been an equitable distribution of opportunities, and efficiency is not the sole basis of promotion in textile mills. Whatever is rational for convincing the manager is applicable to the other executives and to the employees. It seems pertinent to suggest here that the service worker who resorts to wheedling and flattery to win either executives or men is a detriment to the work and should be replaced. The do-it-for-me urge and the aren't-you-wonderful propaganda spring from a desire for personal popularity at grievous cost to safety work. Sincerity, and frank presentation of the cause on its merits builds an enduring foundation. The manager who has to be "worked" for every concession to the safety program suffers from mental absenteeism and, like the one who tries to work him, ought to be replaced.

#### GIVE EMPLOYEES A PART IN SAFETY WORK

In these days of dis-ease in all ranks, men have a decided inclination to do for themselves what has always been done for them. For some occult reason the man who has risen from the ranks to the top is likely to be the most skeptical about the ability of those still in the ranks to initiate ideas or make recommendations on matters of mutual concern. Only recently have employees had representation on safety committees, and in many mills even now they are not permitted to have their own safety committees. To get the manager interested in safety work, we give him

a part of it. Why not do the same with employees? At least half of weekly safety inspections can be made by members of the Employ Safety Committee on mill time. Every accident in a department can be investigated by the members of the safety committee from that department. Committee members, as well as executives, who have made inspections, investigated accidents, and made recommendations become enthusiastic in safety work and follow eagerly the course of their efforts. When their recommendations are acted upon, and due credit is given, they are safety enthusiasts.

Executives and employees like to take pictures of what they believe to be the safe and the unsafe way to perform operations in their departments, and they are willing to have their pictures taken in the case of saving other operatives from bodily injury.

They like to make rules to govern the safe running of their machines. And who else is so well qualified? If simple, clear rules made by the executives' Safety Committee and the Employees' Safety Committee are printed in an attractive booklet in the languages most used in the mill, they will be highly prized and often read.

The executives and employees, after being provided with cuts of guard standard practice pamphlets and the like, will together study out the best guards for the machines they know so well, and when those guards have been installed, they will see that they are used, because they believe in guards of their own selection.

#### **SAFETY BULLETIN BOARDS**

If one man on the Employees' Safety Committee is responsible for weekly or perhaps daily changes on the safety bulletin boards, not only will this part of the program be carried out, but it will enlist the support of its sponsor in the whole safety movement. The bulletin board should be attractive and used exclusively for safety news, pictures, brief stories and comparative accident experiences of departments.

#### **SAFETY MEETINGS**

After the Employees' Safety Committee is a going concern, a different member may be appointed as chairman for each meeting. He will probably need the help of the service or safety worker in planning the meeting, but his responsibility of carrying out the plans that he has had part in making, and the honor of presiding, give an opportunity for self-expression in leadership that deepens his ardor in safety work.

The exceptional outside speaker can interest an Employees' Safety Committee, but members say they get more out of regular meetings, where they can take up the reports of inspectors and of accidents, make recommendations, learn what other mills are doing in safety work, and consider both their progress and the problems for which they have as yet found no solution.

A general safety rally of executives and employees with a stirring brief talk followed by interesting moving pictures with a safety theme will help, but much depends upon the choice of speakers, thorough planning

and personal announcement of the meeting through safety committee members to every employee in the mill.

It has proved to be a good idea to invite one or more members of the safety committees to go with the service or safety supervisor to meetings of the nearest safety council, when programs of those meetings look promising. It is with reluctance that some managements will pass such opportunities down the line. It is traditional with mill officials that the broadening contacts which such trips afford ought not to go below the rank of superintendents. But after this traditional autocracy has been penetrated once, the next trip is more easily arranged.

#### COMMUNITY SAFETY

Safety work with executives and employees must not become static. It depends on contacts for effectiveness and must always reach out toward greater achievement. As there is in everything that changes, one fixed member, so the spirit of social justice that prompts all sincere safety work will endure through changes of managers, methods, and motives, and will reach its fullest expression when industrial policy is clear-headed fairness. This spirit cannot be confined to any one industry or group of industries, but it will reach out until it permeates the city, the school, the home and every individual in the home. And it may be that when the community interests are known to be identical with industrial interests, when the human problem is recognized as a community problem as well as an industrial problem, we shall find the conflicting elements of today's restlessness meeting on the common ground of Safety with the knowledge that they have but one cause and one purpose.

CHAIRMAN ROBINSON: I think we all got some new ideas from Miss Wilson. In order to give every speaker a chance, we will postpone discussion until after the last address.

Mr. Clark, editor of the "Textile World Journal," notified me that at the last minute he found he couldn't get away, so he sent me his paper and if you will pardon the lack of knowledge of his intentions on my part, I will try to read it, though if Mr. Clark were here himself, it is needless to say he would be better able to put it over and more clearly. I think that the paper coming from a man who is in the textile publishing end will have more effect on the various mills than a paper coming perhaps from a certain kind of a mill, that is, a mill that does all cotton work, for example, because that would only reach the cotton people.

The "Textile World Journal" and those textile magazines reach practically every kind of textile industry and therefore it will be much more widely read by the mill agents, men who are in authority, than any other paper we could get. With that in view, we asked Mr. Clark if he would give us a paper at this Congress and he consented. If you will bear with me a few minutes, I will read it. There are some very good statements and I think there will be a good chance for some questions and discussion, not questions on Mr. Clark's ideas, but answers to his statements as to how it is done in other mills and how the difficulties were overcome.

## IMPORTANCE OF CONTRIBUTORY CAUSES OF INDUSTRIAL ACCIDENTS

C. H. CLARK, EDITOR, "TEXTILE WORLD," NEW YORK

The first organized safety work in the textile industry of which I have personal knowledge was inaugurated in 1914 by the Pennsylvania Committee on Safety Appliances, and was confined almost wholly to the development of special guards and locking devices for various types of wool and worsted machinery, including dyeing and finishing machines. Practical manufacturers and workmen served on the sub-committees having direct charge of this work, and their illustrated reports were published by Textile Manufacturers' Journal in twenty-seven separate articles appearing during the year ended November 1915. Many of the safety devices developed and recommended by that committee have been adopted very generally by machinery builders and manufacturers. It is a notable fact, however, that legislation has not been enacted in the State of Pennsylvania making obligatory the use of any of these textile safety devices.

It is since that date that the administration of workmen's compensation laws, and the organized safety campaigns instituted by the National Safety Council, and the casualty insurance companies co-operating with it, have awakened large numbers of textile manufacturers to the humanitarian need of systematic safety work and to the advantage and satisfaction that they may realize therefrom. During this period I have been impressed by the fact that those mills that have gone to extremes in safeguarding of operative machinery, shafting, etc., frequently have reduced accidents as much, nor earned as low insurance ratings, as mills that have paid relatively little attention to such details. This raises a query as to whether the accident hazards of operative textile machinery were not being unduly emphasized by the casualty insurance companies and by those who are directly responsible for safety work in our textile mills.

### IS TEXTILE MACHINERY HAZARDOUS?

It needed only a casual study of the situation to show that, in the industrial compensation rating schedules of certain states and in the accident report forms that are commonly used, there was ample ground for this suspicion. For the existence of such procedure, however, the blame rests quite as much upon textile manufacturers as upon state compensation boards and the insurance companies. To the members of a state compensation board a machine seems to be a machine, whether it be a spinning mill or a braiding machine; the one being a highly hazardous piece of apparatus requiring the services of several men, and the other being relatively fool proof and dozens being easily and safely operated by one person.

For the purpose of illustrating the hazardous nature of the textile industry I was told by one safety expert that 61 characteristic mills employing 33,393 operatives had 119,078 machines, or 357 machines for a hundred employees. In Massachusetts during one year, he says, there were 573 gear accidents in cotton and woolen mills alone, which were r

than half of all the gear accidents reported in all of that state's industries. During the same period the special machinery peculiar to cotton and woolen mills caused 3,177 accidents. For one unacquainted with the textile industry the natural assumption to be drawn from such statistics is that it contains a large amount of extra hazardous machinery. Suspecting that the statistics responsible for these conclusions may have been the cause of error, certain standard reports were examined and considerable basis for this suspicion was found.

In the 1919 edition of "The Industrial Compensation Rating Schedule" for the State of Pennsylvania the "normal ratio of machines to employees" for various branches of the textile industry are given as follows: Cotton and linen goods, 2.1; woolen goods, 1.4; carpets and rugs, 1.0; silk goods, 1.5; knit goods, 1.7; narrow fabrics, 2.7; jute and hemp, 1.2; finishing textiles, .7. The ratio of machines to employees given by the same schedule for other industries that are commonly regarded as equally or more hazardous are as follows: Smelting, .15; steel work, .25; rolling mills, .30; foundries, heavy, .25; foundries, iron, .4; machinery manufacturing, .7; automobiles and automobile parts, .4. In view of the fact that it is common practice in making out accident report cards to emphasize the direct cause of the accident, or the immediate physical instrumentality which produced the injury, it is not surprising that those lacking expert knowledge of textile conditions should interpret this misleading statistical data to the detriment of the textile industry.

#### ACCIDENT REPORTS SHOULD BE SPECIFIC

As an illustration of the relatively small number of textile mill accidents of which the immediate or direct cause is textile machinery, and as an illustration also of the failure of standard accident report blanks to give sufficiently specific information regarding contributory causes, the following report, of a large group of textile mills, appearing in the Executive Series of bulletins published by the Textile Section of the National Safety Council, may be considered as typical:

|                                                 |     |
|-------------------------------------------------|-----|
| Textile machinery .....                         | 276 |
| Hot parts .....                                 | 1   |
| Set screws, keys, etc.....                      | 7   |
| Belts, pulley .....                             | 25  |
| Chains, sprockets .....                         | 5   |
| Cogs, cams, gears.....                          | 20  |
| Rolls .....                                     | 18  |
| Shuttles .....                                  | 41  |
| Other parts .....                               | 159 |
| Elevators .....                                 | 1   |
| Other machinery .....                           | 2   |
| Explosives, fire, matches, steam, etc.....      | 23  |
| Chemicals, corrosive substances, and fumes..... | 13  |
| Falls of persons.....                           | 52  |
| Stepping on objects .....                       | 6   |
| Striking against objects .....                  | 95  |

*Textile Section*

1299

|                                                                       |              |
|-----------------------------------------------------------------------|--------------|
| Falling objects .....                                                 | 5            |
| Objects being handled (dropping materials, strains, cuts, etc.) ..... | 305          |
| Hand tools .....                                                      | 172          |
| Particles in eye.....                                                 | 95           |
| Animals and vehicles.....                                             | 12           |
| Miscellaneous and doubtful.....                                       | 108          |
| <b>Total .....</b>                                                    | <b>1,165</b> |

Appended to the bottom of the bulletin is the important admonition to "Analyze the cause of accidents in your plant, then apply suitable remedies." The only analysis that the author of this bulletin appears to consider important is that which pertains to the 276 accidents caused directly by the textile machinery. This analysis is given in another bulletin as follows:

|                                           |     |
|-------------------------------------------|-----|
| Adjusting and repairing .....             | 47  |
| Cleaning and oiling.....                  | 32  |
| Starting and stopping.....                | 15  |
| Flying machine parts .....                | 30  |
| Breaking of machine.....                  | 3   |
| Working around machine.....               | 132 |
| Passing by machine and miscellaneous..... | 17  |

I think it will be acknowledged that, of the last-named accidents only 33, or those due to flying machine parts and breaking of machines, might not have been due to some important contributing cause, which, if eliminated or avoided, might have prevented contact with a textile machine. Most of the other accidents caused directly by textile machinery, together with a large number of the other 1,165 accidents whose contributory cause is not specifically defined, might have been due to something entirely outside of the machines, and that these "somethings" will never be eliminated so long as specific definitions of contributory causes in accident report blanks are neglected, and the attention of safety committees and campaigns is concentrated upon direct causes.

**CONTRIBUTORY CAUSES**

It is my contention, based upon experience and investigation, that considerably more than 75 per cent of the accidental injuries in textile mills have their important contributing cause in the condition of floors, in imperfect natural and artificial lighting and in the physical condition of operatives.

In an address before the International Association of Industrial Accident Boards and Commissions in 1916, Dudley M. Holman, then a member of the Industrial Accident Board of Massachusetts, and a recognized authority on accident statistics, stated that, as a result of intensive study of nearly 350,000 accident reports during the past four years he had reached the conclusion that only 15 to 25 per cent of accidents could be prevented by safe-guarding machinery and other danger points, and that



from 75 to 65 per cent could be prevented by education and personal fitness. It is quite true that Mr. Holman in his address placed the greatest stress upon the importance of what he called "moral and physical hazards", but he presented some striking statistics and testimony regarding the serious nature of the slipping, tripping, and falling hazard, admitting that the lack of uniformity and completeness in the tabulation of accident statistics had rendered it impossible accurately to gauge the relative importance of this hazard. He presented figures compiled by the Ohio Industrial Commission for the year ended June 30, 1915, showing that, of 6,350 accidents, presumably confined to wood-working establishments, 3,595 were directly due to slipping, stumbling and falling on stairs, floors, etc.

Although not so specified it is apparent that a large proportion of the other accidents, whose direct cause is assigned to cranes, belts and pulleys, planers, joiners and saws, may have had their contributing cause in the dangerous condition of floors or in floor lighting.

#### ADEQUATE STATISTICS LACKING

My inability to produce conclusive statistics to demonstrate the importance of the condition of mill floors and mill lighting as contributing causes of textile accidents is due to the lack of such statistics. The importance of accident statistics as the basis of safety education is generally acknowledged, and if poor floors and poor lighting can be demonstrated to be more hazardous in textile mills than textile machinery, then the development of some simple method by which such important contributory causes of accidents may be listed adequately cannot be avoided. Ask any superintendent, overseer, or intelligently observant operative in a textile mill to give the initial causes of accidental injuries in the mill that have come directly under their observation, and in nine cases out of ten I feel confident that it will not be a machine, belt, pulley or shafting that will be designated, but either the condition of the floor, something on the floor, poor lighting, or the physical status of the injured. Of six serious personal injuries that came under my observation while I was engaged in textile mill work only one was directly traceable to a machine or to the physical condition of the injured; the others were caused indirectly or initially by slipping on wet or oily floors, by tripping over a truck, and by stepping on a roving bobbin. The obsession of one cotton-mill agent, for whom I worked, was clean floors, not only free from dirt and oil spots, but also clear of bobbins, spools, trucks, and other obstructions; some other mill agents laughed at him for the expense incurred in sweepers' wages, and in the time taken by the operatives in keeping clean their section of floor space, but it is a notable fact that that particular mill had remarkably few personal injury cases. Most of the rooms in this mill were well lighted both naturally and artificially, but, had the lighting been poor, the fact that floors were well constructed, were kept immaculately clean and always clear of obstructions about the machinery, would have still reduced accidents from so-called contributory causes to a minimum.

**CLEANLINESS, ORDERLINESS, AND LIGHTING**

It is not my purpose to criticize the valuable work that has been done to eliminate or minimize the hazard of operative textile machinery; this was safety work that had to be done at some time, and the majority of machinery builders and manufacturers are happy that so much progress has been made in so short a time, despite the large expense involved. The application of guards and locks to most textile machinery has progressed as far as safe and practical operation would seem to warrant; to go to the extremes advocated by some safety authorities is impractical and unnecessary. By the concentration of equal effort upon the elimination or minimizing of contributory causes due to the physical status of operatives, and to the condition of mill floors and lighting will prove far more effective eventually in reducing personal injuries in textile mills and other industries to the lowest practicable minimum.

Make the safety slogan for the coming year "Clean and Clear Floors and Plenty of Light" and there cannot fail to be a far more marked decrease in industrial accidents than has resulted from the adoption and application of all varieties of textile machinery, guards and locking devices, and the cost of such a campaign is negligible. It has been said that the safety problem is fundamentally psychological, and that what needs most to be done is to make men think in terms of safety. Keep your floors clean and unobstructed, and your rooms well lighted and it will make it possible for your operatives to think directly in terms of safety. By minimizing or eliminating contributory causes of industrial accidents you will make it possible for your operatives to concentrate upon the very few really dangerous sources of accidents in textile mills.

**CHAIRMAN ROBINSON:** I think that is going to be a paper on which we can get some good discussion after this is over.

We have for our next speaker a man who is Safety Engineer of one of the largest textile mills in the East, and a man who has had considerable experience in the safety game, not only in his own mills but throughout the section of the country where he is employed, and I take considerable pleasure in introducing Mr. C. H. Stowell.

**SAFETY ORGANIZATION FOR A LARGE TEXTILE PLANT**

**C. H. STOWELL, SERVICE DEPARTMENT, PACIFIC MILLS, LAWRENCE, MASS.**

In the formation of a safety organization for a textile plant of more than four or five hundred employees, the most important facts to be considered are that there is no standard or ready-made organization that will fit all plants and that a form of organization that is perfect for one plant may be of no use to another. The larger a textile plant is and the more varied the work done, the farther away from any standard the organization gets.

A successful organization must provide for representation of all departments, however small, and so arranged that any individual in the plant, whoever he may be or wherever he may work, will have an easy

method of getting a recommendation before the proper committee. It must also be such that any information going down from the top through the organization will reach all employees.

The membership of the various committees should be truly representative, that is, they should contain the proper proportion of employees to cover the variation in sex, nationality, skilled or unskilled workers, etc. On workmen's committees there should be no members ranking higher than section hand.

The members of safety committees should be carefully selected. Wherever it is possible they should be elected by the employees. If this is done, more interest will be taken in the committee work. Care should be taken to make sure that all classes of employees in a department have a chance to be members.

#### THE PACIFIC MILLS SAFETY ORGANIZATION

The simplest way in which I can bring before you my ideas as to the best form of safety organization will be to describe the organization we have at the Pacific Mills in Lawrence. The plant there consists of three Departments: Cotton, Worsted, and Print Works, employing 7,800. The work done includes cotton and worsted manufacturing, printing, dyeing, and finishing.

The present safety organization dates from July 1, 1919. Previous to that time considerable accident prevention work had been done by each superintendent through his overseers and the accident rate for several years had been lower than the average textile plant.

The head of the organization is the Agent and all matters which go up through the various committees without being settled are submitted to him for final decision.

Next to the Agent is the Committee of Superintendents, consisting of the superintendents of the Cotton, Worsted, and Print Works Departments and the Assistant Agent. All matters affecting the whole plant come before this committee and matters of general policy in regard to the organization are formulated.

#### DEPARTMENTAL COMMITTEES

Each department has a separate organization. In the Cotton Department there are three committees. The Overseers' Committee consists of the superintendent, assistant superintendent, all overseers, and the foreman of the repair shop. The Workmen's Committee consists of eighteen employees, who must be section hands or lower in rank, selected in such a way that all departments are represented. The Inspection Committee is a sub-committee of three elected by the Workmen's Committee. The organization at the Print Works is similar, but is larger, the Workmen's Committee consisting of thirty employees.

Conditions in the Worsted Department make necessary a somewhat different organization. At the top is the Superintendent's Committee consisting of the superintendent, three assistant superintendents and the master mechanic. The department is divided into three parts, Manufacturing,

Finishing, and No. 10 Mill, which is a separate plant a quarter of a mile from the rest of the department. Each of these divisions has its own organization headed by an assistant superintendent. The membership of the Workmen's Committees is eighteen for Manufacturing, nine for Finishing and twelve for No. 10 Mill.

The committees of the employees meet every two weeks, being allowed half an hour at the close of the day. The Overseers' Committees meet every two weeks, the meetings being considered as part of the duties of the overseers. The Superintendent's Committee of the Worsted Department meets at the call of the chairman. The Committee of Superintendents meets every four weeks.

#### THE SAFETY ENGINEER'S DUTIES

The safety engineer is a member of all committees, has general charge of safety matters, regulations of the State Board of Labor and Industrial elevator regulations, and liability insurance matters. His office handles the accident reports and correspondence relating to them and keeps records of all the committees.

The terms of the members of the various workmen's committees are so arranged that one-third are appointed each month for a term of three months. In this way it is made sure that there are enough old members on the committees at all times so that the business may be carried along without interruption. The object of making the term only three months is to give a large number of employees experience on the committees with the resulting education in safety. Women are given proportionate representation.

The method of procedure with the committee is for each inspection committee to make a thorough inspection of its own department once a month and report to the Workmen's Committee of which it is a part. The Workmen's Committee considers the recommendations made and, if approved, they are submitted to the Overseers' Committee. Matters which cannot be settled here are referred to the Committee of Superintendents except in the Worsted Department, where they first pass to the Superintendent's Committee. It is the general policy to dispose of the recommendations as low down in the organization as possible.

On all recommendations a definite answer is returned to the committee in which the suggestion originated. Either the recommendation is approved and the work done or the reason given why it cannot be approved. In some cases a substitute may be offered. During the first year of our organization more than 800 recommendations were made by the various committees and it was only found necessary to disapprove about twenty.

It will be noticed that with us all men in executive or supervisory positions are permanent members of the safety organization. If an organization is to be successful it must be part of the plant and not treated as a hobby or necessary evil.

As a means of encouragement for the committees and to keep up the interest, there must be action on the recommendations within a reasonable time. Most of the matters brought up by the committees are in the

nature of minor repairs which can be done within a short time. If these can be reported at the next meeting as finished, the effect on the committee is very good, as the members feel that they are accomplishing something. On the other hand, a committee is easily discouraged if its recommendations have no apparent effect.

You know from your own experience if you see something about the plant that needs to be remedied and you make a suggestion and then in a few days you feel that that suggestion has been carried out, it encourages you to be more careful with your suggestion. That is the way with our committee. We try to get the work done as quickly as possible.

During the past winter, it has been difficult to do this work on account of trouble in getting material and getting help, but in all of these 800 recommendations of which I spoke, at the present time I think we can say that at least eighty per cent have been completed. Those vary all the way from two or three boards in the floor that may need nailing down to guarding a whole set of machines, but we don't depend upon our safety committees to keep the plant safe. I don't know that it would be well to tell them so, but we don't. We depend upon the overseers and our own safety engineer's office and it is very seldom—I don't think it has ever happened—that any committee has made a recommendation regarding a machine of which we have not already in our office, a report as being previously recommended by the safety department. Probably you will have the same trouble in your mills. It is difficult to get this work done. The mill is run to turn out cloth; that is the first object and that is what I try to have the men working for me keep in mind—that the mill is run for a purpose and everything must tend toward that end.

Now in a great many plants it has been said that there was opposition at the present time. In our plant I don't think there is any overseer or man in charge of the work who would be willing to see this safety organization discontinued. In fact I think there would be a great deal of opposition to any such suggestion. That wasn't the case when I first started with the organization, however. I have about seventy-five overseers to deal with and out of that number when I first started in, I doubt if there were more than a dozen who cared very much about this safety work. I made it a point to go to each overseer and work on him until I had him with me and I had to use various methods of doing that.

In some cases I find that an overseer had been trying to get some kind of safety work or something related to it into his department and couldn't seem to make any progress on it. In that case I had to take it up with the committees and get it done, having that overseer with me. It took me pretty nearly a year to make sure that I had every overseer with me. We had baseball, and "mill nights" at the Y. M. C. A. The men played pool and had races and various other things. Those things when brought before the committees, were brought up at the beginning of the meeting and we would get the employees talking about something and when we got through with them and got to talking about safety, we had them talking and went onto the other subject.

The principal difficulty is to get the safety committee to talk. They are willing to sit there and listen but it is hard in many cases to get them

## *Textile Section*

to say anything. One way in which we get them started is to call a report from each department, to ask how his department is and if there is anything he wants to suggest. In that way we get them started.

### DISCUSSION

**CHAIRMAN ROBINSON:** I think a great many questions have been brought up that we should like to discuss. I am particularly interested in Stowell's talk for the reason that I have had difficult work in my own on safety committee work and I think that the safety committee organization is something that every concern has to buck up against and started and in my own opinion it is one of the biggest difficulties out of selling the management. In our concern I had the management before I started but getting the workmen sold was different. One of the best ways is through safety committees.

Another point in Mr. Stowell's talk that it is well to emphasize, is more can be accomplished by personal solicitation of the overseers than by sitting in the office and writing letters. So many safety men think they get a good mahogany desk and can dictate letters to a stenographer about safety conditions, they will accomplish safety work. I have never known a safety man who stuck to the office or a safety supervisor who was an office chairman that made a success of safety work. You have to go out and get that personal acquaintance with the foreman.

I find in my own case the best way to get next to the foremen and overseers is to attend meetings of outside interests. If they have a field or anything like that, I am always willing and ready to go out. If they have a ball game, I am ready to play. If they want some games, I am ready to enter into them as heartily as they do. In that way you get to know the human fellow outside of the business end and when you go to him in the shop and say, "Well, Bill, there's a fellow over there that is doing an unsafe thing. Don't you think that he could be cautioned or could get him to do it a little differently?" Why, nine cases out of ten that foreman is with you simply because you are not doing it in a dictatorial way. You can see things that perhaps he, being so close to them and being so used to seeing them done, has passed over time and again and in the future he will be watching for those things.

Mr. Stowell has emphasized that fact of personal solicitation very nicely and I will leave it to the meeting if they want to question Mr. Stowell. If so, you can present your questions to him or you can ask questions about any of these other papers. I would recommend that personal experiences be given. I think that is one of the best means of discussion. If somebody can get up and tell what they have done, it will give you a chance to go home with some new ideas.

**MR. STOWELL:** We are here to get all the information we can and it seems to me that there is no need of sticking strictly to the subjects announced. If there is any information I can give, I will be glad to give it. There is one thing about overseers. If there is an overseer that is in opposition to the safety organization or any man or any employee in a mill who has charge of work, I don't say to myself, "What is the mat-

with that man? What is wrong with him?" I am more inclined to say. "What is the matter with the Safety Engineer? Why hasn't he got that man with him?"

**"INFORMATION FOR NEW MEMBERS OF SAFETY COMMITTEES"**

I try to work on that basis and then go after the men and get them. Possibly you would like to criticize this little book of instructions we give the employees. This is very carefully written. I went over that dozens of times before I had it printed. It does fit us. Maybe it won't fit all mills. There is one thing here in particular that some have criticised. At the bottom of the first page inside where it speaks about bringing the matter before the overseer before bringing it up in the committee, you would judge by reading that over, that we were trying to interfere with the members of the committees in what they want to bring before the committees, but that is not the case. We find we get better results in every way by getting the members of the committees to go and talk to the overseers, explain what their suggestion is going to be to the committee and get any information or any word that he could give them on it because we get better co-operation from the overseers since we began to do that, than we did before.

Our overseers, we believe, are high-grade men. They take pride in their departments. They want them to be the best departments in the mill and if they find that some of these things are coming up in this way, they try to think up methods of overcoming the objections or complying with the suggestion of a member of the committee. Then when they have their own overseers' meetings, they are prepared to speak about it and give intelligent information to their own committees and then we have the records of the workmen's committees written out. The stenographer makes extra copies and sends them to the superintendent or the assistant superintendent in the worsted department and he takes the copies and cuts them up into strips and gives the overseer of the department concerned, any recommendation which concerns him. Then before the meeting of the overseers, he can look that matter up and he is all prepared to state his opinion and give whatever information he can.

We vary from that rule on the inspection committee. They are expected to go through the plant and see the actual conditions and report them and we don't want them to talk to the overseers unless it is on some small matter that can be remedied right away, so there is an indirect way in which a member can bring the matter before the committee without going to the overseer by calling the attention of the inspection committee to it as that committee goes through the department.

**INSPECTION REPORT FORMS**

**MR. A. J. DRESKA** (Paramount Knitting Co., Waupun, Wis.): I would like to ask Mr. Stowell if he has a regular form for the inspection committee.

**MR. STOWELL:** We have no form for the inspection committee. My assistant was rated as safety inspector and makes a weekly inspection of

the plant and fills out the form which the rating bureau of Massachusetts requires. It completely covers the whole plant but the form of report for the workmen's committees is simply keeping the minutes the same as you would keep them for any committee. We keep the actual minutes of the meeting and each recommendation brought up there is numbered and is put on a card index so that no recommendation is ever lost and must be accounted for in some way. It either goes up to the top and is disapproved and goes back to that committee, or the work is done and at the next meeting of that committee, a report is made on every recommendation to that committee reporting what action has been taken on it.

CHAIRMAN ROBINSON: Is there anybody here representing a conference which does have a regular inspection blank for their committees with certain specified questions?

MISS WILSON: I tried the plan of having typewritten a list of the points that the employees' committee will take up and I tell them to take up any others that come to them, not only for safety but sanitation, and I found that to be very, very helpful. They don't know what to look for unless they are told.

CHAIRMAN ROBINSON: In other words, you give them a hint of what they should be on the lookout for.

MR. DAVID S. BEYER (Liberty Mutual Ins. Co.): The insurance companies give an outline of the information for which the safety committee should look, on a regular printed form.

MR. JOHN RENNIE (Joseph Bancroft & Sons Co., Wilmington, Del.): Mr. Beyer has spoken of a form. We use that form all the time and find it very successful. The questions that are supposed to be given are filled out regularly and they cover practically everything in the plant.

There is just one question that I haven't heard discussed at this meeting and that is a school for foremen that is outside of the plant altogether.

We found last winter that that was a very successful thing in Wilmington. The Delaware Safety Council, in connection with the National Safety Council, formed a school for foremen and all the industries in that district have foremen at these meetings and ninety-five per cent of our men were there. All last winter at these meetings they broadened the thing out considerably.

CHAIRMAN ROBINSON: Along that connection, Mr. Rennie, we carry on the same school in Worcester, a foremen's school.

#### WORKMEN'S COMMITTEES

MR. STOWELL: I was going to state in regard to the blank to be filled in, we tried that for a few weeks at first but it was too much for the committee to attend to. They paid more attention to the blank than to the inspection, so we covered that by having the safety inspector go with the committee, giving them any help or information they want, and then brings up another point that I forgot to mention.

A first I attended the meetings of the workmen's committee myself, but I found that the members of those committees considered that I was re-



representing the management and they wouldn't talk as freely as I wanted them to, so instead of going to the meetings myself, I send my assistant and he acts as chairman of the meetings and we get better results in that way. I attend meetings of the overseers.

CHAIRMAN ROBINSON: In relation to committees, I want to give you an experience I had when I started out. I had a general workmen's committee which took in the whole plant. I found there was a lack of interest and in analyzing the cause, I found the reason was that we would have the committee talking wood-working safeguards in our plant and the members of the committee who were from the foundry or from the machine-shop were not interested. Therefore I split my safety committees up so I have men now representing only that kind of work.

In the textile mill, of course, you have got a little different condition, but I should say that the best plan in my own experience would be to take your people that are doing the weaving and have a weavers' committee, then a loom fixers' committee and the mechanical department separate. I don't know whether anybody has tried that in the textile mill but we found in our mill that the best way was to have the committees divided so that they considered their own particular hazard and gave them a chance once in six months to inspect the other departments to see what they could find. It caused a little rivalry and a little interest but they preferred just to talk their own hazards and not talk the hazards of the other parts of the shop.

MR. ALFRED BURNS (West Boylston Mfg. Co.): You have just spoken of a thing I was thinking about. Mr. Stowell says a committee of three of the workmen's committee form a sub-committee of the inspection committee. Well, I don't think they are quite qualified, for instance if they are weavers, to speak or look for dangers in the card room or spinning room or twisting room. I think as you said, a committee from each one of those rooms should inspect their own department.

MR. STOWELL: The reason that inspection committee is a sub-committee is because the workmen's committee is too large to go through the plant. We wanted the committees large enough so that every possible department would be represented, but of course, we couldn't send those full committees through the plant. This sub-committee reports to the workmen's committee, and there are on that workmen's committee men who are loom fixers or weavers or who work in all parts of the plant and they are qualified to pass on any matters that come up in their own part of the plant and we try to cover it in that way. The only reason for that inspection being a sub-committee is to make it a committee that can be reasonably handled.

The nurse also, wherever possible, goes with this inspection committee and inspects the sanitary conditions.

CHAIRMAN ROBINSON: Mr. Stowell, are those three members of the inspection committee always the same men or do they differ at each inspection?

MR. STOWELL: This inspection committee is actually elected by all the workmen's committee. They can put on that committee anybody they desire and when the term of any member of the inspection committee ex-

### *Textile Section*

pires, that makes a vacancy and that is filled by the workmen's committee. A member may serve on that committee a month or maybe two months, but usually we find where an employee goes on to that inspection committee for a short time, say a month, he is apt to be re-elected to the workmen's committee and then re-elected on the inspection committee so the average time is anywhere from one month to four months. Of course it requires one trip around the plant by the members of the inspection committee to get familiar with the plant and to be of any use to the committee. That is why we make the term three months. We tried two months at first but that wasn't long enough. We have always found there is quite a strong desire to become a member of that committee because of the opportunity of seeing the rest of the plant.

All textile mills have employees who have been with the plant for possibly forty years and have never seen much of the plant outside their own department and for that reason, many want to get on this inspection committee and in that way we get good men.

MR. B. G. RUMSEY (Standard Textile Products Co.); We have divided our workmen's committee into a certain number of portions and divided the plant into a certain number of zones and at each inspection, each zone is inspected by a certain portion of the workmen's committee. This is alternated in each inspection which brings every member of the workmen's committee into the entire plant. They can go through the plant and look it over in one-fifth the time; that is, there being five groups moving over five zones. They go in rotation. Each particular member of the committee gets around the plant looking over the entire plant during the course of service. We have found that quite interesting. There is a little rivalry watching for the inspection committee's next trip, that is to say that the people going through on an inspection trip don't want to leave any loose ends to be picked up by the next group. They want to make it clean cut. It has been quite successful.

MR. STOWELL, I had one question in mind in regard to having all overseers serve on the committee. That means that all the overseers are at some certain portion of the day, once every two weeks, away from their departments, grouped at one place. Have you found a suggestion or thought that there might be a little hazard in that? If some emergency came up, such as a fire, leaving the department to husk for themselves for the moment without the overseers? Has it ever disturbed you at all?

MR. STOWELL: That has occurred to us but in order to answer that I will have to brag a little about the Pacific Mills. It is the policy of that plant to have the departments organized in such a way that the overseer can leave at any time but of course that can't always be done. At first, we had the overseers' meetings at 11:30 and we found it caused disturbances in some departments by having overseers leave at that time just before noon. Everybody in the department knew that the overseer had gone out and wouldn't come back until after noon and that was the principle reason why we changed the time to 10:00 o'clock but our meetings are held in such places that the overseers would not have very far to go to get back to their departments. The plant is large

out in such a way that that can be done. Probably inside of one or two minutes they could all be back in their own departments.

CHAIRMAN ROBINSON: I imagine one thing in the mind of Mr. Rumsey was the slacking of production.

MR. RUMSEY: That partially.

CHAIRMAN ROBINSON: Of course, where you have piece workers that shouldn't affect them very much.

Any other discussion on these workmen's committees?

MR. STOWELL: This difference of opinion emphasizes what I said at first. An organization that is perfect for one plant may be of absolutely no use to another. This organization I have described—I have dared any one in the plant to improve it and there have been no changes whatever in it in a year and a half. Anything with any faults in it would be corrected within a short time and in Lawrence last year, the State Board of Education provided a course in safety engineering of which I was instructor. One of the problems I gave the class was to work up a safety organization for their own plants. In that class, I had assistant superintendents, master mechanics, and others of quite a number of the plants in Lawrence, and I had instructed them and given them my own organization as an example. They tried to draw up organizations for their own plants and there were none that could use that system at all. They found that they had to go on that general plan but make up their own plans from that. There was one plant in particular that tried to use this organization but they found they had to change it because of the layout of their own plant.

This is laid out to cover our own plant. There is no other plant at Lawrence built in the same way. I doubt if there is any other plant in the country built in the same way because our space is limited. When we increase, we must go a little distance away from the main part of the plant. This No. 10 mill in the worsted department that I speak of is one of the best plants in Lawrence. It employs about 1200.

A peculiar thing about the inspection committee in that plant is that they find it difficult to make any recommendations. Recently, instead of making recommendations they commended certain departments for being especially clean or for some particular reason of that kind. Some of the other parts of the plant are from sixty to seventy years old and of course the conditions are entirely different there and we try to make this organization cover our own plant.

MR. RENNIE: I would like to ask Mr. Stowell the rate of accidents in that particular plant.

MR. STOWELL: I have tried to make comparisons of the first year of the safety organization with the previous years but it is practically impossible to make any accurate comparison because during the preceding year it was during the war part of the time in which conditions were abnormal and accidents would occur and employees wouldn't report them and also nobody wanted all this information and the records were not kept in such a way that we could make an accurate comparison, but as near as I can figure, there was a reduction of the first year of organization of somewhere between twenty and twenty-five percent in the

### *Textile Section*

number of lost time accidents. The severity of the accidents was reduced something more than fifty per cent. Of course that was partly due to the fact that we put first-aid rooms in just about the time the safety organization started.

We watch the employees and they are obliged to go to the first-aid room for treatment no matter how slight the injury and we can take proper care of them and see that they don't go home unless it is necessary that they come back when they are ready to come back, and that is one of the principle causes why that reduction in severity of accidents has been made.

As near as I can figure, the rate of accidents at the present time including all lost time accidents, however slight, is about four to 100 employees per year.

MR. BEYER: I should say that is a very good record for a textile plant. We find the average is six or seven per hundred in textiles and on an average thirty or forty per cent.

CHAIRMAN ROBINSON: Now just before we leave the inspection committee, there is one thing I might tell you about my own case that may be interesting in regard to sanitation and cleanliness. We have, in our plant, a Sunday inspection, so called, where the heads of the various departments—there are about twelve of them all told—from the general manager down, the superintendent, assistant superintendents, chief engineer, superintendent of foundry, employment service man and each head of department makes an inspection of the plant on Sunday, so that it comes around about once in two or three months for each one, criticizing conditions, especially such items as oily waste left around and alleys were blocked and such things. We have got now, by those Sunday inspections, what we consider to be one of the cleanest looking plants in the city on a Sunday with the result that the habit is extended to week days. That is, the foremen in order not to have too much to do Saturdays cleaning, keep the place in better shape and it has resulted in better, cleaner, more sanitary conditions.

If nobody has more questions on safety committees, we will pass on.

MR. STOWELL: We used to give instructions orally to the members of the committee as to what they should do. We found it difficult to make them understand in some cases. This was quite an expensive thing to get up, but I found after we began to give it out we could almost make the changes in the committees. They understood what they were to do and they understood from this diagram where their committee fitted with the organization and if there is one thing that I would recommend more than any other, it is that the members of the committee have something of this kind. (Referring to the pamphlet of Information.) When a new member is elected, each overseer gives one of these to the new member and he knows what he is there for.

#### ACCIDENTS CAUSED BY SLIPPERY FLOORS

CHAIRMAN ROBINSON: One subject that has been brought up in my mind very distinctly by Mr. Clark's paper is slippery floors and I thi

that if anybody has any contribution to offer on the subject of accidents due to slippery floors, it would be welcome to the other members.

Mr. Beyer, what do you find in that line? Do you find many textile accidents caused by slippery floors or rolling bobbins or things like that?

MR. BEYER: We have found a number of accidents due to such cases. It is as hard to avoid entirely as accidents due to bare feet. I thought Mr. Clark had a very interesting paper and I am rather sorry he wasn't here personally to support some of the statements he made. It might have made a more interesting discussion had he been here.

There are two or three points that struck me as the paper was being read, in which it seems to me his deductions might be due to a misunderstanding of the conditions, as for example, in the rating schedule. He spoke about the use of machine ratios in the textile industry as compared with other industries.

I happen to have been a member of the committee that worked out those machine ratios and we found that there was a very much higher ratio of machines to operatives in the textile industry than in almost any other industrial division and we also found that the proportion of mechanical accidents in the textile industry was higher than almost any other industrial division so that we did not, as Mr. Clark seems to think, base our judgments merely on the fact that we found more machines there. That was only one thing considered and since we have the record of hundreds of plants over a period of years covering accidents and accident costs, we are in a much better position to form a judgment with all that data, than any one working in a plant whose vision is more or less limited to the accidents with which he comes in contact.

The matter was given very careful study. We had a very broad statistical basis back of it so it was not a snap judgment based on the appearance of the thing as one might infer that Mr. Clark thought it was.

He spoke about the accident reports being inaccurate or misleading, from the standpoint of the real cause of the accidents.

We do find that in many cases the immediate cause which leads to an accident may be, for example, a slippery floor which causes an employee to slip and make an unexpected motion and put his hand in a pair of gears, and yet, if the gears were guarded that slip would mean nothing. Employees slip many times and no accident occurs. So where an employee is injured in an unguarded gear, even though he put his hand in the gear in that way, I think it is fair to charge the accident to the gear, because the gear could be guarded to prevent the accident.

CHAIRMAN ROBINSON: On the other hand, if he hadn't slipped, he wouldn't have put his hand in the gear.

MR. BEYER: That is true, yet we know the management *could* guard the gears and could not always prevent the slipping, so I think it is perfectly logical to attribute such an accident to lack of mechanical protection.

Mr. Clark spoke also about the light, and about clean floors, both of which are very desirable, but he said the cost of maintaining such conditions is practically negligible. I think that is a rather questionable state-

### *Textile Section*

ment. In the newer mills we generally find lots of window area. . . of the older mills have large unlighted wall area and the building wide; to provide light in the middle of such buildings at all times is an inexpensive matter. The question of keeping the floors clean is only a matter of habit, and is more easily handled.

I think Mr. Clark's paper was very interesting and I only wish we were here to discuss it further.

CHAIRMAN ROBINSON: I think that is one thing the textile industry is up against, and perhaps in New England more than anywhere else that is that the mills were built a good many years ago, and they existing conditions which to change would mean a monetary outlay which is pretty hard to say is warranted, in order to reduce accident

The mills that are being built now-a-days, especially in the South where there are a large number of new mills being built, have taken consideration the lighting proposition, so that eventually all these mills will have to be replaced by newer buildings anyway, and at that time the lighting situation will naturally be improved.

MISS WILSON: I should like to ask a question for information there any one here who can tell whether or not there is value in putting whitening on twister-room floors to take up oil?

MR. C. E. PETTIBONE (American Mutual Liability Insurance Company, Boston): I cannot answer that directly, but I might say this, that I have found, on slippery, oily places that a great deal of the trouble could be avoided by sprinkling it with lime dust.

CHAIRMAN ROBINSON: Is that what you refer to as whitening?

MR. PETTIBONE: No, I imagine not, but the effect would be practically the same.

MISS WILSON: It is the same thing, practically a chalk.

CHAIRMAN ROBINSON: I found, in connection with wood-working establishments, our Providence Plant has used resin to some extent on floors, preventing slipping. I don't know whether that has been tried in textile mills or not.

MR. STOWELL: If there is any one thing we pay more attention to than any other, I think it is slippery floors. We tried various things. We tried powdered pumice-stone, possibly Miss Wilson refers to that. We tested various soap powders advertised to clean floors without making them slippery. The average scrubber isn't satisfied to clean the floor without a large amount of suds. We tested two or three of these powders and then the chemist analyzed them and found them simple. One was made up one of his own, and we use this powder made by him now. It is something like borax. I don't know what it is. It will clean the floor without suds, and ten minutes after the floor is washed it is dry and not slippery. The principal reason for slipping is a scum after it has been washed. In one part of our mill we use three women in washing floors, and there is no trouble at all there from slipping. The floors after washing are clean. After washing they mop them so that there is nothing left on the floor at all, and in a few minutes they are dry and not slippery. I think the principal cause of slippery floors is the wrong method of washing.

MR. R. G. STOWELL (Carter Bloxonend Flooring Company, Chicago): I represent a floor concern. I have been interested in the textile industry for the reason that a great many concerns have endeavored to produce a floor that would prevent slipping. Several are on the market, and all are good. In some textile institutions they are now considering the use of an end grain wearing surface which will prevent slipping. The question now up with these floor people is the very thing that you have up here now, as to how to clean them properly. There is no doubt that the end grain wearing surface on a wood-block floor will absorb a great many of the things which fall upon the floor, naturally, which could not be mopped up, but the dry-cleaning of an end grain floor is a thing that will make the end grain wearing surface the floor for textile mills, and we are hoping to produce that.

CHAIRMAN ROBINSON: That is an excellent suggestion for new mills. It is kind of an imposition to ask an old New England manufacturer to go through his plant and put in block pavement.

It is a mighty good thing not only for the non-slipping, but also for the quiet. In trucking over it you don't get the loud noise that you get on a smooth floor which is apt to disturb the operator.

MR. PETTIBONE: May I say something about the point Mr. Beyer brought up about the gears and slipping? A firm I was formerly with had analyses made of many accidents and we soon found that we would have something to do to determine to what to charge the accident. The question first came up as to who was responsible for accidents. You can follow that through and there is a certain responsibility to the president of the concern, possibly very remote; some to the foreman, and so on down the line, and we tried to find the man who by his action alone, the last man, could have prevented the accident. We found it was the man to whom we charged the accident, and on that same principle we took the last condition, which by changing, or protection (which in this case was the gears), would have prevented the accident, and blamed it on that.

I think you must have some rule along that line to determine how you are going to charge your accidents, and we have found that that worked out very satisfactorily.

CHAIRMAN ROBINSON: That is a good suggestion. Are there any other suggestions or questions, regarding slippery floors? How about material lying around on the floors: roving, bobbins, and so forth. how can you prevent that? I think myself that about the only thing is education.

MR. STOWELL: I think I have talked too much already, but that is another thing we do in sort of a systematic way in the weave room where you find most of that trouble. The weaver is held responsible for his section of the floor. The same thing holds good in other parts of the mill.

CHAIRMAN ROBINSON: Even though the bobbin may have come from a loom not in his section a section hand is held responsible for his section.

MR. STOWELL: Yes. The principal trouble is that some of the automatic looms don't drop their bobbins in the right place, but throw them on the floor.

## *Textile Section*

MR. RUMSEY: You come back to what I said before. If every foreman were a capable inspector, there would be no slippery floors.

CHAIRMAN ROBINSON: The foreman is the final man, and if you get the foreman with you, you will cut down accidents. I think you find that in most cases the foreman is the key man.

Are there any other suggestions?

We sent out a questionnaire here sometime ago, requesting that everyone consider any questions they would like discussed and send them in. We got a few questions, and one of them is on standard guage which we got from Mr. Rennie. I think, Mr. Rennie, that that will be taken care of in tomorrow's meeting.

The chief job of this section this year, will be to establish safe standards, and in that connection it might not be out of place to announce that the Textile Section have offered their services in joint sponsorship with the mutual casualty insurance companies, in drawing up a standard set of textile safety pamphlets, or a standard set of rules governing safety in textile plants.

There will be a meeting of this Section, together with the representatives of the mutual companies, tomorrow after the morning session to appoint a permanent committee to work on this for the Engineering Standards Committee, which is composed of the four engineering societies. The Engineering Standards Committee has volunteered to undertake standardization of all kinds of practices and work. The National Safety Council is very closely connected with them in safety standards. The Textile Section is the joint sponsor with the mutual casualty companies in drawing up the Textile Section Safe Practices.

MR. STOWELL: I would like to ask if anybody here can give me this information or not. I wanted to find a real up-to-date lunch room. Is there anybody who can tell me of such a place?

MR. CONRATH: I was down to the International Harvester Company at Milwaukee works and I saw a really elaborate lunch room there. One of their inspectors was here.

MR. RENNIE: I was through the Allis-Chalmers Company and saw an excellent lunch room there.

CHAIRMAN ROBINSON: We have not talked much about the jute and hemp industry but maybe Mr. Conrath will say a few words in regard to safety in this industry.

### THE JUTE AND HEMP INDUSTRY

MR. CONRATH: The only thing I can say about the jute and hemp industry is that we have had the same trouble with slippery floors, and have purchased electric machines for doing some of that work outside of working hours, Saturdays and Sundays, so they are all right. In certain places we have put matting or linoleum on the floors.

CHAIRMAN ROBINSON: Of course the wood-working industry recommends the use of rubber mats very largely around wood-working machinery. I am afraid if you attempt to do that around the looms in a textile mill it would be a very expensive proposition, but a corrugated rubber mat



is a good non-slipping surface. The only thing you have got to be careful about is not to have it projecting above the floor and thus make it a tripping hazard.

MR. A. E. CONRATH: The rubber and oil don't agree. The oil eats the rubber and softens it.

ADJOURNMENT.

### THURSDAY MORNING SESSION

THE meeting convened at 10 A. M., Chairman H. L. Robinson presiding.

#### REPORT OF NOMINATING COMMITTEE

MR. D. S. BEYER: The Nominating Committee has succeeded in making a unanimous report, with one exception, and that is for the chairman of the committee. We had one member that objected very strenuously to the name of Mr. Stowell, that member being Mr. Stowell himself, but the rest of the committee, combined, was able, by a majority vote, to put his name through as nominee for Chairman.

For Vice-Chairman the committee would like to appoint the name of A. E. Conrath, of the International Harvester Company, the present Vice-Chairman.

For secretary, Mr. B. G. Rumsey of the Standard Textile Products Company.

That would give representation on the committee of an Eastern mill, as Mr. Stowell represents the Pacific Mills; a Western mill, represented by Mr. Conrath; and a Southern mill, as some of the mills of Mr. Rumsey's company are located in the South. This will give a fairly good geographic division if the members decide to accept the recommendations of the Nominating Committee.

(The report of the Nominating Committee was accepted.)

(Mr. Bigelow, Asst. Chief Engineer, etc., then read a paper on "Accident Prevention in Cotton Mills", which with the discussion that followed will be embodied in a Safe Practices pamphlet to be published later. Accordingly this paper will not be included in the Proceedings.)

#### ORGANIZATION OF TEXTILE SECTION STANDARDIZATION COMMITTEE

CHAIRMAN ROBINSON: Now we have several casualty men with us, so I would suggest that we proceed to appoint a temporary secretary and a temporary chairman and get organized.

MR. BEYER: I think we have a very efficient secretary and chairman at present. I move they be nominated for permanent organization.

(Motion seconded and carried.)

CHAIRMAN ROBINSON: To explain a little further; the Textile Section, as some of you know, has had a standardization committee appointed for the purpose of getting up a safe practices pamphlet. As Miss Wilson

### *Textile Section*

stated yesterday, we had five or six meetings this year for drawing up pamphlet, and I would suggest, if I may be permitted to do so, that present committee be allowed to remain, representing the Textile Section of the National Safety Council. They are all big mill men, or the majority of them are, and have had considerable experience in textile work. I will read their names directly and you can add anybody to that committee that you want to. It is simply a representative committee of textile industries and manufacturers, and I would suggest also that new officers of this section serve on that committee.

The committee as it stands at present, is as follows:

|                |                 |
|----------------|-----------------|
| H. L. Robinson | Kenneth Moller  |
| A. E. Conrath  | David S. Beyer  |
| Ida M. Wilson  | A. Makepeace    |
| W. S. Ide      | Henry A. Owen   |
| Geo. Bigelow   | Robert Burgess  |
| James Strang   | C. E. Pettibone |

And the National Safety Council is to appoint one member. That member will probably be Mr. Williams, Chief Engineer, and Secretary at present time.

On that present committee we have got machine manufacturers, mill men, and we have also two insurance men, but that is incidental. I believe they will also be on the other committee.

Now for the Textile Section; I would recommend that you let this committee represent you, but I will also give you a chance to add any other that you think should be there, if you think of any men that are not ready on.

I would like to suggest, myself, that it might possibly be a good idea so long as so many textile mills are in Massachusetts and New England that the Associated Industries of Massachusetts have a representative on that committee. They are members, I presume, of the National Safety Council, but that may be something that your new committee will want to add, and perhaps shouldn't be added on to the Textile-Section committee.

Are there any other recommendations for nominations on that committee to represent the Textile Section for the American Engine Standards Committee on Textile Codes?

MR. CONRATH: Is Mr. Stowell on that committee?

CHAIRMAN ROBINSON: The new officers are on that committee. Stowell and Mr. Rumsey, the two new officers, belong ex-officio on that committee.

If there are no other names that you can suggest I will ask Mr. Beyer representing the casualty companies, if he has anything to say, but we go ahead on that new committee.

MR. BEYER: The National Association of Mutual Casualty Companies has been appointed as joint sponsor for the new code with the Textile Section. They had a meeting some days ago and appointed the following

ing members to represent them, and constitute the Mutual Casualty Companies' committee: Mr. Pettibone, of the American Mutual; Mr. Bessey, of the Employers' Mutual of New York (I am not certain of the detailed wording of these names, but you can get those later); Mr. Youmans, of the Employers' Mutual Liability Ins. Co., of Wausaw, Wis.; Mr. Tatum, of the Textile Employers' Mutual Liability Company, and myself, representing the Liberty Mutual.

It seems to me it might be well to have a joint meeting of the two joint sponsors and to elect officers to represent the joint committee. Unfortunately there doesn't seem to be many of these Mutual men here. They were all advised, and possibly they thought the meeting would last longer. Mr. Pettibone has just arrived, and some of the others may come in.

CHAIRMAN ROBINSON: Would it be better to hold off until 12 o'clock, or would you recommend appointing a Nominating Committee from these two lists and let them proceed with nominations, and call a meeting of the joint committees when they are ready?

MR. BEYER: I think it would be very desirable if we could get the permanent committee organized before we leave the Congress, because we have more representatives, undoubtedly, than we shall be able to get together for another year, since they are so scattered.

CHAIRMAN ROBINSON: Don't you think it would be well, before we have that meeting, to have the Nominating Committee ready to report something?

We can elect a Nominating Committee, it doesn't have to be appointed. The names can be suggested and somebody can make a motion that a certain number be appointed and names can be suggested as to who should be on that committee. Then, when you do have a joint meeting, you will have some business to transact. As it is now, if you have a joint meeting, the only business you will have will be the appointment of that Nominating Committee.

MR. BEYER: I think that is a good suggestion, particularly so, if we could have a meeting later on during the day.

CHAIRMAN ROBINSON: The chair is willing to accept a motion to that effect, that we elect a Nominating Committee.

MR. BEYER: Mr. Pettibone has just given a suggestion which I think is perhaps very good: that we appoint a Nominating Committee here and then take a mail vote of the members.

CHAIRMAN ROBINSON: That is a very good plan.

MR. BEYER: That would give everybody a chance to vote and save getting the people together again.

CHAIRMAN ROBINSON: Have you any suggestions as to who should serve? I think possibly you should have three men on that committee, or possibly five, who know the others and their connections.

MR. BEYER: I would suggest two from the Textile Section, two from the Mutual Casualty Companies, and one from the Council.

CHAIRMAN ROBINSON: I think that is a very good plan.

MR. BEYER: I move that the Chairman be empowered to appoint that committee.

CHAIRMAN ROBINSON: Have you the list of the Casualty Companies?

MR. BEYER: Yes, I can give you that.

CHAIRMAN BEYER: Then I will appoint Mr. Conrath and Mr. Runn as representing the Textile Committee, and Mr. Pettibone and Mr. Bessey representing the Casualty Companies.

Will somebody get in touch with Mr. Bessey? We will ask Mr. Williams, or somebody from the Council, to represent them.

Mr. Pettibone, will you serve as Chairman?

MR. PETTIBONE: Yes.

CHAIRMAN ROBINSON: Is there any special time you want to call the committee together?

MR. PETTIBONE: Are they all here?

CHAIRMAN ROBINSON: Mr. Bessey is not.

MR. BEYER: Perhaps if the committee would go in a body of the present four members and hunt Mr. Bessey, it might be safest.

MR. PETTIBONE: I will say that we will hold the meeting immediately after this meeting adjourns.

CHAIRMAN ROBINSON: Stepping out of the office as Chairman, I wish to present my sincere thanks for the aid of the committee and the Section during the past year.

I know that the new Chairman will be fully as well supported as I was. I am sure he has my hearty support, and I presume that everybody will be very glad to give any assistance.

In formulating this code you probably will be called upon to present your practices in your own plants, along these different lines, and anybody who has anything to suggest would do well to get in touch with the committee as finally appointed and make those suggestions.

I believe the intention is to have everybody that is interested in textile safety, from the manufacturers to the labor unions and the insurance companies and the operators, represented on that committee, so that everybody will have a chance to say something. But, if anybody who is a member of the Textile Section has anything to say or any suggestions to make to that committee, I know they will be only too glad to have their suggestions sent to them.

MR. STOWELL: There is one thing I would like to suggest before I forget it, and that is that there be some effort made to have this code, if it is issued, be agreed upon by all insurance companies, or any one else concerned. There are quite a number of books and pamphlets which have been issued on cotton mill safeguards, and other textile mill guarding, and they give different rules and cause a great deal of trouble.

Now in Massachusetts the insurance standards do not agree with the State Board of Labor, and we have a great deal of difficulty in that way.

I know that the Travellers' Insurance Company is getting up a cotton mill book now because they asked me for some pictures for their book, and it seems to me that somebody getting all these people together and getting uniform books would be of great help.

CHAIRMAN ROBINSON: Of course in getting up the pamphlet the insurance companies are only one of the entire committee appointed. The

was a chance to criticize it given to the textile mill owners and their representatives, and the manufacturers, so that it has had at least a partial examination by those interested, but it might be well if the various insurance companies should have a copy sent to them before it goes to press, and give them a chance to criticize it. That is something that your new committee can take up.

This will not be put on to the press before you have a meeting of your officers for the next year together with this Standardization Committee, and you can, at that time, if you desire, hold up the issuing of this copy until the joint committees have had a chance to decide whether they want to use any of it in their new code.

MR. G. D. BRAGDON (General Accident Company, Philadelphia): I have heard a good deal about the mutuals. Some five or six years ago I got up a set of safety standards for cotton mills and appeared before the Cotton Mill Owners' Association in Georgia. We tried very hard, at that time, to put over safety standards in that locality, but there do not seem to be any representatives of the Southern mills here.

CHAIRMAN ROBINSON: Mr. Rumsey is representing the Standard Textile Products. They have several mills in the South.

MR. BRAGDON: I know I was at about sixty per cent of the cotton mills about the Potomac River and at that time we had a set of standards drawn up, and while the cotton mill owners wouldn't adopt it, they gave us their assurance that they were heartily in favor of it. I haven't heard anything about it so I don't know whether anything has been done to put these standards before any of the Southern mill owners.

MR. BEYER: That is the intention of this committee that is being organized at the present time. At present it is just a steering committee which will assume the direct responsibility for getting together the final committee, which will pass on the standards. It is the intention to ask representatives of the stock insurance companies to serve, as well as all of the principal manufacturers' associations. There are two or three different manufacturers' associations in the East and some Southern cotton associations also. Every group of textile people who are organized and will be interested in this, will be asked to have a representative on the committee. We have included the machinery builders, and so forth. Ultimately the committees may have a hundred members.

It is the thought, that if it would be impossible to get them together every time, they would be sent copies of the data for criticism, and before the final work of the committee is undertaken, the entire personnel must be submitted to the American Engineering Standards Committee, and approved by them so that in each case they will go over the list and see for themselves that it is a broad, representative committee, before the ground is really cleared for any action.

The paper which was presented here, is merely a tentative, advance statement, worked up by the present committee but it will be the intention of the committee to get data such as you mentioned, to bring together, to start with, all of the different standards and publications that are available on the subject. This will be done in the case of each com-

mittee. Sometimes there may be half a dozen sets of standards prepared by different bodies along similar lines, and they will be tabulated and the best material taken from each, criticised, and new material added, and may be a couple of years before the final standards are issued.

CHAIRMAN ROBINSON: That is the idea of the Engineering Standards Committee.

MR. BRAGDON: My idea is that there shouldn't be several standards. The stock companies working in Southern States we would like to have a standard to work with.

CHAIRMAN ROBINSON: That is the idea of the Engineering Standards Committee. All these standards will eventually be standard when accepted and in order to have them national, when adopted, everybody that has any interest will be represented and have a chance to criticize them. Will this Nominating Committee also get in touch with Mr. Williams and tell him that he is the representative of the National Safety Council?

The committee is Mr. Conrath, Mr. Pettibone, Mr. Rumsey, Mr. Bess and Mr. Williams.

ADJOURNMENT.

---

#### TEXTILE SECTION STANDARDIZATION COMMITTEE

The personnel of the Textile Section Standardization Committee as constituted for the year ending with the Congress of 1921 is as follows:

C. H. Stowell, Pacific Mills, Lawrence, Mass.

A. Makepeace, American Printing Co., Fall River, Mass.

H. L. Robinson, Crompton & Knowles Loom Works, Worcester, Mass.

Ida M. Wilson, Lowell, Mass.

A. E. Conrath, International Harvester Co., St. Paul, Minn.

David S. Beyer, Liberty Mutual Insurance Co., Boston.

Kenneth Moller, Lockwood, Greene & Co., Boston.

W. S. Ide, S. Slater & Sons, Inc., Webster, Mass.

Henry A. Owen, Whitins Machine Works, Whitinsville, Mass.

Robert Burgess, Maverick Mills, Boston.

James Strang, Saco-Lowell Shops, Boston.

George Bigelow, Liberty Mutual Insurance Co., Boston.

S. J. Williams, Chief Engineer, National Safety Council.

B. G. Rumsey, The Standard Textile Products Co., New York City.

C. E. Pettibone, American Mutual Liability Insurance Co., Boston.

E. H. Coffin, Associated Industries of Massachusetts, Boston.

## Woodworking Section

September 29 and 30, 1920

---

J. E. RHODES, Chairman

Secretary-Treasurer, Southern Pine Association, New Orleans, La.

F. A. BARKER, Secretary

Resident Manager, Lumbermen's and Manufacturers' Insurance Agency,  
Milwaukee, Wisconsin

---

### WEDNESDAY MORNING SESSION

**T**HE meeting was called to order by the Chairman at 10 o'clock.  
CHAIRMAN RHODES: We will first have the report of the Secretary..

#### SECRETARY'S REPORT

I am sure the program for the Woodworking Section of our Congress which is now in session, will prove of interest to all of us. The Council and representatives of each section have been devoting considerable time since our last meeting in Cleveland to the preparation of a program that would cover the advanced work of safety in the lumber and woodworking industry, and the subjects selected must naturally be of interest.

I am advised by the executive office of the National Safety Council that there has been during the past year a very material increase in membership for the Woodworking Section. This is especially gratifying because of the apparent lack of interest heretofore in this hazardous industry.

Reports which we have received from various industries indicate that safety for small plants as well as large, is receiving careful attention from the owners.

The greatest problem brought to our attention is not the physical guarding as much as organization to promote the right spirit among employees, to secure their co-operation to think safety, eliminate carelessness and to co-operate to prevent accidents. This is more essential than physical protection in any industry. It appears that human nature just won't check itself on carelessness. The chance-taker and careless individual are endangering others just as much if not more than them.

selves and they must be educated that it is pure folly to be careless and to take chances.

During the last year the National Safety Council has received many favorable replies as regards its educational work through the medium of bulletins, plans for organization, and descriptive methods of physical guarding, and the Council desires to extend to you today upon request, any information or data that may be available in its files, and should the answer to your problem not be immediately available it will be obtained for you.

This is a service that the members of the National Safety Council should avail themselves of more frequently than they do. Don't merely pay your fees and accept what is given you without inquiring as to what more can be given you if you will make your wants known. I am wondering how many of you are aware that the Council has experienced safety engineers for your mechanical problems of safety, as well as experienced organizers for your problems of safety educational work.

I dare say a number of your problems will be brought to this Congress. We are mighty glad to have them brought here for discussion, but please remember lots of good assistance could have been secured by directing your inquiry prior to this time to the Council. We, therefore, urge you to take advantage of these facilities to which you as a member are entitled.

In conclusion please bear in mind that our section, although rapidly increasing in membership and prestige, wants your most sincere co-operation for the coming year on the following:

1. Our membership must increase. Each member should be able to secure at least one new member to the Council.
2. The Council, in order to make our section second to none, needs your assistance in furnishing material, data, etc., for safety in lumbering and woodworking plants. Keep in touch with the Council for new ideas, and be willing to furnish information as well as receive it. Suggestions and criticisms are always welcome.

CHAIRMAN RHODES: Mr. F. G. Lovett, of the Province of Ontario, which has taken a very great interest in safety work, is here prepared to discuss the need of improvement in the safeguarding of woodworking machines.

#### THE NEED OF IMPROVEMENT IN SAFEGUARDING WOODWORKING MACHINERY.

F. G. LOVETT, INDUSTRIAL ACCIDENT PREVENTION ASSOCIATIONS OF ONTARIO,  
TORONTO, ONT., CANADA

I think we are all agreed that the need of improvement in safeguarding woodworking machinery is a real one; in fact it is so self evident that it requires no emphasizing on my part. The real question is how best to meet that need.

Woodworking tools are perhaps the most hazardous of any one class of machines. The high rate of speed at which they run and the fact that in a large percentage of cases the material to be machined is held



the guards of the past have failed. When we can get co-operation along these lines, backed up by the employers, then the goal which we seek will be in sight.

There are many operations in a woodworking plant where standard guards cannot be used. Different plants having different methods and means of doing practically the same work. Managers and superintendents should design special guards for such work. This is a big field, and wonderful things might be accomplished if those in authority will only give the support so much needed. Many accidents are happening every day, and the employer blames the employees for being careless; no doubt in many cases they are careless, but they are not nearly so careless as the employer, whose fault lies in that he does not take a real interest in the welfare of his employees and does not consider the monotony under which the employees work day in and day out. The workman stands at the same machine doing the same work over and over again. We tell him to keep his mind on his work, but that is next to impossible. In a great many cases he has become so used to his surroundings, so accustomed to the various operations to be performed, that his mind is always wandering in other fields of thought, and it is under these conditions that most of the accidents happen. It is necessary, therefore, to have guards that will be real safeguards when the unforeseen happens.

#### SANITATION IN WOODWORKING INDUSTRIES

Another big need in the woodworking industries, at least in a large number of them, is improvement of the lighting systems, both natural and artificial. Windows are seldom, if ever, cleaned; walls are covered with dust and dirt which absorb instead of reflect light; and floors are littered with all kinds of waste material and shavings. Such conditions make a dismal place in which to work. Can we expect men to have clear minds under such conditions? I think not.

Many of our industries in this class, and this applies more particularly to the planing mills, are just where they were forty years ago. They have the same buildings with the same old equipment, and they are still using the same methods as were used by our forefathers when accident prevention was unknown and mutilated men were considered a necessary by-product of the industry. These are the plants that have the more serious types of accidents. These are the types of employers who will tell you that they have provided a guard when ordered by the inspector, and if the man doesn't use it, it is his own lookout. You know them, you have met them; they are in every town and city. This is where the first great improvement must begin, but we are not discouraged. They like other classes of employers will yield to treatment if it is wise and persistent, but in the meantime let us get together those who are alive to the needs of improvement in woodworking industries, let us invite their co-operation with the manufacturers of guards, and with the help of the National Safety Council this need of improvement in safeguarding wood-working machinery will be met.

CHAIRMAN RHODES: In his paper Mr. Lovett suggests one or two thoughts for discussion: whether or not wood-working machines ought to

be built with safeguards by the manufacturer as part of the machine or whether safeguards should be bought as extras after the machines are installed. There are some machines, of course, which are provided with them as an integral part of the machine, but there are many which are not.

#### DISCUSSION

MR. W. GRAHAM COLE (Director of Safety, Southern Pine Association): A year ago I was appointed as a representative of this section to the executive committee of the Engineering Section. That was composed of engineers interested in safety, their primary object being to secure information on engineering problems. I have been requested by this committee to mention that it is ready and willing to consider any problem presented to it by the Woodworking Section.

We have an engineering problem in safeguarding this machinery, and we have the opportunity to get the aid of the Engineering Section to solve it. The most important thing is a saw, and the Engineering Section has put on its program a paper on safeguarding the circular saw. That paper will be presented this afternoon and I think it is our duty to be there to help the engineers discuss the saw guard problems. It was put on primarily for our benefit.

CHAIRMAN RHODES: Mr. Schreiber, Deputy, Industrial Commission of Wisconsin, has prepared a paper on the "Essentials for Safety in a Woodworking Plant." We shall be glad to hear from Mr. Schreiber.

#### ESSENTIALS FOR SAFETY IN A WOODWORKING PLANT

HENRY SCHREIBER, DEPUTY, INDUSTRIAL COMMISSION OF WISCONSIN,  
OSHKOSH, WIS.

The Industrial Commission of Wisconsin, in the past year has been making a special effort to reduce saw accidents. All the deputies in the field have instructions to pay particular attention to saws, because accidents from this source keep coming in every day. For many years we have been familiar with woodworking machinery and have worked and lived among those who handle this kind of equipment. Nearly all the saw accidents occur on circular rip saws, hand feed. In the past year, of all the saw accidents I have investigated, only two occurred on a cross cut slasher saw. So, to strike an average, I will say that if you have fifty injuries on saws, forty-nine will happen on hand feed rip saws.

Now all the saws on which accidents have occurred, which I have seen in the shops in the past year, are guarded and equipped with a splitter and so forth. Some of these guards cover the saw entirely; others are attached to the splitter and cover the top of the saw; some are fastened to the ceiling and some to the saw table. I find saw guards of every kind and description, home made and patented devices costing anywhere from ten cents to fifty dollars. So, as I said, it is nearly impossible in this state to find any saw, on which an accident has happened, that is not guarded in some way. Still accidents are occurring

every day. Now, why do we have these accidents? How do they happen on the hand feed rip saw?

#### WHY AND HOW SAW ACCIDENTS OCCUR

We in the field during past years have not stopped at guarding. Guarding merely puts a device over the saw or covers it. This prevents a man from throwing his hand on top of the saw—that is about all any guard will do and possibly it is all it is good for. We have to take care of the saw itself, and there is all our trouble. Most of the saws on which these accidents occur have no set, are not hooked or hammered, have been filed or gummed or sharpened for weeks, and have practical teeth at all. Still they are in use, most of them, nine and ten hours a day. I have some samples here and I hope you will take a look at them. It won't do any harm, and it may help to prevent an accident.

I was in a shop recently where accidents were continually happening. They had in one department fifteen hand feed rip saws; all guards were asked the foreman how often he changed saws. I could hear the grunting like switch engines. "Well," he said, "I don't remember, I think they have been on for two weeks." These saws were in use ten hours a day. Well, they change twice a day now, and I don't remember their having an accident on these saws in the past two years. That is because a sharp saw will cut, clear itself, and will not kick back, turn, burn, or snake. As a rule, this is the story of the accident. The operator, being dull, Mr. Operator forces the timber in; the saw does not clear itself, and the board kicks back; the operator tries to catch the pieces and his fingers come in contact with the saw, with the result injury caused by the saw itself.

#### HOW SAWS SHOULD BE SHARPENED

When you get into a shop where they have saws, you need not ask whether they are sharp. You only need ask when they are changed. Sharp saws put on. You can tell whether they are dull or sharp by the way the operator has to push, and also by the sound. A sharp saw in operation will sing; a dull saw grunts, just as if a fellow is looking for a prescription and can't find it.

In large shops nearly every department has a rip saw or a cross saw that everybody uses and nobody takes care of. In the shop they call them man-killers. These saws are filed perhaps once in two years, they cause a good share of the accidents, because somebody has to make a box or a sewing table or a baking board, or to cut up pitch. There are a thousand and one other things cut up on these saws that the employee never sees and knows nothing about.

I know of some shops where saw accidents are at a premium. They have none, and have not had any for years, and they are woodworking establishments at that. I am referring to accidents on circular rip and cut-off saws. Their saws have a guard and are kept in shape. The operator is on the job, and knows his business. He gums them, gives them hammers them, etc. There is a whole lot in knowing how. Some

these filers don't belong in the filing room, for when they fix up a saw is as bad as if a shoemaker had tried to build a house. They are misplaced. The filer who knows his business hooks the saw right. hooking is meant this: the teeth should be filed so that the point strikes the wood first and clears itself. If the saw is not properly hooked, the bottom of the tooth strikes the lumber first. This causes the wood to kick back and then there is another accident. No matter how many guards you put on, the operator will get hurt, because the damn saw won't cut lumber.

#### PROPER OPERATION AND PLACING OF RESPONSIBILITY

In order to reduce the saw accidents, it will be necessary to place responsibility for the proper operation of saws and reform some filing rooms. Where one man can not take care of the work, he should have helpers. If one helper is not enough, get two, because one accident prevented might pay the wages of a half dozen helpers. Get enough men to do the work, and see to it that it is done right. Compel the foremen and superintendents to change the saws when they see that they are beginning to get dull, and you'll reduce the saw accidents at least 75 per cent and increase the production. I have been in some saw filing rooms when men have come in with saws and have asked for a sharp one. The filer has looked at the saw, and told him, "Why, that saw is all right. You put it back and I'll file it to-morrow. I've got something else to do." Well, that fellow instead of going to the superintendent or foreman, puts it back and bumps away on it. If, in this case, the superintendent and foreman were held responsible, this saw would never have been put back unfired, because, once the responsibility rests on these two men, they will not allow such chances to be taken.

#### POWER TO SEAL MACHINES

I can take you to any shop—the first one we come to perhaps—and you shall find in operation saws with teeth (sometimes three or four) broken off. Only last week, while inspecting in a Fox River Valley shop, the first saw I came to had four teeth gone. I didn't turn the saw all the way around because I was afraid there might not be any teeth on the other side at all. The places where the teeth had been broken out were worn smooth. This saw had been operating some time, to say the least, in this dangerous condition. Now, if I had had the authority to seal this machine so that it could not be operated until a sharp saw and one with teeth were in place, then my visit to this plant might have done some real good. You can readily see that if, as stated before, the responsibility was placed on the superintendent and foreman, placing a seal on this machine would have much better effect, because these men are responsible for production and it would not take them long to perceive that they can not get production from a machine which the law did not permit them to use. The saws would be kept sharp and in good condition after one such experience. You can bank on that.

OTHER WOODWORKING MACHINES SAFER BECAUSE THEY TURN OUT  
FINISHED PRODUCT

As to accidents on other woodworking machines, these are very few. Shaper accidents are practically eliminated because the shaper knife heads are guarded and you can't do a job with dull knives. The shaper produces a finished product. If a man were running dovetail, bending rails or running panels, etc., so that a half dozen men had to sand and scrape in order to have them right, somebody would bother, and it would not happen again. The same thing applies to stickers, moulding stickers, door, sash, blind, and core stickers. If the finished pieces are not smooth, some one will talk Sunday School to somebody, and it won't happen again.

The same applies to tenon machines, boring machines, and all others which turn out a finished product. Saws do not turn out a finished product, and therefore are not properly taken care of. Hence the accidents. Machines which turn out a finished product are cared for, and the accidents are practically eliminated. It can't be any other way, because you can't do a good piece of work with dull knives or saws.

Self feed rip saws, the modern up to date self feed rip saws are getting to be regular automatic machines. The construction is practically fool proof for the operator. Band resaws, band rip saws, jig saws and other band saws are kept in proper working condition because otherwise they spoil the lumber. No mill superintendent or foreman will stand for this waste of material very long. Therefore, the scarcity of accidents on these saws.

PLACING THE RESPONSIBILITY FOR ACCIDENTS

Now, I don't blame the employer for these accidents entirely. He doesn't know anything about the condition of each saw and hasn't time to pay attention to it. He leaves this to his superintendent, foremen and other men, and he should hold these men personally responsible. The employer furnishes the saws, the knives, and everything else that is needed, and it is up to the men in the shop to use them right, get the work done, and avoid accidents.

The present condition can only be attributed to the lack of proper supervision or regulation. I wish to leave with each one of you these three main thoughts. They form together a means by which accidents on saws can be effectively decreased. These three governing features are:

1. Proper maintenance, repairs and upkeep of saws. Sharp saws.
2. Placing responsibility on the superintendent and foremen—the only men who can get real action.
3. The State officials should have the authority to seal machines the condition of which are such as to be a real danger.

(Mr. Schreiber then presented exhibits of saws and samples of work finished on various machines and demonstrated how tools in proper condition make for safety as well as efficiency and the highest grade of product.)

CHAIRMAN RHODES: The next paper will be by Mr. James C. Wilson further continuing the need of safety in woodworking machinery.

MR. WILSON: I am a claim adjuster, and not a manufacturer. I am here today undoubtedly for the same reason that a great many others are to get a further incentive for safety work. The death rate over the last fifty to one hundred and fifty accidents, and most of them are in the woodworking industries, because that is the class of business that our company insures exclusively.

It seems that every time we have a slump in business our accident frequency goes up. The number of accidents per hundred men employed today is greater than it was six months ago. Not only that, but the accidents are more severe.

In analyzing the accident reports for the past two years we find they are increasing all the time. More employees are hurt today than before, costs more to take care of them. Something has to be done.

One of our representatives was in San Francisco at the meeting of the International Association of Industrial Accident Boards and Commissions. They are pushing rehabilitation work, something that comes after a man is hurt. I believe they have got the cart before the horse. They ought to do something to prevent the accidents; take care of the fellow before he is hurt instead of after he is hurt.

Mr. Schreiber gave me a big idea in accident prevention. It never struck me as forcibly as it did this morning, that dull tools are so oft the cause of an accident. But it is just as plain as day that these r-saws won't cut the wood unless they are perfectly sharp.

## THE NEED OF IMPROVEMENT IN THE SAFEGUARDING OF WOODWORKING MACHINERY

JAMES C. WILSON, ASSISTANT SECRETARY, LUMBERMEN'S MUTUAL CASUALTY COMPANY, CHICAGO

The almost universal application of workmen's compensation laws has drawn men from all industries in practically all states in the union in safety work and everyone here is vitally interested in anything which will eliminate the preventable accident.

As nearly as I can determine, approximately 80 per cent of all accidents are preventable, and I am sure the percentage of industrial accidents is at least so high if not higher.

In our efforts to analyze the causes of preventable accidents we have studied the time of day; the day of the week; the nationality of the injured; whether married or single; his age; his experience and whether injured previously or not, because a long time ago it was forcibly brought to our attention that the human element is the greatest factor in all cases and that the injured man himself contributed to his accident in practically all cases.

### BLUE MONDAY

We found that accidents were—in the good old days—and still are, in spite of prohibition, more frequent in the first three hours of the day.

following a holiday or Sunday. The next highest time is the last hour of the same day. This proves that the laborer does not rest on Sunday. Instead he will do some unaccustomed work, take a trip or do something else which brings him back to his machine on Monday far below standard, so that it requires at least two days to speed up again.

Manufacturers on a piece work basis report the same facts—their low point is on Monday and their peak on Wednesday. Following Monday or the day after a holiday in accident frequency comes Saturday, and for this we blame fatigue and carelessness, because a man gets careless after running a machine or saw eight hours a day without mishap for five or six days. But a "hang-over" and a tired arm or strained eyes are not all the controlling causes. Many men, especially during the past few years of unsettled conditions and high wages, have attempted to handle jobs for which they are not fitted, either by experience or ability. This is particularly true in trades where boys under 21 years are employed.

Since we must admit that such a large percentage of accidents can be prevented, we must seek the remedy, and human nature always turns to the nearest remedy which in our case is "Safeguarding." This, of course, is a simple solution to a part of our troubles, and to me it cures the smallest ailment and is only a fair start on the road to safety. For the figures I'll give you shortly show we have almost as many accidents on guarded machines as on the un-guarded ones.

#### COMPEL THE WORKMAN TO USE THE GUARDS

Many accident reports state that the guard was provided but was not in use, and we find this true of practically every inspection we make. This condition is bound to exist as long as the worker is permitted to do as he pleases about guards. In spite of the safety campaign which has been waged for years by this admirable organization, "The National Safety Council," by state commissions and innumerable firms, corporations, and insurance companies, the workman is not in sympathy—he is not properly digesting his education. Whether he is being given the proper diet is a question.

If all states penalized the workman for removing a guard, much good would result. Of course, the employer must be made to provide the required protection. The State of Wisconsin without doubt is leading the other states in the question of safeguarding, but the figures just published for 1919 by the Wisconsin Industrial Commission clearly indicate the need of improvements in all guarding.

#### ECONOMIC LOSS OF INDUSTRIAL ACCIDENTS

They report 14,995 accidents causing a total loss to the workman of 2,875,875 days or in round numbers three million. This means the labor of 1,000 men for 3 years. There are approximately 75 counties in this state, and this lost time would give each county 40 men for 3 years to build roads—surely a terrible economic loss. The Commission further reported 226 deaths and 21 cases of total permanent disability.

In compiling our loss experience on guarding, our company finds the following information:

On saws of all types, guarded, we find 757 accidents costing in compensation an average of \$41.50. Seven hundred and sixty-five claims on unguarded saws cost an average of \$67.35; of these 548 are rip saw cases, both guarded and unguarded, which averaged \$88.10, clearly indicating that a rip saw is a dangerous plaything.

On guarded knife cutting machines we found 509 accidents with an average cost of \$25.50; and 593 unguarded ones average \$52.50, almost twice as much. In this class we put square head jointers, prohibited here in Wisconsin, and find the average cost per case is \$187.79, while accidents on cylinder head jointers average \$53.10 each.

#### GUARDS FOR THE POINT OF OPERATION

It is our experience, dealing exclusively with the lumber and woodworking industry, that the machinery and equipment used in these industries are more difficult to guard *at operating points* than any other machines as a class. It is true that there has been some permanent safeguarding, such as the safety cylinder head in jointers, but in a majority of cases the guard is devised on the machine in accordance with the work for which same is being used, which has meant, in a large percentage of cases, guards that are more or less impractical; at least the operator, because of the non-permanency of the guard, is prejudiced against it and does not use it. To illustrate, we may take a common circular saw and we immediately observe a hundred or more guards manufactured. Each carries a different thought of protection, which indicates that not one is as yet properly designed for universal work. It would also be possible to enumerate a dozen other ordinary woodworking machines which present a like condition. Therefore, it is obvious that the need of improvement in the safeguarding of woodworking machinery must largely come from a source other than standardized guards.

#### GUARDS SHOULD BE MADE FOR PERMANENCY

It has been our practice in recommending protection for this class of machines, to devise a guard which would be practical for the majority of the work being done, as well as for a considerable degree of permanency. In other words, we are having a large percentage of our accidents occur by reason of the operator removing the guard which has been provided, and he will continue to do so if that guard does not impress him as a permanent and necessary part of the machine. A machine properly equipped with a guard for a certain type of work is used without it by the operator on the least excuse or the slightest pretext that the work he is about to do makes a guard impractical, and we find he deliberately leaves the guard off the machine when he returns to the standard work for which it originally was installed. Oftentimes guards can be so designed to serve the purpose of convenience in work, as well as safety. To illus-



trate, we have frequently recommended, and it has been tried out with considerable success, a pattern or form guard for shaper work. In a good many cases this pattern or form, which is necessary in shaper work, can be designed to give the essential protection at the point of operation. This means permanency in construction of a guard because it is a part of the machine and is necessary to do good work.

One of the most substantial and most needed permanent guards recommended for woodworking plants is the complete exhaust system. We find repeatedly our most serious accidents on knife cutting machines follow the removal of the exhaust hood, or that they have occurred because the machines are not equipped with such devices.

#### SUGGESTIONS AND RECOMMENDATIONS

This condition has been brought to the point where serious thought must be given by the manufacturers, the State Departments and the employers, as well as the safety organizations, to the improvement of all forms of woodworking safeguards with particular emphasis on the point of operation. The attitude of labor toward education, or toward the use of guards provided by the employers, clearly indicates to us that some radical and drastic action must be taken in the way of State legislation, and we believe that such legislation should, first, make certain requirements of the manufacturer of new machinery; second, compel the employer, to use only properly safeguarded machines, and lastly, penalize the workmen for not using or for removing guards which were built in the machine or attached after it has been installed.

We recommend that improvement in safeguarding be carried out on the following essential basis:

(1) The purchasing department must insist that the manufacturer provide, as far as possible, permanent guards for all hazards of the machine which he is selling.

(2) The safety engineer of the plant should immediately inspect every new machine and, if it is not equipped with a proper safety appliance, design one which will be permanent and which, if possible, will facilitate operation of the machine.

(3) The employer through his supervisor should insist that the employee operate the machine with guards in place at all times.

(4) The State should check up the employer and employee to insure compliance with the laws pertaining to installation and use of safety appliances.

(5) The insurance companies, should there be such, carrying the insurance on the risk, should familiarize themselves with safety requirements and State laws, check up at proper intervals through their inspection department industries which they insure, and assist the employer by suggestion and education to make his plant perfectly safe for the workers.

CHAIRMAN RHODES: Is there any discussion?

## DISCUSSION

MR. H. W. BEAGLE (Surtz Guard Company, Chicago): How are the accidents classified when the guards are hung up on so-called guarded machines?

MR. WILSON: If it is guarded, it is guarded. We only classify guarded accidents as accidents on a machine that is properly guarded at the time of the accident. The unguarded ones occur on the machines that are not guarded, whether the guard is hung up on a nail or not.

I want to ask Mr. Schreiber if he has seen a good, efficient guard for a dado head.

MR. SCHREIBER: I have not seen any.

MR. LEVY: I will venture to say in 90 per cent of the plants, anywhere from 8-inch to 16-inch saws are used on one machine, and we have to use the same guard for every saw. The men cannot put new guards on every few minutes. We must have a guard as efficient as possible for all types of saws. We can't have a variety of saws in a small industry. One saw must do all classes of work. It must be a rip saw, trim saw, dado head, groover, all combined. The guard must not interfere with the different classes of work. A man has to hold his work at various angles and hold it to the form by hand. The guard must not strike the work. The operator wants to watch the work and the guard that completely covers the saw interferes. Oftentimes he does not cut to a form, but to a pencil line or a scratch line. What we want is a saw guard that will meet the requirements for special kinds of work. For the rip saw, where no attention is paid to knots, checks, and such things, the guard that covers the saw is the ideal thing, but not for special work.

There is another machine which I would like to refer to, that is, the shaper. We have that pretty well protected, but I find that many industries are using the guard just as they receive it from the manufacturer. The general type of guard today is the spring with the wooden shoe. The operator tries to use that shoe for all classes of work, instead of using the various types of shoes having various sets of springs, for different classes of work.

That is a case for the superintendent and the foreman. I don't think the fault lies so much with the man on the job. It lies with the manager and superintendent. If we at this Congress could do anything to arouse an interest among the manufacturers of woodworking machinery so they will devise guards to take care of certain classes of work, then I think we shall get somewhere. The standard guards provided can only be used on a small proportion of the work.

CHAIRMAN RHODES: Are there any representatives of machinery manufacturers who wish to offer anything on this subject?

MR. E. E. JONES (President, Surtz Guard Co., Chicago): There are three points that I consider important; the size of the saw, sawing to the line, and edging. Edging is what I call straightening the board. In the exhibit of saw guards in the basement you will notice the front of the hood is toward the operator, so that he can saw to a line and straighten the lumber. Originally those guards were made entirely open, and that is

where the point comes in. of putting a 12-inch guard on a 16-inch saw. There is nothing to prevent it. Now you have to provide a guard for the several saws, or have several guards for the machine. The latter is the better way for actual efficiency, regardless of the little time it takes to change the guard. The large factories all have machines that will not have a variance of over an inch in saws. I worked for several years in a woodworking plant, and when a 14-inch saw had worn down to twelve inches it was put on another machine, and never used on the first machine again. This I consider the ideal condition.

MR. E. ROSS FARRA (American Car & Foundry Co., Wilmington, Delaware): I would like to know how you are going to guard a saw for edging. We have no laws in Delaware in this subject. We can't make a man keep a guard on his machine, and we have had more than one accident.

MEMBER: We leave it to the men themselves. We make a direct appeal to the men in our plants to make a special effort to avoid accidents. We ask them to make suggestions for safeguarding dangerous places, and if they make suggestions and we adopt them, we pay for them. We have eliminated 43 per cent of the accidents.

MR. SCHREIBER: I see there are two expert manufacturers here from my territory. I would like to hear from them, Mr. Thalheim and Mr. Balthaser.

MR. JOHN THALHEIM (Gurney Refrigerator Co., Fond du Lac, Wis.): I am the first mentioned gentleman. I came here to learn. I have learned quite a bit since I have been sitting here. I will leave it to Mr. Balthaser to do the talking.

MR. LEO BALTHASER (Sanitary Refrigerator Co., Fond du Lac, Wis.): I think some one with more experience will be able to tell you more about it. I made it compulsory to use the guard. Any man who does not is discharged. We insist that guards are put on for a purpose, and they must be used, and the first man we catch not using them will be discharged. We get very good results.

We do edging on a self-feed rip saw, and the guards are arranged so it is not necessary to remove them. But there are different types of guards, and it is possible some of them might have to be removed.

CHAIRMAN RHODES: You discharge the employee if he takes off a guard?

MR. BALTHASER: Yes.

MEMBER: We can't fire good sawyers. They are too scarce. Many of our men are sixty-three years old and have been sawyers for thirty years. They don't want to change.

We have an old-style boring machine and mortiser. I understand they are not combined any more. I got a guard for the boring bit and found that the machine then became more dangerous than ever. The boring bit goes down through the material, and when the mortiser is used the tables moves up to the knife. The tendency is to catch a fellow between the table and the guard. It seems to be impossible to get the belts adjusted so they would stop instantly. The boring bits will make any-

where from 25 to 100 revolutions after the power is off. I would like to know how to guard the boring bit so it won't be an additional hazard.

MEMBER: The Fairbanks-Morse Company has dozens of boring machines that are guarded, whether idle or boring, combination or boring machines.

CHAIRMAN RHODES: I find a great deal depends on the employee and his training. Mr. F. C. Dana will discuss this subject.

MR. DANA: First of all I would like to answer the question the gentleman just raised about men who have been in his employ for thirty or forty years, and whom he was afraid he would not be able to replace if he discharged them. My answer is that he can discharge one man and eliminate that trouble, and the man to discharge in that case is the foreman. He is absolutely not on the job if he tolerates any practice like that. If he is the right kind of foreman he can take the matter up with those men in a manner in which they will be very willing to agree with him. You have got to have a foreman who is a leader of men, and if he has the necessary qualifications to be a leader of men, nine times out of ten he can get the fellows to keep the guards on the machines. We have very seldom had trouble in getting a man to keep a guard on a machine. In fact it is the new men we have the most trouble with.

When we put new guards on the machines we get the suggestions from the operators, who often make very valuable suggestions. In two cases within the past two years the operators have practically designed the guards themselves, and I believe they proved to be just as efficient guards as you could buy for the machine. This is an incentive for the man to be a booster. The other men that work around him will want to put something on their machines. It has started a safety movement through the department, and every man is working for safety.

We have a ruling that no man can take a guard from a machine without the consent of the foreman. If he does, he is discharged. We have discharged a man in eight months for taking a guard off a machine without permission.

The new man that comes into the shop, if he has had no experience at all, is nervous, and looking around instead of watching his machine. We employ about 140 woodworking machine hands, and we have eight men in that department who are old hands. When a new employee is brought in the department he is turned over to the foreman. The foreman has a record of his past experience on his employment card, and he decides which one of the eight old hands can best instruct the new man. He remains directly under the supervision of the old hand for a period varying from two weeks to a month, and in no case is he ever released from the supervision of that man in less than two weeks' time. The first thing he is taught is how to run that machine without accidents.

In the past year we have had only one accident of any consequence in our woodworking machine shop. One man lost his fingers. That is the only accident where there has been any compensation paid. I attribute that record principally to that foreman and the eight men he has for the instruction, because those are the men that are certainly getting the results. It means a great deal not to have any time lost from accidents.

**TRAINING MACHINE OPERATORS IN SAFE METHODS**

**F. C. DANA, DIRECTOR OF PERSONNEL, KISSEL MOTOR CAR COMPANY,  
HARTFORD, WIS.**

This is a subject that was given very little consideration by the majority of manufacturers until recent years. The idea formerly was that if you hired an experienced woodworking machine hand, he was supposed to be thoroughly familiar with the operation of his particular machine and, therefore, should be able to operate the same without danger of injury. In theory this idea might seem flawless, but it was far from practical, as was shown by the vast amount of lost time due to accidents.

I find that injuries caused by woodworking machinery usually result in a greater loss of time than injuries occurring in other departments and should be given serious consideration, because they often cause the operators to become less efficient, due to the loss of fingers and hands.

Bearing me out in this statement is the report of the Wisconsin Industrial Commission regarding industrial accidents in the woodworking industry. This report for the years 1915-16-17 shows that there were 2,365 accidents during this period, 50 per cent of which occurred on saws. The injuries on saws alone were responsible for four deaths, two arms cut off at elbow, three loss of hand, 76 loss of one finger, 36 loss of two fingers, 13 loss of three fingers, five loss of four fingers, one loss of foot, three loss of eye, and one facial disfigurement. This shows the great need of maximum safety work in this industry.

What were the causes of these accidents and how could they be reduced if not entirely eliminated? The causes usually were due to lack of guards, carelessness on the part of the operator, inadequately lighted shops, and the lack of proper instruction in the methods of operating the machine in order to avoid injury.

Adequate guards can be made to protect practically every machine and if you equip your machines with practical guards, you will find in the majority of cases you have won the operator of that machine for the safety movement. See that your guards amply protect the point of operation. This is of vital importance, as all of your serious accidents occur on this part of the machine. Obtain proper lighting facilities. After this has been done, great care should be taken in selecting competent men. A careful workman is one of your greatest assets and it is necessary that he be educated along lines of safety. This education should begin the moment the man enters the department. Who is going to see that the new employee gets the proper start?—the foreman. Remember he is your key man, and the responsibility for the newcomer's safety rests in a large degree upon his shoulders.

**FOREMAN MUST INSTRUCT NEW EMPLOYEE**

Statistics show that accidents occur to new men in a ratio of six to one. Who is going to aid you most in reducing this? Your foreman. The foreman who today does not instruct every new employee, or dele-

gate the duty to some one else who is trustworthy—the foreman who fails to instruct every new employee regarding the hazards of his work is no longer fit to be a foreman. Foremen today are of a different type from that of several years ago. We all realize that. At that time a foreman's ability to a great extent was based on the number of men he hired and fired. He was not considered to be as important as he is today. Today he is one of the dominating factors in your plant, and he must have the qualifications to be a leader of men. If your foremen are possessed with these necessary qualifications, they will aid materially in bringing the safety work to a high degree of efficiency.

If you were to have a graphical analysis of the accidents occurring in our industrial plants showing the causes of injury and the terms of service of the men involved, you would find that your line representative men in the employ for one month would be the longest. This is perfectly natural, the average new man is not at ease when he enters the shop.

After all, safety is a matter of education, and if your key men have been taught the lesson and are vitally interested in their work, they will carry the message on to the men. Some organizations are large enough, so that they can have schools in safety, and where this can be done it is an excellent idea.

CHAIRMAN RHODES: Has any one anything to offer in regard to their efforts to train employees?

#### DISCUSSION

MR. COLE: I would like to answer the gentleman's question as to how to keep the guard in place. That is a little bit of what is being termed today "human engineering." The greatest thing in the world, in any industrial work, is obtaining the safety interest of the men. I have ceased to preach safety. I believe in working safety. If we can get the men in the shop to feel they have an incentive to work for safety, we will probably have more guards kept on the machines. I have in mind a logging company and a saw-mill company. A large flag is flown over the mill that shows the smallest percentage of accidents for a given period. The two mills are about the same size, and their hazards are identical. It is a game with those men, they want to get the flag from the other mill. One mill had the flag for three months, when a sawyer had his leg broken. While he was in the hospital one of his friends asked him if his leg hurt him. He replied, "Yes, a little, but what hurts me most is that I kept the flag away from my mill." If we can encourage that spirit among the men, they are going to work for safety. They are working for a purpose, and they know they will get some credit. They are going to see that the guards are kept on, because they know that an accident will discredit their mill. I have here a chart from which I wish to read some figures. These figures were obtained from the accident reports received from the subscribers of the Southern Pine Association for the first three months of this year. Twenty per cent of these accidents were to men who had been in the employ of their company less than one

month, 38 per cent to men who had been in the employ of their company less than three months, 54 per cent to men who had been in the employ of their company less than six months, and 72 per cent to men who had been in the employ of their company less than one year. Considering severity, 25 per cent of the resulting time lost was incurred by men who had been employed less than one month, 59 per cent by men who had been employed less than three months, 63 per cent by men who had been employed less than six months, and 80 per cent by men who had been employed less than one year. I think that emphasizes Mr. Dana's idea of the need of training the employees.

A MEMBER: Our company at present has a committee composed of men from each department, who inspect the shops, make note of unsafe conditions and encourage the laborer to work for the interests of safety. This company also pays \$50 a month, divided into three prizes, which are awarded to any one, laborer, office man, or superintendent, for the best suggestions each month.

My instructions are to see that the men live up to the rules of the company, and if a man does not live up to the rules of the company, to discharge him. It is just as easy to hire a man to take his place, no matter if he has been there for fifty years, after he is discharged, as it is after he is killed or injured permanently. Then you have to find a man anyway to take his place, and, in addition, you have benefits to pay. It is sometimes hard to find some one to take a particular position, but our orders are to discharge any one who fails to live up to the rules.

CHAIRMAN RHODES: The human element is the largest factor in the prevention of accidents. With the large turnover of labor during the last two or three years, probably every plant has had a greater number of new men on its pay roll than ever before. There are probably different conditions in every plant that have to be handled according to the peculiar situation found.

The subjects assigned to the Wood-Working Section of the National Safety Council naturally fall into two general divisions: wood-working operations, and logging and lumbering. I feel we have had a very splendid morning's session with the discussion of subjects of interest to wood-working men, the factory men, and the manufacturers. Tomorrow our program will deal a little more largely with matters of interest to loggers and lumber men, but it will also cover a great deal of the human element factor, which is of direct interest to factory employees and employers.

MR. BYRON: I would like to ask if any one present knows anything about the depths of throats on round head jointers.

MR. D. D. EVANS (Deputy, Industrial Commission of Wisconsin): Less than a year ago the Industrial Commission of Wisconsin asked committees to make investigations on round head jointers, where accidents have occurred. When the ruling was first put into effect that round heads should be used, there was no specific depth mentioned, and the first ones had a  $\frac{3}{8}$ -inch throat with a  $\frac{1}{2}$ -inch bolt. By the use of the shallow throat, it was possible to cut out the sanding operation on a great deal

of the machine work. But we find, since lumber is becoming poorer : the greed for products is getting greater, wood-working men begin order the throats larger, so they can take a bigger cut. When the round heads first came into use, you would not find any that were cutting more than about 3/16 of an inch. Today we find them using a 3/8-inch cut. It is a different kind of lumber they are working on now. On investigation of accidents, I found the shallowest throat was 5/16-inch deep and 1/2-inch wide. The largest was 3/8-inch wide and 5/8-inch deep. I found a great majority of accidents on round heads occurred with the wide and deep throat cutters.

CHAIRMAN RHODES: Is there anything further? This is a big and interesting subject, Gentlemen. It is not a matter of theory. I have become very much convinced of that since I have attended these meetings for the last two years. The three thousand or more delegates who gathered here, representing all of the principal industries of the country, cannot but have a good time, but, if you will attend the sections about this building this morning, you will find they are all as fully and sincerely interested, possibly some more so, than we have been here this morning. Many industries are getting more out of these conferences than we are. The industrial casualties in the United States have been appalling, and the National Safety Council has become so great and strong as it is because of the realization by business men and large employers of the necessity of doing something in a practical way to reduce the drain on our humanity and our national efficiency.

Representing the industries that we do, working in lumber, it seems to me to be nothing more than proper, in fact, an obligation and a duty, to take advantage of the opportunity that is given us to become a part of this great organization, and do what we can to spread the gospel of safety through the industry.

ADJOURNMENT.

## THURSDAY MORNING SESSION

THE meeting was called to order by the chairman at 10 o'clock.

CHAIRMAN RHODES: We have done what we can to create interest in the Wood-working Section of the National Safety Council. We have written personal letters to everybody whom we thought might be able to attend these meetings and we were much gratified with the attendance yesterday. The attendance yesterday consisted principally of mill-work and factory men. The program this morning will consist of papers of interest to lumbermen and loggers.

The small attendance does not indicate lack of interest on the part of lumbermen in this work. However, I hope very much that we can interest them to co-operate with the Council a great deal more during the next year. The lumbermen are taking increasing interest in safety measures of all kinds.

The Southern Pine Association, consisting of two hundred and forty



members, organized a Safety First Department about two years ago for the express purpose of assisting its members in the reduction of accidents and hazards among their employees. I am taking the liberty of referring to this, for which you will pardon me, because it is a matter very close to me, and I know that the description of that work will be of interest to you. Mr. W. Graham Cole, Director of Safety and Industrial Relations of the Southern Pine Association, is in charge of this work among the Southern saw mills and logging camps. He has achieved a record that is very satisfactory to us.

In the first place we had difficulty in interesting the rank and file of the employees in work of this character as they are usually more or less suspicious, but they have come to see pretty generally that the work is being conducted for their benefit and is prompted by a sincere interest in their welfare.

I will ask Mr. Cole to explain to you some of the details of the work, the problems he has tackled, and what he has been able to accomplish.

### SAFETY WORK OF THE SOUTHERN PINE ASSOCIATION

W. GRAHAM COLE, DIRECTOR OF SAFETY AND INDUSTRIAL RELATIONS, SOUTHERN PINE ASSOCIATION, NEW ORLEANS, LA.

In response to the request of your Chairman, I will endeavor to explain what we are trying to accomplish for safety in the Southern saw-mills and lumber camps. Previous to the time that the Safety Department of the Southern Pine Association was organized, a few of the insurance companies in the South had started to work along definite safety lines, but it was a new problem for an association of lumbermen to undertake such activities.

To interest the manufacturers, in this plan was a difficult problem. We felt that the first thing to do was to carry on an advertising and publicity campaign. We believe a great deal in personal work, but from the standpoint of an association which has over three hundred members (employing nearly one hundred thousand men) this was impractical. Our idea was to sell the plan to the big boss and assist him in passing it on down. Safety work has to emanate from the man at the top, not from the man at the bottom. We realized that if we could get the general managers sold on the idea, they in turn would not have much trouble in selling it to their employees.

We found out that a great many safety men in the North who had put the safety idea across in their shops and factories, were skeptical as to whether it could be put across in the logging camps and saw mills of the South with the same success.

The Southern logging man is pretty far away from many of the human interests which are to be found in the larger cities, such as theatres, etc.; therefore, when you give him this idea, it is something to absorb his attention which is not otherwise absorbed, and he is pretty quick to take to it.

## *Woodworking Section*

### GETTING AT THE CAUSES OF ACCIDENTS

The problem, as I said before, was to sell safety to the owner of business, and through him to his employees. In starting out, we decided to begin with an advertising and publicity safety campaign. In or however, to make our bulletins practical and applicable to the work, felt it necessary to get some history of the accidents which were occurring in the lumber industry. There were plenty of statistics on steel and chemical industries, on railroad operations, etc., but the previous accident statistics of the saw mill and logging industry were few. We undertook, therefore, to obtain accident reports from the operations of all of our subscribers, and for this purpose we prepared and furnished an accident report form, but advised our people that a copy of the insurance report was equally acceptable.

Last January we issued a report of the activities of our department for a year. This report was prepared and published for the benefit of the foremen, each one being supplied with a copy. I feel that the foremen are the chief aids in all safety work; after obtaining the interest of management in safety it is necessary to impress the foreman with the fact that safety is a part of his daily work. Some of the charts which we had prepared from the accident records were included in this report. These charts were based upon both frequency and severity, in order to show not only how often accidents occurred, but how serious were the results. The more vital question, of course, is that of seriousness. We have used the figure of days lost per month per man employed. From this information, we were soon able to discover the causes which were producing the most serious accidents.

We issue two bulletins every month, and have them illustrated wherever possible. I consider a camera as an essential part of my traveling equipment, and when I see anything that may be useful, I take a picture of it. These bulletins are posted throughout the logging camps and saw mills.

In addition, we have prepared a card illustrating the "V Bed" method of felling timber. These cards are placed in the hands of our log sawyers. Just a word in passing concerning this method which is clearly illustrated by this stump. In order to cut the "V Bed," each sawyer must be provided with an axe. Then, by one man working from each side, a deep V-shaped notch is cut. The saw is then started from the opposite side of the tree, so that it will meet the upper points of the V. If the notch has been cut deep enough, the falling tree will break clean, pulling no splinters from the butt. The V-shaped wedge on the end of the log prevents it from kicking back over the stump.

### THE V-BED METHOD OF FELLING

In connection with our work, we have organized safety committees. We feel, as I mentioned yesterday morning, that if we can give the men definite safety work to perform instead of simply preaching safety, our work will be much more effective. One of these committees in con-

sidering ways and means for preventing accidents, found that a great many of them were due to trees kicking back over the stump. They went out into the woods in a practical way and endeavored to find out whether this could be prevented. Their efforts resulted in the idea represented by this stump. Feeling that the "V Bed" will prevent many accidents throughout the industry, the Southern Pine Association has decided to advertise it to the fullest extent.

We have developed the following sales points in trying to place the method before our manufacturers. In the first place, considering safety, this V-shaped wedge on the log prevents it from jumping back over the stump; second, by being chopped and sawed, the only points of fracture of the falling timber are near the heart—this prevents splinter-draw; third, the bed is cut out of the stump, not out of the log, thus saving considerable lumber; fourth, by pairing off, one man chopping left-handed and the other right-handed, the two sides can be chopped at the same time, thus allowing more logs to be cut per hour than by the old method.

In addition to our bulletins, we issued a small pamphlet to take the place of the old rule book. We endeavored to write it in a more suggestive manner, however, in order to make a stronger appeal to the men. This pamphlet has been distributed so that it can be placed in the hands of all the men whom the management feels will benefit by it. We have distributed over fifty thousand of these pamphlets during the last six months.

Now, just a word for the charts which give an idea of how we tackled the work of getting some benefit out of dry statistics. I feel that these charts are particularly important as a means of proving our facts to our members. During the last year we found that of all the accidents reported in the industry, 65 per cent were in the logging operations rather than in the mills. Furthermore, of the 35 per cent which were in the mills, we found that only one-sixth of the time lost from those accidents was due to what were considered as mechanically preventable accidents. In other words, only about six per cent of the total lost time in the entire operations from log to car was due to mechanically preventable accidents. We used this fact as a strong argument that although safeguards are necessary, it is even more essential that we consider the human element.

The accidents were often found to be directly chargeable to foremen, due to the fact that they have not properly instructed their men in safety work. In my estimation this indicates in the strongest manner possible the need for good safety educational work among the foremen as well as among the men.

#### ACCIDENT FREQUENCY AND SEVERITY

This chart (exhibiting chart) shows by a line the monthly frequency rates, i. e., the number of accidents per thousand men per month, from July, 1919 to June, 1920. You will notice that there is a considerable increase for 1920. I consider that as a very good indication. The actual

number of accidents has not increased, but more attention is being given to all injuries and more reports are being made out for minor accidents which explains the increased rate.

The lower half of this chart shows, for the same period, the severity, i. e., the number of days lost per man per month. It shows a decrease of one-quarter of a day per man per month, which, when multiplied by three hundred days in a working year and fifty or sixty thousand men which the association represents, becomes quite an enormous figure. Although more reports are being sent in, the results are decreasing in seriousness. We feel that this is an excellent showing.

The next chart (exhibiting chart) shows the percentage of accident and gives our men, right out in the field, an idea of what particular work they are doing that is causing serious accidents. For instance, falls on trees, logs, and lumber caused 13 per cent of the accidents, but 28 per cent of the time lost, and was our most serious cause.

This next chart (exhibiting chart) shows the same accidents classified by departments. This last chart simply represents the time of the day in which most of the accidents occur. We find that there is a peak in the morning about eleven o'clock, just a little while before the noon hour, and another in the afternoon about four o'clock, the four o'clock peak being a little higher than the one in the morning. These results are similar to those obtained in other industries.

I just wanted to show how we have undertaken this work, and if I can answer any questions regarding it, I shall be very glad to do so.

**CHAIRMAN RHODES:** Mr. Cole's work has inspired a great deal of interest among the employees in the Southern mills and plant committees are being organized in quite a number of saw mill operations. His work including the extensive line of bulletins which he has issued have had pretty wide circulation throughout the entire country.

The Chairman cannot conceal his disappointment at the lack of interest among the lumbermen in this meeting. Efforts were made to secure a large attendance, but the gentlemen evidently have not arrived, and I am particularly disappointed because we have a speaker who has come more than a thousand miles to attend this meeting, and who has a very interesting message to convey.

The second paper on the morning program was scheduled to be delivered by Mr. V. A. Griffith, but I am pleased to say to you that since the program was printed he has been elected District Judge.

He is very much interested in safety work in the South and his subject, "Results Obtained in the Manufacture of Lumber by the Adoption of a Plan of Safety Organization," will be of interest to you and it will be of interest to lumbermen generally. I am sorry there are not more present to greet Judge Griffith, whom I have the pleasure to introduce.

## RESULTS OBTAINED IN THE MANUFACTURE OF LUMBER BY THE ADOPTION OF A PLAN OF SAFETY ORGANIZATION

V. A. GRIFFITH, GRIFFITH AND WALLACE, ATTORNEYS, EDWARD HINES YELLOW PINE TRUSTEES, GULFPORT, MISS.

There is scarcely any doubt that there are more real obstacles to be surmounted and more discouragements to be overcome in organizing a lumber manufacturing plant for safety and in keeping it organized than in any other substantial industrial enterprise. And foremost of these difficulties is the indifferent mental attitude towards it of those who chiefly benefit by safety, that is, the workers themselves—an attitude growing out of the long pioneer history of the lumber business, and its heretofore chronic practices of very frankly disregarding the matter of mere personal safety. It has not been so long ago that the typical saw mill was an affair in which two men did all the logging from the tree to the mill, and two more did all the remainder of the work, unless the outfit happened to be steam propelled, in which case there was an additional man. The machinery was usually crude and crudely arranged, but there was plenty of room and plenty of time, and the few operatives frequently regarded it as adding zest and flavor to the employment that it was so manifestly an adventure with danger. And even yet a very substantial portion of the lumber of the country comes from such outfits, and by far the larger number of saw mill operatives now in the service have received their original training in small plants and under more or less primitive surroundings. They are as a rule brawny men of self-reliant character and are much inclined to regard special effort towards the promotion of safety as somewhat a reflection upon their sturdy ability to take care of themselves and also as an effeminate turn taken in what to them is a very masculine business. Many of them regard accidents as belonging to the industry, and strange to say, some firmly believe that when the time shall arrive for any one of them to be hurt he will be, regardless of any mere human effort to the contrary.

### HIGH TURNOVER A DISADVANTAGE

There is also perhaps a larger proportion of turnover among saw mill employees than in any other substantial industry, a fact that very strongly militates against a safety organization, and in conjunction with this there yet lingers even in the larger plant the old ever present idea that the particular operation is only a temporary one, and that in a while it will be cut out and gone. The best and most satisfactory of safety organizations must have had, as foundations upon which to build, the three requisites of permanency of plant, permanency of operating crew, and at least a fair tradition of past community interest. Other difficulties may be stated, but from the above alone it is apparent that the average saw

mill promises but little for safety organization except upon extraordinary and very sincere and earnest effort.

It is not surprising therefore that but few attempts in a thorough organized, systematic, and well sustained way have been made for safety in the lumber industry. Nevertheless, the owners and managers, especially of the larger plants and operations, in the lumber manufacturing business are as well informed as to what advancements are being made in the industrial world, and are as truly anxious to keep abreast of these advancements and to take part in patriotic and humanitarian work as those of any other industry.

#### BASIS OF SAFETY ORGANIZATION

Having observed the satisfactory results of systematic safety organization in other lines of endeavor, and having the faith that by sustained effort the difficulties in the way could be finally obviated, it was determined toward the end of last year (1919) by the Edward Hines management in Mississippi to adopt such a plan for their lumbering operation in that State, and to do so upon a thorough and comprehensive basis just as if their plants had existed for years and expected to continue in operation for all future time to come. And while, to make it reasonably certain of success, it was determined to place it upon a compulsory basis throughout, it was appreciated in the very beginning that, unless the interest of the men could be enlisted upon some other than a compulsory basis, the plan could not attain that measure of success which would make it really worth while. So an organization was worked out and put in operation wherein the voluntary co-operation of the men was sought for and emphasized to the highest practicable degree. To overcome so far as possible the difficulties first herein mentioned and to get the men so far as could be, into a receptive mental attitude, it was in meetings and by distributed literature impressed upon them that by far the larger percentage of accidents in saw mills and lumber camps was preventable in the first place, and, in the second place, that it was an entirely erroneous impression that accidents as a rule resulted from defects in machinery, appliances, and ways, that, contrary to the common impressions, more than 70 per cent of all accidents resulted from carelessness, thoughtlessness, or inattention on the part of the men themselves, and that therefore the success of the plan depended upon the workmen themselves and only in a small part upon the plant equipment and upon the management. It was especially promised them that so far as the percentage was due to defects or want of safe guards in machinery, appliances, and ways, the management would set about forthwith to correct all that and would be diligent to install safety devices and guards not only in all places where such a device had been originally intended, but that all possible efforts would be made to invent and install other and further safeguards and safety appliances, and, as a further assurance or guaranty of this, the position of general inspector for safety was created and a special crew of men were put to work under his direction to install the guards and safety devices mentioned.

## EMPLOYEES MAKE VALUABLE SUGGESTIONS

This work was faithfully carried on throughout the plants in a way that the men in their daily work were as constantly as practicable made aware of it as redeeming the promises made to them in that connection and at the same time impressing them with the fixed purpose of the management to make safety a real and genuine part of the operations. Moreover, the men themselves were encouraged to co-operate in this matter of installing and devising safeguards, one of the means adopted to the end being a standing invitation to them to make suggestions in writing to be placed in a box called the Suggestion Box, it being guaranteed that every suggestion would receive respectful consideration and those worthy of adoption would be adopted and credit given to the person making the good suggestion, and a system of cash prizes for valuable suggestions was instituted, so that not only the sense of pride in the men was appealed to in their being called upon thus to join in a creative work of value, but also the incentive of immediate pecuniary gain was offered in the competition for these prizes. The result has been that not only have many valuable suggestions for safety been received but also suggestions beyond the scope of safety, it being estimated that the value of the suggestions so received which were outside of the scope of safety has been equal to or in excess of the total cost of everything done or spent in the safety work. For instance, a negro made a suggestion which was found to have nothing to do with safety but which was so valuable as an operative matter that he was awarded a prize of \$10 for it. The improvement was made at a cost of \$40 and has been found to save \$200 per month in the expense of operation. A white man made a suggestion by which 300 feet of trestle costing \$5.00 per foot was saved, and many like illustrations could be given. The spirit of co-operation and good will on the part of the men appealed to by these various features has reduced the labor turnover with the result that with a somewhat smaller total force the aggregate output has been increased 10 per cent. We come, therefore, immediately to the showing that even if such an organization as was adopted saved nothing in accidents and in preventing injuries and suffering, it has more than paid for all its costs in money, time, and effort by the reduction of operating expenses, in lowering the rate of turn over, and in increasing the output on a decreased force.

## SAFETY ORGANIZATION COMPRISES SIX UNITS

But the results in prevention of injury have been equally satisfactory, considering all the untoward obstacles which had to be overcome. As stated, the plan of safety organization adopted was one which involved an appeal to the interest and best human qualities of the men themselves, from the lowest grade in the ranks up to the general manager. The organization embraced two saw mill plants and two logging operations, extending over an area of some fifty miles north and south, and an operative force of about 1200 men. Over each plant and logging operation there was constituted a General Committee consisting of a Chairman, the

### *Woodworking Section*

general inspector, the superintendent, the auditor, and the saw mill man. The second element of the organization is the general inspector whose duty it is to keep all the units in action and to assist and guide in the work in general, and to form the main coordinating link between them all. The third unit is the foreman's safety committee, consisting of five foremen at each plant or logging operation. Working in close conjunction with them is the fourth unit, the workmen's safety committee, consisting of five white workmen and a separate colored workmen's safety committee consisting of three colored workmen. The fifth and sixth units are, respectively, the foreman of each department and the weekly safety overseer in each department. In this organization it is understood that the foreman is the most important unit and that his attitude toward safety determines very largely that of the men under him. The foreman is by every possible means impressed with his position of leadership and with the necessity of his sincerely maintaining the same in all good faith and perseverance if the work is to succeed and if he expects to rank well in the esteem of his superiors. The foreman is further impressed with the added opportunity which the safety work affords him to get on terms of close human touch with his men, where the men may be made to feel more than ever that the foreman (if he is the right kind of a foreman) is their friend and helper and well-wisher and that his chief concern is, as it ought to be, their welfare and success in their work in all respects, not alone in safety.

To further arouse the interest and enthusiasm of the foremen they are rotated in committees, each committee serving three months, and are given rather broad privileges as to inspection, reports and recommendations. They also visit at the employer's expense the other plants of the employers and also distant plants on occasion, and they receive the full time and expenses when thus engaged. The same general duties and privileges are allowed the workmen's committee, which committees are elected by the men themselves for three months and are rotated personnel.

#### ACCIDENT RATES ARE REDUCED

It was said that this plan of organization was too elaborate for a lumber operation, too complicated for the comprehension of, and handling by, the type of men found as employees in such works. And so it would have been without the presence of the co-ordinating agency of the general inspector, but with his aid and constant attention it has been made to work and work well.

Every accident however trivial is required to be formally reported and every one must receive immediate medical attention, which is at the cost of the employer. Thus the suffering and loss which formerly resulted from infection from apparently trivial hurts have now been reduced to a fair minimum. First aid kits and first aid stations have been installed throughout all the works, and workmen's safety committees are trained by the surgeons in their use. The frequency rate of accident (and these figures include every kind of accident down to the most trivial) has been reduced in the plants from 70 per 1000 men per month to 40, and in the



woods operations, while the frequency rate has not been substantially reduced, there has been a striking reduction in the severity rate. As a matter of fact, the frequency rate has improved considerably more than the above statements would indicate, because of the fact that practically all accidents are now being recorded. Foremen are being trained to report every injury, however slight, and accidents are now being reported which formerly were not noted at all.

#### SAFETY WORK MAKES BIG SAVING

As to the cost, as against the former practice of carrying liability insurance, a substantial saving of expense has already resulted. Although there is no workmen's compensation law in the State, half time is being paid for all time lost on account of injuries received; physician's attendance, drugs, and hospital bills are paid by the employer; all this without regard to the question of legal liability, that is to say, without regard to whether the injury was the fault of the employer or of the employee. And in spite of this extra-legal and far more liberal policy of compensation, the total cost to the employer has been less by approximately 30 per cent than the premiums formerly paid to liability insurance companies. It is to be noted that in the present estimate of cost everything that is spent for the maintenance of the safety organizations, such as salary of general inspector, and of all other agents and employees so far as apportionable to the safety work and to the casualty department are charged into this cost.

The results in the short time of six months may, therefore, be stated as equalling every reasonable expectation, and in some respects to have been more than was really anticipated. Of course, there have been foremen, even in the more important departments, who have taken to the work slowly and with ill-concealed indifference. They have croaked around about its not having been done at So and So where they came from and had their training, and that "they didn't kill so many there" and that "it is a lot of extra trouble and humbug for nothing." There are still men in the ranks who continue to regard the whole program with a smiling tolerance to be endured until, as they think, the enthusiasm presently aroused shall have time to die down, and it is not to be doubted that there are yet a few who even look hopefully to a day when, as they expect, the same old system of carelessness and indifference to results may have sway as in the past. But over against these are foremen and men who have taken and are taking a genuine and sincere interest in the work and are determining to make it a lasting success.

#### VALUE OF EMPLOYEE DETERMINED BY HIS INTEREST IN SAFETY

It has now arrived at the time when the management is beginning to take definite note of the fact that the efficiency of both foremen and men is fairly accurately gauged by the direct interest taken by them in the safety work. Or to state this proposition in other words, and this seems to me is the highest and most comprehensive tribute that could be paid

to the general efficacy of safety work: The management is now finding that the value of the individual employee as a producer, whether he be foreman or workman, is very nearly in direct proportion to the interest which that employee is taking in the matter of aiding and encouraging the advancement of the safety work. Therefore, the progress of the plan is just now about to reach the stage when it will be up to the management to make absolutely secure the continued increasing success of the plan by beginning to let out of the works as judiciously as can be done all those who will not genuinely take part and aid sincerely in the progress of the plan and its purposes from beginning to end, and more especially will this be the test as to retaining in their employ indifferent foremen. It is inconceivable that any intelligent management with the result before it which has been accomplished in so short a time will not take the requisite steps in this connection, unpleasant as it may be to any management to sever relations with some employees who have been long in the service.

#### SUMMARY OF RESULTS OBTAINED

To sum up the results: There has been created a feeling of closer personal relations between employer and employee, a stronger sense of loyalty and good will. The rate of turnover has been reduced, and with a smaller force there has been a 10 per cent increase of output. The cost of operations has been reduced by an amount more than equaling all that has been spent for safety and for the maintenance of the safety organization, through the installation of suggestions made by the men. The frequency rate of accidents has been reduced 40 per cent and the severity rate nearly as much. The total cost of the safety and casualty departments, on a much more liberal basis than ever before as to allowances, has been reduced 30 per cent below the old premium cost for accident insurance. And with it all there is the greater and more genuine satisfaction that there has been put into the work the spirit of humanity, of kindness, and of patriotism, which to every good man outweighs mere dollars and cents beyond any thought of comparison.

CHAIRMAN RHODES: Judge Griffith, I want to thank you in behalf of the Woodworking Section for the splendid paper you have submitted to us.

I want to say to those present, who may not be so familiar with the lumber business, that Judge Griffith has spoken for one of the largest lumber companies in the United States. There is so much information in this paper that I know will be of interest to the lumbermen that I am going to see that it is printed in a special separate pamphlet and distributed to them as widely as possible throughout the country in addition to its publication by the National Safety Council.

I want to introduce the man who has been actively and closely identified with that work, who has charge of it directly for the Edward Hines Yellow Pine Trustees, at Gulfport, Mississippi, Mr. C. L. Skatvold.

MR. SKATVOLD: The direct application of Safety First brings about efficiency on the part of the employees. Efficiency goes with Safety.

(A Nominating Committee was appointed by the Chairman.)

CHAIRMAN RHODES: The next subject on the program is "Safety and Sanitary Accomplishments of the Loyal Legion of Loggers and Lumbermen", by Dr. S. T. Tharaldsen, sanitary officer of this organization, from Portland, Oregon.

It may be of interest to you to know what the Loyal Legion of Loggers and Lumbermen is. During the war the I. W. W.'s, operating largely through the logging camps in the States of Washington and Oregon, at that time did what they could to prevent the production of lumber for war purposes, chiefly aeroplane stock from spruce.

The situation became so difficult that the War Department was finally obliged to undertake the production of aeroplane spruce in that section of the country and—as a result, I believe, of the efforts to increase production and to enable the employers to get more closely in contact with the men—there was organized the Loyal Legion of Loggers and Lumbermen, in which the employers and employees have equal participation. Many of the manufacturers of lumber in the Northwest informed me that the results have been very satisfactory; others feel that they have not been so satisfactory.

I have a letter from Dr. Tharaldsen, in which he states that he has been delayed, and is unable to come from Portland, and submits his paper, which will now be read.

### SAFETY AND SANITARY ACCOMPLISHMENTS OF THE LOYAL LEGION OF LOGGERS AND LUMBERMEN

DR. T. THARALDSEN. SANITARY OFFICER. LOYAL LEGION OF LOGGERS AND  
LUMBERMEN, PORTLAND, OREGON

The chief objects of the National Safety Council as I understand them are, first, to insure to the worker a safe place to work; secondly, to educate the worker to protect himself and his fellow worker. The result will be the elimination of preventable accidents and the consequent loss of life, limb, time and money.

The Loyal Legion of Loggers and Lumbermen, commonly known as the 4-L's, is solidly back of this movement in the territory in which we operate. I wish to lay particular stress on two of the results which we hope to obtain and describe briefly to you the methods we have used and the progress made to date. We are endeavoring to obtain for our members a safe place to work and a safe place to live. We recognize that while the time loss due to accident is of great importance, it is but of relatively small importance when compared to the time loss due to sickness. So in the matter of providing a safe place in which to work, in addition to safety devices of all kinds, we stress the importance of sanitary drinking fountains, sanitary toilets, rest rooms, and comfort stations. Then, when the whistle blows, we follow our members to their living quarters. The nature of the lumbering and logging industry is such that a very large percentage of our members live in camps which are usually of a more or less temporary nature.

## IMPORTANCE OF HOUSING

Prior to the organization of the 4-L's very little attention was paid to the housing of men in camps. Some few of the larger operations had begun to realize the importance of this work, but on the whole, living conditions were bad except for one feature. The mess in the lumbering industry of the Pacific Northwest was superior to that in any other industry in the world, and the waste was terrific. A logger philosopher described the situation very aptly by the phrase, "They feed us like kings, and sleep us like hogs." Bunk-houses were poorly constructed, inadequately lighted and ventilated, and in most instances seldom swept, and never scrubbed. They were greatly overcrowded, and no one paid the least attention to such important matters as ventilation, air space, or floor space. Bathing facilities, dry rooms, and recreation rooms were almost wholly lacking. The toilets and the hog pens were the two most constant and conspicuous features of the camp.

A careful survey of living conditions in camps was made, and the results were laid before the operators.

This survey demonstrated one very interesting fact. Over 90 per cent of the operators were willing and anxious to correct these conditions, once their attention had been directed to the necessity of doing so. In other words, the average operator had so concentrated his efforts on production that it had never occurred to him that his employees were not properly cared for outside of working hours. Camp to him meant but one thing—food. In response to a question regarding his camp the typical answer was, "I've got the best cook in the State, and I buy the best of everything. I lose hundreds of dollars every month on my dining room." A Sanitary Department has been created; a sanitary pamphlet published, containing sanitary regulations and detailed specifications for camp construction; local sanitary committees formed; sanitary inspections of camps are made and reported at definite intervals. The closest co-operation with State Boards of Health and the U. S. Public Health service is maintained.

## BRIGHTENING UP THE LOGGING CAMP

The results to date really are remarkable. Practically all camps now provide shower baths. The minimum of 400 cubic feet of air space per man in bunk houses is seldom violated. In the rainy districts, dry rooms are a common feature. Hog pens have been moved from the immediate vicinity of the camp. Kitchens, mess halls, and toilets are fly-proofed. The common drinking cup and the water bucket have been replaced by the sanitary drinking fountain. Electric lights are replacing the smoky and expensive oil lamp. Stationary wash tubs, with hot and cold water under shelter, have superseded the half barrel and butter firkin formerly used. The double deck bunk is slowly but surely disappearing from the bunk house. The company owned blankets, sheets, and pillow cases are gradually replacing the old unsanitary blanket roll. Practically all camps except the very small or very temporary ones are provided with a recrea-

tion hall or reading room. In many of the larger and more permanent camps some very pretentious halls are provided, with pool and billiard tables, reading rooms, bowling alleys, moving picture machines, boxing gloves and similar equipment.

By directing the attention of our affiliated operators to camp conditions, and taken as a whole they proved to be very willing listeners, they were soon convinced that industrial sanitation is not a fad, but on the contrary is a necessity which can no longer be ignored. They were convinced that a sanitary and livable camp is an essential to the company, and one which pays well by preventing depletion of its working force by disease, which reduces the labor turnover and increases the efficiency of the crew, due to the fact that they are contented. That there has been a very appreciable decrease in the labor turnover is illustrated by the remark of the manager of a well known employment office, who is quoted as saying, "There won't be much need for an employment office pretty soon if the 4-L's keep on cleaning up the camps."

#### TEACHING THE LUMBERJACK TO APPRECIATE THE VALUE OF HYGIENE

The second phase of this work, and the phase which has presented the most obstacles, has been the effort to obtain the complete co-operation of the crew. This is by far the most important part of our health program and will ultimately produce the best results in our campaign for prevention of disease. All improvements in camps will prove of little avail if we fail to inculcate into the individuals who live therein, a better understanding of how diseases are spread. We must bring home to each individual the fact that the presence of a disease carrier in a camp is more of a menace to the health of the crew than is an overcrowded bunk house; that unclean hands are a greater menace than an odoriferous and unsightly garbage pile; that the sanitary toilets, kitchens, and mess halls simply close avenues for the transmission of diseases and are safeguards in the presence of a disease carrier. In short, the lesson we endeavor to teach is this: a bunk house is as clean as its filthiest occupant, and the health of no camp is safe if it harbors an individual who is suffering from or is the innocent carrier of a transmittable disease.

In many instances, with very little effort, we have succeeded in obtaining the most complete co-operation, and in these instances the progress made has been remarkable, but unfortunately in many instances we find that the best appointed camps are allowed to run down, due to the fact that the individual members take no personal interest in the matter. At times this has proved to be very discouraging both to this department and to the operator. However, I believe that the morale of the men has improved markedly within the past two years and has about kept pace with the sanitary improvements. To assist in building up this morale we have instituted what we term a "personal service". Under this head are grouped all our various endeavors to be of assistance in individual cases. The U. S. Public Health Service and the Department of Agriculture have very kindly furnished us with a supply of the various pamphlets

dealing with such vital questions as flies, bed-bugs, and cockroaches. These are furnished to all camps and have been of inestimable value to us in combating these germ carriers. Through the U. S. Public Health Service, we also obtained what I believe to be the most rational "doctor book" for lay readers. This is known as "Miscellaneous Publication No. 1 Care of the Sick and First Aid to the Injured." A copy of this book has been placed in each of our 400 locals.

#### PLANS FOR CONTROL OF VENEREAL DISEASES

In conjunction with the U. S. Public Health Service and the State health authorities, we are about to institute a very active campaign for the control of venereal diseases. In this connection lectures will be given in the camps and the various phases of the diseases will be illustrated by moving pictures and lantern slides. Free clinics will be established at various central points, where our membership will be enabled to obtain advice, and if necessary, free treatment for these diseases. Health talks dealing with other diseases will also be made. In fact, we hope by improving sanitary conditions, installing safety devices, and educating our membership along these lines eventually to make the lumbering industry the most attractive industry to the worker. Too much attention cannot be given the subject of sanitation and living conditions. Statistics prove that the time loss due to preventable accidents is about one-eighth of that due to preventable diseases.

The L. L. L. L. is squarely facing both problems and is slowly but surely progressing. That our efforts are being rewarded is very apparent to anyone who has followed the history of the lumbering industry in the Pacific Northwest. The data collected to date from affiliated 4-L operators indicate that 382 operators employing more than 61,000 men scattered in small groups over the states of Washington, Oregon, and Idaho, have in the past year expended more than one million dollars for improvements which affect the living conditions of their employees. I believe that it can safely be asserted that the past year has shown a greater degree of improvement in living conditions in camps and mills than any like period in the entire history of the industry. The effect of our work upon the morale of the employee is of course less tangible and more difficult to demonstrate in cold figures, but nevertheless, it is equally as apparent to the close observer who is in touch with the situation. Speed the day when periodical physical examinations for all persons in the industry will make it possible for us to demonstrate by reliable statistics the economic value of modern public health activities.

To sum up our endeavors I will repeat a statement which I have often made in talks to the men in the camps. "We are trying to eliminate all preventable diseases from our midst. When this is accomplished the most common cause of death will be old age."

CHAIRMAN RHODES: We in the South have followed rather closely the work of the four L's, and have not known exactly what its practical results would be, but with evidence like this given by the operators there

selves, I am sure it will be of great interest to the Southern lumbermen.

(The Nominating Committee reported the following nominations: For chairman, Mr. E. Ross Farra, American Car and Foundry Company, Wilmington, Delaware; for vice-chairman, Mr. F. G. Lovett, Industrial Accident Prevention Associations of Ontario, Toronto, Ontario, Canada; for secretary, Mr. F. A. Barker, Lumbermen's and Manufacturers' Insurance Agency, Milwaukee, Wisconsin. On motion duly made and seconded, the nominees were elected.)

CHAIRMAN RHODES: This concludes our program for the morning, and the Chairman is in a little doubt as to the advisability of adjourning the section finally because of the fact that the three papers scheduled for tomorrow include two men who are not here—Mr. Weathersby, of Silsbee, Texas, and Mr. Horn, of Nashville, Tenn.

Would it be your pleasure that we have these two papers scheduled for tomorrow presented at this time, and conclude the session, or hold the other session tomorrow morning?

(On motion it was voted to read the papers and conclude the meeting of the section.)

## SAFETY AS APPLIED TO SOUTHERN LOGGING OPERATIONS

R. L. WEATHERSBY, LOGGING SUPERINTENDENT, KIRBY LUMBER COMPANY,  
SILSBEE, TEXAS

Down South, there is growing, large-bodied, tall, straight, free from knots and shakes, what is known to the world's lumber trade as Southern pine. Within the shades of these forests dwell the loggers who fell the trees and start them on their way to serve man's purpose. These men, whose activities are in the great out of doors, are exposed to falling temperatures of winter and heat's penetrating rays of summer. They must adjust themselves to the varying conditions of a country which, it had long been thought, could not be benefited by any set rules of safety, and which, therefore, was a place where every man was for himself and the devil CARELESSNESS for them all. With the advent of safety organization, this state of affairs has changed and it is not necessary for me to tell this body of the benefits derived and that will be further derived from its continued development.

The simple fact is that the woodsman through the mental teachings of safety has begun to think, and through this factor, the strongest of safeguards, has in addition created and put into effect mechanical devices whereby the necessity for taking dangerous chances has been largely eliminated. All accidents can be prevented, but man has not yet and never will reach the foresight of caution which will bring this about. Accidents will occur when we have concluded that every preventative has been applied; fool-proofing is yet an undeveloped science, and it all demonstrates that it should be the duty of the individual and industry to continue to lower the minimum.

Essentially first is the inspection of tools and equipment and the direction of the handling and doing things in the safe way. It is useless to put down one-hundred-pound steel and not properly spike it; to purchase safe equipment to be handled by a careless man; or to subscribe for safety first bulletins for bung fodder.

#### HAND TOOLS

Tools, especially double-bit axes and cross-cut saws, should not be carried in the caboose conveying workmen to and from the woods, unless confined in a box or locker provided for that purpose. Upon reaching the woods cross-cut saws should be carried upon the shoulder with teeth projecting outward, while axes should be carried in hand, never upon the shoulder. Sawyers should protect themselves against any underbrush that might foul the axe when dapping a tree preparatory to its felling. When the tree begins to fall they should step back a safe distance, avoiding the danger of a kickback, watching its top to prevent injury from falling limbs; and before approaching the fallen tree, observe surrounding timber and protect themselves against hanging limbs or other timber that might have been disturbed or broken in the fall of tree. In trimming tops of fallen timber the same precaution is necessary as in dapping in so far as fouling of axe by underbrush is concerned and possible injury to workman associate or both.

#### SKIDDING

These are hazardous operations and every man engaged therein should be his brother's keeper. Drum pullers should never pull slack out of line until signaled by flagman, who should never give signal until log is securely hooked and until he has stepped to opposite side of log from direction it will be pulled. Drum pullers coming into yard with log should use necessary precaution to prevent it hanging against any obstruction that would cause tongs to release, injuring flagger or decker, a frequent accident. Log should not be decked when rider is between deck and track as it might roll entirely over car, injuring rider or horse. Slack should be taken out of lines slowly by drum pullers until line has tightened to prevent throwing limbs or other obstructions, which are frequently thrown a long distance by a sudden jerk of the line. Logs being skidded should be watched closely by ground men so that they may protect themselves against small trees that might be uprooted if hit, or rotten limbs that might be thrown upon workmen. Skidder and drum men should know that sheaves on their booms are in safe condition to prevent falling upon them underneath.

#### LOADING

Loadermen should be cautious in removing logs from deck to prevent disturbing them before tong hooker can get into clear and to prevent its breaking, which invariably happens from rough and clumsy handling. Ground men should know condition of bunk load before attempting to



fasten toggle chain. Loadermen should never pull log before tong setters have set their tongs and stepped aside to guard against injury from a skidding log. After completing load, loadermen should deadman same when in a hilly country to prevent run away of cars, which results in serious loss both to life and property.

#### TRACK WORK

Steel gang foreman should not permit men to ride steel cars. This is the most dangerous car operated, due to the fact that necessity demands its operation over tracks which are in course of construction and otherwise weak and which, therefore, make the car more susceptible to derailment and wrecking. Men engaged in spiking, handling ties, or other materials should be experienced. Gangs should be filled out with this thought in mind and perfected as nearly as possible; their supervision by green foremen should never be tolerated. Handling the materials just mentioned is the greatest source of the promiscuous minor and serious injuries, which are often due to ignorance of men supervised by a careless foreman who does not regard the safety of his crew. He might lie to you in explaining how he broke some tool to prevent your reprimand for carelessness; but if you give no thought for the safety of your men and he gives none for his crew, a broken limb is sent back to the camp dangling to a workman with the simple explanation that "he got hurt; how? I do not know." A careless foreman lets the calamity go at that and you stand for it. These occurrences can and should be prevented by more careful and intelligent handling, and the industry that regards not the safety of its men has yet to learn it is shirking a responsibility.

The safety of your train crews is largely within the hands of your track forces. Removal of a tie or a spike, or making repairs without the forethought of the necessary signal to permit approaching trains to protect themselves, are all within the hands of your track men. You should at least know whether you have a careful foreman who realizes his responsibility. Have you foremen on the section who will display the danger flag to warn the engineer, who is running for the hill, that he may get his train under control before reaching the point of danger? Think this over; and if you have not, then you, yourself, are asleep at the switch.

#### TRAIN CREWS

Engine men should carefully go over their engines before leaving the roundhouse. Those little things, a nut here and a bolt there, develop into big and dangerous things unless continuous attention is given. It should be known that gauge cocks and water columns are in good condition with sufficient water in boiler. It should be the duty of some individual in the train crew to examine all hand holds, steps, pilots, and footboards with brake rigging on caboose. Do not take chances which can be lessened by the suggested caution and care. Firemen should know whether the king pin between engine and tank is in safe condition, as a

break here invariably results in a fatal accident. Care should be used in coupling together loaded cars when making up trains or otherwise and where logs are found projecting that will not permit clearance for brakeman in making coupling, he should deadman his car and with connecting load shove projecting logs far enough back to provide sufficient clearance. In such procedures the engine man should exercise such caution in handling his engine as will prevent disturbing the entire load. Trainmen should never walk on moving cars, which as a rule are covered with bark, which further adds to the danger of such practice. Cars generally in use are of skeleton type and a man falling suddenly always goes underneath, which results in the loss of limb or death. The engine man, before going under his engine, should know that throttle is shut off, the reverse lever on center, and the engine well chocked. Care should be exercised to avoid hitting a valve, especially blow-off cock which only requires a slight vibration to release when under pressure. The engine man should further know that the headlights are in good condition, as there are many unexpected delays which compel running after dark where the right of way is not fenced and where other standards of protection are not provided in the form of signals that would warn him of danger. The fireman should never clean the ash pan or fill rod cups without cautioning the engineer, as a slight movement of engine when he is so engaged may result seriously.

That which I have said concerning the necessity of carefulness in handling train equipment applies to all equipment, skidders, loaders, and all appurtenances necessary in logging. The employment of careless men to handle your equipment or to operate your trains should be criminal. It will not perhaps be possible to secure men who are 100 per cent efficient in rules governing the operation of trains over our great trunk lines, nor is such perfection absolutely essential; but we do need careful common-sense men who know and observe the signals and rules governing the operation of logging trains, which have their individual and peculiar dangers that cannot be guarded against other than by absolute carefulness.

#### ROLLWAYS

**FIRST:** See that there are no loaded cars which will not clear the rollway.

**SECOND:** Know that man hole is clear and not filled with bark or other debris which will prevent your getting into same with safety.

**THIRD:** Observe the load; and before knocking the toggle, determine in what manner it is going to break, and be sure that you are in position to get in the clear.

**FOURTH:** Do not attempt to unload lapped loads before they have been separated.

**FIFTH:** In the beginning make sure that there are no men at foot of rollway picking up sinkers, or otherwise engaged, upon whom logs might roll.

**SIXTH:** And lastly, if you have been careless and observed none of these precautions, resulting in your being caught upon the rollway,

blocked by falling logs from the man hole, run like h--l: it's up to you and your Maker.

This is a long and to some of you perhaps a dry subject; there is absolutely nothing new in what I have said. It is all known to every experienced logger and I have simply and as briefly as possible gone over what constitutes common-sense safety as it is applicable to general woods operations that require no scientific or perplexing thought to interpret. Safety first, self protection, is born in a man of normal mind, but in the great race we are making, we forget and confuse the gift of proper thinking. The problem before this body and its universal teaching to the individual should be to exercise his power of concentration on those things in which he is NOT TO FORGET. This is what you are undertaking both for the individual and industry. The man or industry who will not accept his part in this great work by unselfish co-operation should be outlawed. The fruit from safety training means a clear and active mind whose possessor may without danger govern the demon of fire, control the deadly currents of electricity and ride upon the bosom of unknown seas.

#### THE TRADE JOURNAL AS A VALUABLE AID TO SAFETY

S. F. HORN, EDITOR, "SOUTHERN LUMBERMAN," NASHVILLE, TENN.

It is perhaps restating an obvious fact to say that the trade paper possesses unusual possibilities for educational work in the furtherance of the safety movement. The very primary function of the trade paper is the dissemination of practical information which will be of real and positive value to those engaged in the line of industry to which it is devoted; and surely no information is of greater value than that which tends to promote safety. An idea of the possibilities for good work in the direction of safety possessed by the trade papers may be gathered from the assertion of the National Safety Council that three-fourths of all deaths and serious injuries in industry can be eliminated, and that not more than half of this reduction can be accomplished by mechanical means, leaving one-half to two-thirds of it to be done through the medium of organization and education.

In my opinion, however, the trade papers as a class have not yet fully recognized the vast field for good work in this direction, and it is my earnest hope that the work they do along this line in the future will far over-shadow what has been done in the past—and that is not minimizing the value of past performances. As a matter of fact, the work which the trade papers have done to speed the safety movement has already been attended by conspicuous success, not only in the lumber and wood-working trades, but in various other industries. A few instances may be interesting.

For example, one of the leading trade journals devoted to the coal trade early recognized the great importance of safety work in coal mining. In recognition of the importance of the subject they ran a great

deal of material relative to first aid meets. This grew to such proportions as to occupy much of the space in the paper, and it was necessary to reduce the volume of the material. Reports from the mines show that there was an immediately noticeable decline in interest in the first aid movement coincident with the restriction of publicity on the subject. This particular paper also runs an annual safety and welfare number and it is stated that these special issues have had the visible effect of stimulating the safety sentiment and creating a desire to purchase safety equipment.

#### TRADE PAPERS PUBLISH SAFETY INFORMATION

The trade papers devoted to the railroad business have been notably active in this work. One of them, for instance, devoted much time and work to an investigation of the use of motor cars used by maintenance gangs in going to and from their work. An undue proportion of accidents occurring in the earlier years on some roads where these cars were used had led to their absolute prohibition by certain railways. This trade paper, however, through the publication of rules for best practice in operation of these cars and an insistent stressing of the fact that operation of such cars could be made safe by following proper rules helped to remove the restrictions on the use of this valuable time and money saving utility in maintenance work.

In the iron and steel trades the trade journals have not lagged. The subject of safety has attracted their deepest interest and has been treated not only from the viewpoint of humanitarianism but from that of conservation of workmanship and skill, looking towards the advancement of efficiency. They have published from time to time the safety codes proposed or adopted by the various states with reference to the iron and steel works, foundry, and machine shop operations; and have given much publicity to the elaborate safety and welfare work which the various steel companies have been carrying forward on their own individual account.

#### SAFETY INSTRUCTIONS MADE INTERESTING

Innumerable instances could be recounted of the work of trade papers in advancing the safety movement in other industries, but we are interested primarily in the lumber and woodworking trades. It is a source of great gratification to me to be able to say that the work which has been done for safety by the lumber trade papers has been persistent, energetic and, I believe, productive of very beneficial results. The lumber trade is a particularly prolific source of accidents, not only on account of the hazardous nature of the work but also due to the type of common labor so frequently employed in the woods and about the mills. Carelessness seems to be an inherent trait of the labor employed in sawmill and logging operations—and carelessness has no place where powerful saws are tearing their way through logs or where giant trees are crashing to the ground.

It is remarkable, for instance, how many accidents occur in the lumber trade through sheer carelessness in the method of carrying axes and

cross-cut saws. Carrying an axe might appear to the layman to be an extremely simple matter, but in this as in other things there is a right way and a wrong way; and one of the most interesting articles on safety which we ever published was on this particular phase of the question, illustrated with drawings showing the safe way and the dangerous way. This article pointed out that if a man carries his axe in his hand with the head under or in front of the arm, he is likely to be seriously injured should he happen to stumble and fall—and it is an easy matter to stumble when pushing one's way through the woods. If the axe is carried over the shoulder, with the head of the axe back of the shoulder the probability of accident is materially lessened. The only safe way to carry a saw, it was pointed out, is to put it on the shoulder with the teeth pointed outward and the hand on one end. If the saw is carried under the arm, as is frequently done, the man is almost certain to be seriously injured or lacerated in case of a fall. It is pleasing to think that through the publication of this one little article we may have been the means of helping the prevention of many accidents. The real importance of this apparently trifling matter is emphasized by the fact that over 19 per cent of all the accidents in logging operations originate in the handling of saws, axes, and other hand tools.

#### CO-OPERATION WITH SOUTHERN PINE ASSOCIATION

One of the most potent forces for good in advancing the safety movement in the lumber industry has been the Department of Safety and Industrial Relations of the Southern Pine Association, whose work under the direction of Mr. W. Graham Cole is well known throughout the industry. Through co-operation with this department, the lumber trade journals have been able to render the results of its good work available to those lumber manufacturers who are not affiliated with the association. One of the best mediums of publicity adopted by the association is a series of large posters, most of them graphically illustrated, cautioning the workers to be careful and pointing out specific dangers. By an arrangement with the trade papers, advance copies of these posters are available to the lumber trade press for reproduction in their columns simultaneous with their distribution by the association.

These posters are models of their kind. Posted in a conspicuous place, the worker can not escape their lesson. A typical example, devoted to the dangers incident to skidding logs, is headed "Get on the Safe Side Before Giving Signal" and goes on to recount the case of a mythical Jim Smith who stood between the log and the skidder while fastening the chocker and who was thrown under the log when the drum puller took up too soon. The poster is illustrated with two skillfully posed photographs showing just how the unfortunate Jim was injured. The poster, incidentally, does not place all the blame on Jim but closes with an emphatic admonition to skidder drum pullers to be sure they receive the proper signal before pulling a log.

Mr. Cole, above referred to, is not only an unusually efficient safety engineer, but recognizes the value of the trade papers in his work and is

kind enough to oblige with specially written articles on the subject of safety. One of the most attractive articles in the 1919 Christmas Edition of the *Southern Lumberman*, and one which attracted much favorable comment, was from his pen. It was copiously illustrated with reproductions of some of the posters of the Southern Pine Association, and if the testimony of the papers' readers is to be believed, was a strong link in the chain of education for safety in the lumber trade. Another activity in this connection undertaken by the *Southern Lumberman* was the publication of a series of safety lectures made available through the National Safety Council which, we are pleased to believe, had a beneficial effect.

#### EDITORIALS ON SAFETY

The *Southern Lumberman*, and the same is true of other lumber trade papers; has also given considerable editorial attention to this all-important subject. We recall a recent editorial we had in this connection based on a sad incident at a Southern sawmill. The owner of this mill converted to the safety movement, undertook to install a guard on the sawyer's box. The sawyer strenuously objected to the installation of the guard, however, and, being an old and valued employee, his wishes were regarded and the guard left off. Shortly thereafter he was struck by a wild log and almost instantly killed. Incidentally, his family sued for and recovered a large sum of money in damages. This incident is a graphic illustration of the fact that it is necessary not only to educate the mill owner, but the employee as well. It also demonstrates the owner's folly in being deterred from doing what he knew was right on account of the whim of an individual.

I have perhaps devoted too much attention to what my own paper has done in the safety movement, but my experience has naturally rendered me more familiar with its accomplishments than any other. I wish to emphasize the point, however, that the other lumber papers have shown a most commendable energy and enterprise in this movement. This has been particularly apparent in the Pacific Northwest.

Several months ago the Safety Board of the State of Washington prescribed rather elaborate safety regulations for the sawmills and logging railroads in the state, covering the construction and operation of log hauls, log decks, band and circular saws, edgers, slashers, jointers, shapers, stickers, etc. The promulgation of these regulations was materially assisted by the western lumber trade papers, which printed the regulations in detail accompanied by photographs of the various safeguards in actual operation. When such safeguards are first proposed, many of the sawmill operators are likely to regard them as unduly onerous, but their explanation and illustration by the trade papers goes a long way toward demonstrating their practicability and their value to the employer as well as the employee. And it is obvious that the proportion of accidents will be materially reduced if the employee is provided with a safe place to work.

## TRADE PAPERS STIMULATE SAFETY EDUCATION

The Northwestern lumber papers were also active in giving wide publicity to the fire rules for logging camps recommended by the fire prevention committee of the Pacific Logging Congress. When we remember the tremendous damage to property and loss of life—not to mention the destruction of growing timber—incident to the great forest fires of the West, it is hard to overestimate the importance of the work which the lumber trade papers can do in the work of building up respect for these fire rules.

One movement which is now gaining in favor among the sawmills of the South is the formation of employees' safety organizations, interest in which was to a great extent stimulated by the educational work in this direction conducted by the lumber trade papers. Several of the lumber trade papers published articles regarding the first of these organizations which was formed and which proved to be a model of its kind. Commenting on the causes which led up to its organization, the general manager of the operation stated: "We have been attempting to carry on a certain amount of Safety First work for a number of years, but have met with indifferent success. After numerous conferences, we finally decided that an organized Safety First program was necessary, both from a humane and business standpoint, and that this work should be compulsory. In order to carry out this idea, however, we felt that it was necessary to enlist the interest of the men themselves. From a close study of our accident reports we found that the majority of them were unnecessary; they caused an unnecessary expense and reduced the efficiency of our employees. Our work up to the present time has convinced us that Safety First work will do many things among the men, will insure a better class of employees, and will save considerable in labor. To sum up, we will have a better class of employees, more loyalty from our men, and a greater degree of efficiency. We have had the plan of safety organization installed only thirty days, but our accident list is already decreasing rapidly, our men are becoming very much interested, and we are keeping up their interest."

Can there be any question that the publication in the trade papers of such eloquent testimony of the real value of safety work, emanating from one of the recognized leaders in the industry, can fail to arouse other lumber manufacturers to the practical benefits to be derived from the undertaking of similar movements at their own plants?

## PUBLICITY FOR SAFETY THROUGH ADVERTISING

Although the principal function of the trade paper in safety work lies along the lines of education, I feel that I may take the liberty of referring to another service which it can perform and which has never been developed to its fullest degree of usefulness. While not deprecating the immense effectiveness of educational work in the safety movement, there is no gainsaying the value of mechanical appliances for the protection of saws, belting, emery wheels, and similar sources of danger. The

probability of accidents originating in a rip saw, for instance, are visibly diminished if that rip saw be protected with a guard. Effective guards are manufactured, yet how few of them are seen in sawmills and wood working plants. Such mechanical safety appliances are frequently referred to in the reading columns of the trade papers, but even if a sawmill operator becomes convinced of the advisability of using them he is not informed as to where he can buy them and does not know where to look for them. This is due to the unaccountable fact that the manufacturers of such contrivances have for some strange reason never seen fit to advertise their wares in the lumber trade papers. I do not mention this because of the profit which my paper or the other lumber paper might derive from such advertising—it would be comparatively insignificant in proportion to the volume of other advertising—but it has long been a source of surprise and regret to me that the manufacturers of saw guards, etc., did not recognize the benefits to be derived from advertising to the lumber manufacturers. I believe that the comparative scarcity of such safety appliances in the sawmill trade may be directly traced to this source.

There are other more capable and more interesting speakers on the program, and I shall not burden you further with a recountal of the work which the trade paper has done, is doing, and can do in the safety program. Too much of this sort of thing is destructive to any sense of modesty which one may have. But, in closing, I take the liberty of speaking for the entire lumber trade press when I say that the lumber trade paper can always be counted on in the future to bend their every energy to the preaching of the gospel of safety—and they reach a large and open-minded audience.

## LOGGING ACCIDENTS ON THE PACIFIC COAST

WILLIAM A. MARSHALL, CHAIRMAN, OREGON INDUSTRIAL ACCIDENT COMMISSION, SALEM, OREGON

The purpose of this brief paper is (1) to show the great need and value of accident prevention in logging operations on the Pacific Coast by presenting facts showing the severity of disabilities resulting from accidents in this industry as compared with other industries, and (2) by offering additional statistics as to causes of these accidents, perhaps aid in determining the particular causes toward which preventive measures should first be directed. Accident experience of the logging industry in the State of Oregon is used on the assumption that conditions in this industry do not differ materially in the coast states and our neighboring Province of British Columbia.

### FREQUENCY AND SEVERITY

A study of the comparative severity of logging accidents and accidents occurring in all other industries in Oregon during a period of three years shows clearly that logging is by far the most hazardous of any



Logging Accidents in the State of Oregon, for the period July 1, 1918, to June 30, 1920—By cause.

| Causes                                                  | Fatalities |         |       | Per. Perm. Temp. |        | Per Cent | Days |      | Per Cent |
|---------------------------------------------------------|------------|---------|-------|------------------|--------|----------|------|------|----------|
|                                                         | Totals     | Partial | Total | Cases            | Lost   |          | Cent | Cent |          |
| I. Machinery                                            |            |         |       |                  |        |          |      |      |          |
| Engines—caught by moving parts.....                     | 1          | 14      | 72    | 87               | 16,830 | 2.05     | 1.28 |      |          |
| Engines—all other.....                                  | ...        | 6       | 30    | 38               | 9,205  | .85      | .70  |      |          |
| Drag saws—caught by.....                                | ...        | 2       | 19    | 21               | 1,485  | .50      | .11  |      |          |
| Hauling logs with donkey engine:                        |            |         |       |                  |        |          |      |      |          |
| Caught by line.....                                     | 0          | 26      | 264   | 298              | 79,201 | 6.97     | 6.01 |      |          |
| Caught by logs.....                                     | 10         | 8       | 84    | 103              | 78,526 | 2.43     | 5.86 |      |          |
| Breaking or pulling loose of lines or hooks.....        | 7          | 8       | 76    | 91               | 63,480 | 2.14     | 4.08 |      |          |
| Trees falling or objects set in motion by logs going in | 13         | 1       | 81    | 101              | 94,245 | 2.38     | 7.15 |      |          |
| All other.....                                          | ...        | 5       | 25    | 30               | 6,881  | .71      | .52  |      |          |
| Loading logs:                                           |            |         |       |                  |        |          |      |      |          |
| Caught by logs.....                                     | 2          | 0       | 48    | 59               | 19,658 | 1.39     | 1.49 |      |          |
| Slipping or flying lines or hooks.....                  | 1          | 2       | 40    | 43               | 9,460  | 1.01     | .72  |      |          |
| All other.....                                          | ...        | 2       | 18    | 20               | 1,900  | .47      | .14  |      |          |
| Miscellaneous.....                                      | 1          | 5       | 38    | 44               | 13,624 | 1.04     | 1.03 |      |          |
| II. Steam Pressure Apparatus:                           |            |         |       |                  |        |          |      |      |          |
| Boiler explosions.....                                  | 2          | 2       | 5     | 9                | 17,478 | .21      | 1.33 |      |          |
| All other.....                                          | ...        | ...     | 4     | 4                | 69     | .09      | .01  |      |          |
| III. Vehicles                                           |            |         |       |                  |        |          |      |      |          |
| Cars and engines                                        |            |         |       |                  |        |          |      |      |          |
| Train wrecks.....                                       | 14         | 5       | 13    | 32               | 39,271 | .75      | 6.77 |      |          |
| Falls from.....                                         | 5          | 10      | 45    | 60               | 43,694 | 1.41     | 3.32 |      |          |
| Struck by or caught between.....                        | 4          | 9       | 19    | 32               | 40,411 | .75      | 3.07 |      |          |
| All other.....                                          | 7          | 6       | 54    | 67               | 56,050 | 1.68     | 4.23 |      |          |
| Push cars.....                                          | ...        | 5       | 43    | 48               | 4,839  | 1.13     | .37  |      |          |
| Skidding and hauling logs with team.....                | ...        | 10      | 121   | 131              | 13,951 | 3.09     | 1.08 |      |          |
| IV. Explosives, electricity, fire and hot substances    |            |         |       |                  |        |          |      |      |          |
| Blasting.....                                           | 3          | 1       | 10    | 14               | 24,163 | .33      | 1.83 |      |          |
| Hot water and steam.....                                | 2          | ...     | 32    | 34               | 12,531 | .30      | .95  |      |          |
| All other.....                                          | ...        | 2       | 16    | 18               | 3,924  | .43      | .30  |      |          |
| V. Falls of Persons                                     |            |         |       |                  |        |          |      |      |          |
| From standing trees and springboards.....               | 2          | ...     | 14    | 16               | 12,185 | .38      | .92  |      |          |
| From fallen trees.....                                  | ...        | 1       | 176   | 177              | 3,741  | 4.17     | .23  |      |          |
| From car in loading.....                                | ...        | 1       | 28    | 29               | 4,240  | .68      | .32  |      |          |
| Slipping and stumbling.....                             | 1          | 2       | 211   | 214              | 13,104 | 5.04     | .99  |      |          |
| All other.....                                          | 2          | 0       | 153   | 164              | 26,349 | 3.86     | 2.90 |      |          |

# Woodworking Section

Logging Accidents in the State of Oregon, for the period July 1, 1918, to June 30, 1920—By cause. (Continued.)

| Causes                                                             | Fatalities |      | Permanently Partially |       | Total Cases | Per Cent | Days Lost | Per Cent |
|--------------------------------------------------------------------|------------|------|-----------------------|-------|-------------|----------|-----------|----------|
|                                                                    |            |      |                       |       |             |          |           |          |
| VI. Stepping on, striking against or falling on sharp objects..... | ....       | 1    | 10                    | 236   | 247         | 5.82     | 19,086    | 1.45     |
| VII. Falling objects.....                                          |            |      |                       |       |             |          |           |          |
| Trees, poles and limbs.....                                        | 21         | 3    | 25                    | 190   | 239         | 5.63     | 182,456   | 13.85    |
| Rolling logs or other objects.....                                 | 24         | .... | 4                     | 144   | 172         | 4.05     | 159,695   | 12.12    |
| All other.....                                                     | 1          | 2    | 4                     | 99    | 106         | 2.50     | 23,829    | 1.79     |
| VIII. Handling objects.....                                        |            |      |                       |       |             |          |           |          |
| Cable strands.....                                                 | ....       | .... | ....                  | 99    | 99          | 2.33     | 932       | .07      |
| All other.....                                                     | 1          | .... | 14                    | 417   | 432         | 10.18    | 18,864    | 1.43     |
| IX. Hand tools.....                                                |            |      |                       |       |             |          |           |          |
| Slipping, glancing or breaking.....                                | ....       | .... | 28                    | 613   | 641         | 15.10    | 29,388    | 2.23     |
| All other.....                                                     | 1          | 1    | 31                    | 199   | 232         | 5.47     | 52,896    | 4.01     |
| X. Animals.....                                                    | ....       | .... | 2                     | 44    | 46          | 1.08     | 3,741     | .28      |
| XI. Miscellaneous.....                                             |            |      |                       |       |             |          |           |          |
| Asphyxiation.....                                                  | 1          | .... | ....                  | ....  | 1           | .02      | 6,000     | .46      |
| Drowning.....                                                      | 7          | .... | ....                  | ....  | 7           | .17      | 42,000    | 3.19     |
| Frozen feet.....                                                   | 1          | .... | ....                  | 3     | 4           | .00      | 6,128     | .47      |
| Burned to death (forest fire).....                                 | 3          | .... | ....                  | ....  | 3           | .07      | 18,000    | 1.37     |
| All other.....                                                     | ....       | .... | 4                     | 32    | 36          | .85      | 4,517     | .34      |
| Total.....                                                         | 143        | 10   | 277                   | 3,815 | 4,245       | 100.00   | 1,317,835 | 100.00   |

## Summary of Causes

|                                                               | Fatalities | Perm. Totals | Perm. Partial | Temp. Totals | Total Cases | Per Cent | Days Lost | Per Cent | Compensation | Per Cent |
|---------------------------------------------------------------|------------|--------------|---------------|--------------|-------------|----------|-----------|----------|--------------|----------|
| I. Machinery                                                  | 41         | 2            | 93            | 795          | 931         | 21.93    | 384,523   | 29.18    | \$250,699.60 | 27.39    |
| II. Steam pressure apparatus                                  | 2          | ...          | 2             | 9            | 13          | .31      | 17,547    | 1.33     | 19,617.34    | 2.14     |
| III. Vehicles                                                 | 30         | ...          | 45            | 295          | 370         | 8.72     | 248,216   | 19.34    | 148,225.43   | 16.19    |
| IV. Explosives, electricity, fire and hot substances          | 5          | 1            | 12            | 58           | 66          | 1.55     | 40,518    | 3.08     | 20,172.45    | 2.20     |
| V. Falls of persons                                           | 5          | ...          | 13            | 582          | 600         | 14.13    | 59,619    | 4.52     | 67,062.54    | 7.33     |
| VI. Stepping on, striking against or falling on sharp objects | ...        | 1            | 10            | 236          | 247         | 5.82     | 19,086    | 1.45     | 23,449.34    | 2.56     |
| VII. Falling or rolling objects                               | 46         | 5            | 33            | 433          | 517         | 12.18    | 365,780   | 27.76    | 230,584.47   | 25.18    |
| VIII. Handling objects                                        | 1          | ...          | 14            | 516          | 531         | 12.51    | 19,796    | 1.50     | 29,521.01    | 3.23     |
| IX. Hand tools                                                | 1          | 1            | 59            | 812          | 873         | 20.57    | 82,264    | 6.24     | 75,129.69    | 8.21     |
| X. Animals                                                    | ...        | ...          | 2             | 44           | 46          | 1.08     | 3,741     | .28      | 4,326.16     | .47      |
| XI. Miscellaneous                                             | 12         | ...          | 4             | 35           | 51          | 1.00     | 76,545    | ...      | ...          | ...      |

important operation in the State. Using the method of weighting or measuring the severity of accidents in term of days lost, it was found that all occupations of the State other than logging showed an average loss per full time worker of 18.8 days, while logging operations developed an average of 44.2 days. Segregating the construction, maintenance and operation of logging railroads from other logging operations, the former showed an average loss per full time worker of 34.8 days, while the average for the latter was 46.9 days.

The experience for the same period revealed a similar condition relative to frequency of accidents in logging operations and all other industries. All logging operations developed a frequency of .213 accidents per full time worker, while the average for all other occupations in the State was but .206. Here, too, it was found that all work in connection with the movement of logs by railroad resulted in an average frequency of but .116, while for other work in logging the average was .241.

#### A COMPARISON OF INJURIES

The following table, based upon the same three year experience, affords a comparison of severity by type of injury. It should be understood that figures here given for logging include construction, maintenance, and operation of logging railroads:

|                                    | Logging      | All Industries |
|------------------------------------|--------------|----------------|
| Fatal ..... (per cent)             | 3.37         | .90            |
| Permanent Total ..... (per cent)   | .24          | .07            |
| Permanent Partial ..... (per cent) | 6.52         | 4.76           |
| Temporary Total ..... (per cent)   | 89.87        | 94.27          |
|                                    | <hr/> 100.00 | <hr/> 100.00   |

When it is understood that the above figures include all accidents involving loss of time, even for as short a period as one day, and that, on the average, of every 100 accidents in logging operations 3.61 will result fatally or in permanent total disability, 6.52 in permanent partial disability, and that the remaining accidents cause an average period of disability greater than any other important industry, in the state, then the need of preventive measures is obvious.

#### CAUSES OF LOGGING ACCIDENTS

The tables on pages 1366 and 1367 show the causes of accidents in all cases disposed of by the Oregon Industrial Accident Commission during a period of two years ending June 30, 1920. To the summary is added a column showing the amounts of compensation paid out on account of these accidents:

By referring to the number of accidents and the total paid for compensation, it will be noted that the average compensation per case was \$215.65. This does not include the cost of administration or medical aid. It should also be noted that the average estimated loss of actual or potential working days per accident was 310. These figures as to average cost

and average days lost per case were found to be more than double the averages for all industries in the State combined.

As in all our former studies, these tables show the serious accidents in logging occur more frequently in (1) felling and bucking, (2) pulling logs by power to point of loading, and (3) the operation of logging trains.

**STATUS OF ACCIDENT PREVENTION**

Reviewing the various tests applied to show the great waste resulting from accidents in this industry, it is clear that coöperation of employers and workmen in organized educational safety work will pay handsomely. During the past several years there has been increased interest by logging operators of the Pacific Coast in this work. The activities in the states of Washington, California, and Oregon, and in British Columbia, particularly during the past year, include additional legislation, district organization of employers, safety committee and educational work, and establishment of safety standards.

In conclusion, I am pleased to be able to say that in the improvement obtained along safety lines on the Pacific Coast the National Safety Council has been an important factor.

**CHAIRMAN RHODES:** The National Safety Council is eager to have all the memberships that we can secure, and a good many of the lumber companies on the Pacific Coast are now members of the Council. We are all expected to boost the Council and urge membership wherever possible.

I want to pledge to Mr. E. Ross Farra, the incoming chairman, my personal co-operation in his work during the coming year in making the section as successful as possible and in getting out as good an attendance as we can at the next Congress.

**ADJOURNMENT.**

1. The first step in the process of the investigation is the identification of the problem. This is done by the investigator who is responsible for the study. The next step is to collect data. This is done by the investigator who is responsible for the study. The next step is to analyze the data. This is done by the investigator who is responsible for the study. The next step is to interpret the results. This is done by the investigator who is responsible for the study. The next step is to draw conclusions. This is done by the investigator who is responsible for the study. The next step is to report the findings. This is done by the investigator who is responsible for the study. The next step is to discuss the implications. This is done by the investigator who is responsible for the study. The next step is to recommend further research. This is done by the investigator who is responsible for the study. The next step is to conclude the study. This is done by the investigator who is responsible for the study.

1. The first of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

2. The second of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

3. The third of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

4. The fourth of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

5. The fifth of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

6. The sixth of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

7. The seventh of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

8. The eighth of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

9. The ninth of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

10. The tenth of these is the fact that the United States has a large and growing population of people who are not citizens of the United States. This is a result of the large number of immigrants who have come to the United States in recent years, and the fact that many of these immigrants are not naturalized citizens.

# INDEX

- A. B. C. session, 67-84.
- "Accident cases from the standpoint of the employee responsible for the accident" (Forstall), 1088-1089.
- Accident causes, see Classification of causes of accidents.
- "Accident hazards in laying conduit underground" (Lueck), 1034-1037.
- "Accident hazards when laying gas mains" (Carter), 1053-1057.
- Accident prevention:
  - "Prevention and reclamation, (Mock), 99-105.
  - "Safety service" (Dow), 36-41.
- Accident reports, see Report forms.
- Accidents:
  - Costs, 1333.
  - "Economic effect of railroad safety work" (Dunn), 1227-1231.
  - "Fixing the responsibility for an accident" (Mulligan), 726-734.
  - Freak accidents, 438-440.
  - Statistical and standardization committee tentative report on a standard list of causes for use in classifying accidents on construction work, 599-604.
  - "Tracing the real causes of accidents" (Gaddis), 454-457.
- Accident-Statistics:
  - Burns, 382.
  - Cement industry, 472.
  - Children's deaths in St. Louis, 1077.
  - Detroit school accidents, 204.
  - Frequency and severity of logging accidents, 1365-1366.
  - Frequency and severity rates, 1349.
  - Geuder, Faeschke and Frey, 59.
  - In "Human conservation—a national necessity" (Wells), 47.
  - Intro-school accidents in Milwaukee, 199.
  - Knife cuts, 959-960.
  - Logging accidents in State of Oregon, 1368-1369.
  - Lost time, 1332.
  - Ohio industrial accidents, 192.
  - "Paper mill accident records" (Guerant), 1011-1017.
  - "The problem of school hazards" (Payne), 200-202.
  - Quarries, 486, 489, 490.
  - Report number one of the statistical and standardization committee of the Construction Section, 584-593, 604-605.
  - Rochester Gas and Electric Corporation, 1045.
  - St. Louis schools, 377-381.
  - Standardization of accident reports, 1017-1020.
  - "Standardization of accident statistics and their value in construction work" (Davidson), 577-584.
  - Textile industry, 1297-1300.
  - Travelers Insurance Company estimate, 321-322.
  - "Uses of statistics in connection with safety work" (Clark), 1245-1246.
  - "Value of comparative accident statistics" (Sandel), 981-985.
  - See also specific subjects, sub-head Accident statistics.
  - "Accidents from falls of rock or ore" (Boardman and Bates), 872-879.
  - "Accidents from falls of roof and ground" (Kudlich), 881-888.
  - "Accidents to meter readers and other employees on equipment outside of the company's premises (Opp), 1090-1099.
  - "Accidents to meter readers and other employees on equipment outside of the company's premises" (Tewksbury), 1099-1105.
  - "Advertising campaign to reduce automobile and street car accidents" (Hardin), 643-647.
  - Allen, C. A., "Signalling to and controlling mine hoists from moving cages", 810-815.
  - Altman, R. M., Chairman, Paper and Pulp Section, 989-1032.
  - American Association of Industrial Physicians and Surgeons, Joint meeting with Health Service Section, 107-165.
  - Americanization:
    - "The safety education of the foreigner—a problem for the chemical industry" (Fiesinger), 508-509.
  - Annual meeting of members:
    - See Business session.
  - Automobiles:
    - Accident statistics, 321-322, 328, 368, 386, 639-641, 977, 980.
    - "Advertising campaign to reduce automobile and street car accidents" (Hardin), 643-647.
    - "The enforcement of laws and ordinances relating to self-propelled vehicles" (Van Osdol), 633-642.
    - Methods of preventing truck accidents, 979-981.
    - "Motor truck accidents" (Squires), 976-979.
    - Railroad hazards and prevention, 1239-1242.
    - See also Grade crossings, Traffic.
  - Automotive Section:
    - Appointment of committees, 470.
    - Minutes of meeting, 435-470.
    - Nominating committee report, 457-458.
  - Baker, Mary, "The employment secretary", 993-997.
  - Ball, W. C., "Safety and time service", 1201-1209.
  - Baltzell, C. H., "Transportation accidents", 1234-1238.
  - Banquet, 167-183.
  - Barrett, Kate W., "Women's interest in public safety", 344-349.

- Batchelder, H. K., "Burns and scalds—tanning industry", 963-967.
- Bates, W. S., and Boardman, J. L., "Accidents from falls of rock or ore", 872-879.
- Beard, Harriet E., Discussion of Detroit's school accident prevention program, 203-205.
- Bell, H. J., "Competition in safety work", 1247-1250.
- Beltling:  
Six foot belt guard as a standard, 435.
- Benefit Associations, see Employees' benefit associations.
- Beyer, D. S., "Fundamentals of safeguarding", 81-84.
- Bigelow, G., "Accident prevention in cotton mills", 1316 (omitted).
- Blasting, 489, 495-496, 826-827.
- Blood poisoning, see Infection.
- Bloss, A. W., "How the employees' publication promotes plant spirit", 256-258.
- Boardman, J. L., and Bates, W. S., "Accidents from falls of rock or ore", 872-879.
- Bonsib, R. S., "Hazards in the tanning industry and their remedies", 923-930.
- Bonus systems in safety work:  
"Discussion of the two papers on bonus systems" (Chaney), 744-747.  
Methods discussed, 747-750.  
Mine rescue teams, 858.  
"Prize and bonus systems in safety work" (Smith), 735-741.
- Borgers, Henry, "The foreman", 939-1001.
- Borland, W. P., "Safety work of the Interstate Commerce Commission", 1273-1281.
- Boucher, L. J., "Hazards of quarries", 486-495.
- Bowie, G. W., "Millwrights", 464-469.
- "Boy Scouts and safety first" (Freeman), 349-353.
- "A Broader field for safety work" (Frank), 1177-1182.
- "Building a safety organization in a foundry" (Salisbury), 688-691.
- Building construction, see Construction.
- Bulletin boards:  
In "Getting the safety message to the individual miner" (Hubbell), 780.
- Kimberly-Clark Company, 1006-1008.
- Bulletins:  
Electric railway section suggestions, 652-653.  
Home made bulletins, 562-563.  
Post-cards sent to homes, 52-53.  
Summary of discussion at safety bulletin luncheon, 185-186.  
Use in cement plants, 480-485.
- Bureau, A. A., "Physical examinations and reconstruction", 968-973.
- Burlingame, Dr. C. C., "Doctor and patient vs. employer and employee", 85-91.
- Burns:  
Accident statistics, 964.  
Acid and alkali burns, 558-561.  
In "Hazards in the tanning industry and their remedies" (Bonsib), 929.  
In "Safe practices in blast furnace operations" (Touzalin), 723-724.  
Prevention of lime burns, 931-932, 934.
- Showers for acid burns, 544-545, 546-547.
- Treatment of, 966-968.
- "Treatment of acid and alkali burns" (Smith), 555-557.
- Treatment of acid burns, 544-545, 546-547.
- "Burns and scalds—tanning industry" (Batchelder), 963-967.
- Burrell, G. H., "Carbon monoxide gas", 751-753.
- Business and administration committee report (Cameron), 20-21.
- Business session, 7-31.
- By-laws of N. S. C., Amendments to, 26-28.
- Cameron, W. H., Business and administration committee report, 20-21.
- Campbell, R. W., "Reminiscences", 172-178.
- Campaigns:  
"Advertising campaign to reduce automobile and street car accidents" (Hardin), 643-647.
- Campaigns:  
"Competition in safety work" (Bell), 1247-1250.  
Gas company departments, 1104.  
Harcourt Steel Company, 59.  
General Electric Company (Ft. Wayne, Ind.) "No Accident Week", 55-57.  
Kimberly-Clark Company, 1007.  
Proctor and Gamble Company, 54-55.  
Railroads, 1250-1256.  
"Carbon monoxide gas" (Burrell), 751-753.
- Carelessness:  
In "Some psychological aspects of accident prevention" (Colcord), 291-293.
- Carruth, H. P., "Some economic aspects of welfare work", 1026-1030.
- Carter, R. S., "Accident hazards when laying gas mains", 1053-1057.
- Cement industry:  
Accident statistics, 472.  
"Electrical hazards in cement plants" (Diedrick), 499-503.  
"Hazards of quarries" (Boucher), 486-495.  
Length of employment as related to accidents, 472-474.  
Nurses and first aid practice, 475-478.
- Cement session round table:  
Minutes of meeting, 471-504.
- Chairs:  
In "The interest of the state in its industrial women workers" (Perkins), 431.
- Chaney, Lucian, "Discussion of the two papers on bonus systems", 744-747.
- Charlton, Dr. E. A., "Hazards met in open-cut mining", 900-909.
- Chemical fire extinguishers, 479.
- Chemical industries:  
"Gas and fume removal in the chemical industry" (Szamatolski), 526-531.  
"The goggle problem in chemical plants" (Kershaw), 513-518.  
"Pipe Lines and tanks as causes of accidents" (Hoffman), 537-542.
- Chemical Section:  
Chairman's report, 505-507.  
Committee to study tank car problem, 548-550, 554.  
Minutes of meeting, 505-554.

- Nominating committee report, 536-537.
- Suggestions for improvement, 532-536.
- Children, Safety work with:
  - Detroit's school accident prevention program, 203-205.
  - Proto, the safety clown, 57.
  - Safety drawing (Redmond), 58.
  - "Utility accidents to public prevented through school safety instruction" (Payne), 1073-1078.
  - See also Schools, Safety work in.
- Clark, C. H., "Importance of Contributory causes of industrial accidents," 1297-1301.
- Clark, J. C., Uses of statistics in connection with safety work," 1245-1246.
- Clark, Dr. W. L., Chairman, Health Service Section, 85-165.
- Clarkson, G. E., Report of committee on pedestrian hazards of Public Safety Section, 386-390.
- Classification of causes of accidents:
  - "Importance of contributory causes of industrial accidents" (Clark), 1297-1301.
  - "Tracing the real causes of accidents" (Gaddis), 454-457.
- Cleary, Dr. J. P., "Field hospitals and their value on construction work," 571-575.
- Clothing for industrial workers:
  - In "Hazards in the tanning industry and their remedies" (Bonsib), 928-929.
  - Linemen, 1042, 1044, 1048-1049.
  - Tanning industry, 964, 967.
  - Coal mining, see Mines and mining.
- Colcord, Dr. A. W., "Physical examination of employees", 134-146.
- Colcord, D. H., "Some psychological aspects of accident prevention," 289-294.
- Cole, W. G., "Safety work of the Southern Pine Association," 1342-1345.
- Colors, Safety:
  - Hot water pipes, 967.
- Committees, Safety:
  - "Building a safety organization in a foundry" (Salisbury), 688-691.
  - Duties, 692-697.
  - "Duties of safety committee members" (Dow), 1256-1261.
  - "Getting results from plant safety committees" (McKenney), 78-81.
  - In "Securing the interest of the construction executive force" (Schults), 567-568.
  - In "Tanning industry," 931, 933.
  - Organization, 920-923.
  - "Safety Committees—value, organization, methods used and procedure" (Eaton), 918-920.
  - Workmen's committees (Discussion), 1307-1311.
- Company magazines, see Magazines, Employees.
- "Competition in safety work" (Bell), 1247-1250.
- Construction:
  - Accident statistics, 569-570, 572-573, 621, 625-626, 627, 1005-1006.
  - Discussion of building codes, 622-624.
  - "Field hospitals and their value on construction work" (Cleary), 571-575.
  - "Hazards in building additions to power plants—protecting operators and equipment" (Mulligan), 105-1062.
  - "How to interest the small contractor in safety" (Ulbricht), 614-617.
  - "Possibilities of co-operation between state boards of labor and industry and the contractor in promoting accident reduction" (Walker), 619-622.
  - "The progress of safety work in the shipbuilding industry," 606-611.
  - "Progress of the New York state industrial commission toward safeguarding building operation" (Spence), 625-630.
  - "Securing the interest of the construction executive force" (Schults), 565-569.
  - "Standardization of accident statistics and their value in construction work" (Davidson), 577-584.
- Construction section:
  - Appointment of chairmen of standing committees, 630.
  - Minutes of meeting, 565-630.
  - Nominating committee report, 612.
  - Statistical and standardization committee report number one, 58-598, 604-605.
  - Statistical and standardization tentative report on a standard list causes for use in classifying accidents on construction work, 59-604.
- Co-operation:
  - Address (Jeffers), 1198-1201.
  - Railroad safety work, 1232-1233.
  - "Co-operation with railroad labor organizations" (Hale), 1209-1217.
  - Copp, Tracy, Chairman, Women in Industry Section, 397-434.
  - Corcoran, Mike, "The man on the job," 998-999.
- Cotton Mills:
  - "Accident prevention in cotton mills" (Bigelow), 1316 (omitted).
- Cranes:
  - Methods of operation, 718-719.
  - "Safety features of overhead traveling cranes from the standpoint of construction and design" (Prakken), 708-718.
- Crum, F. S., Chairman, Statistical Committee of the Public Safety Section, 321-326.
- Dana, F. C., "Training machine operators in safe methods," 1338-1339.
- Dashiell, P. T., "Discipline and accident prevention", 1087-1088.
- Davidson, F. A., "Standardization of accident statistics and their value in construction work," 577-584.
- DeArmand, L. G., Report of Publicity Committee of Public Safety Section, 374-377.
- "The development of uniform standards for safeguarding circular saws" (Paine), 269-273.
- Diedrich, A. F., "Electrical hazards in cement plants," 499-503.
- "Discipline and accident prevention" (Dashiell), 1087-1088.
- "Discussion of the two papers on bonus systems" (Chaney), 744-747.
- Diseases, Occupational:
  - Anthrax, 933-934.
  - "Health hazards in the rubber industry" (Horan), 1118-1122.
  - In "Hazards in the tanning industry and their remedies" (Bonsib), 924.



- Rubber industry, 1122-1123.  
 "Doctor and patient vs. employer and employee" (Burlingame), 85-91.  
 Doepke, H. F., "Health surveillance of workmen exposed to industrial poisons," 552-554.  
 Dow, M. A.  
 "Duty of safety committee members," 1256-1261.  
 "Safety service," 26-41.  
 Drinking water:  
 In "Industrial sanitation" (Fitch), 1159-1160.  
 Drummond, A. B.:  
 Chairman, Packers' and Tanners' Section, 917-937.  
 "Hazards of conveying machinery," 938.  
 Dublin, Dr. L. J. and Lieboff, Philip,  
 "Occupation hazards and diagnosis signs," 163-165.  
 Dues for membership in the National Safety Council, 27-28.  
 Dunn, S. O., "The economic value of railroad safety work," 1227-1231.  
 Durgin, Elmer, "Getting employees acquainted with each other, with the company's officials, and with the company's products," 234-236.  
 Dust:  
 "Grain dust explosion hazards" (Price), 311-318.  
 "Duties and responsibilities of foremen and men in advisory positions with reference to the safety of men under their jurisdiction" (Mallon), 672-676.  
 "Duty of safety committee members" (Dow), 1256-1261.  
 Eaton, J. M., "Safety committees—value, organization, methods used, and procedure," 918-920.  
 "The economic value of railroad safety work" (Dunn), 1227-1231.  
 Education, Safety:  
 Development in the public schools, 195-196, 205-209.  
 "Importance of safety instruction in schools" (Potter), 197-199.  
 "Practical methods of teaching safety to engineering students" (Keown), 283-288.  
 Report of secretary of Education Section, 187-191.  
 "What the Ohio state industrial commission has done to promote safety education" (Lange), 191-195.  
 See also Schools, Safety work in.  
 Education of workmen:  
 "Accidents from falls of roof and ground" (Kudlich), 881-888.  
 "Duties of safety committee members" (Dow), 1256-1261.  
 "Fixing responsibility and penalizing those responsible for accidents and rewarding those showing ability in time of accidents" (Foster), 1079-1086.  
 "Getting the safe message to the individual miner" (Hubbell), 777-782.  
 "How to promote safety education in a plant" (Fonda), 74-78.  
 "Prize and bonus systems in safety work" (Smith), 735-741.  
 "Safety and the man" (Gunn), 1114-1118.  
 "The safety education of the foreigner—a problem for the chemical industry" (Fiesinger), 508-509.  
 "The safety game as played in one plant" (Kimberly Mills of the Kimberly-Clark Company), 992-1009.  
 "Selling safety in the factory" (Martin), 1170-1174.  
 Steam railroads, 1262-1263.  
 See also New employees.  
 Education Section:  
 Election of officers, 208.  
 Minutes of meeting, 187-209.  
 Secretary's report, 187-191.  
 Electric Railways:  
 Accident statistics, 649.  
 "Advertising campaign to reduce automobile and street car accidents" (Hardin), 643-647.  
 Methods of promoting safety, 647-648.  
 "The necessity for and importance of observing operating rules from the standpoint of the claim department" (Holliday), 658-661.  
 "The necessity for and importance of observing operating rules from the standpoint of the transportation department" (Thompson), 661-664.  
 Training of employees, 666-671.  
 Electric Railway Section:  
 Minutes of meeting, 631-679.  
 Nominating committee report, 653-654.  
 Program committees' report, 633.  
 Report of committee to establish closer relationship between the National Safety Council and the Central Electric Railways, 643.  
 Resolution concerning co-operation with Public Safety Section, 396.  
 Secretary's report, 633.  
 "Electrical hazards in cement plants" (Diedrich), 499-503.  
 Electricity:  
 "Electrical hazards in cement plants" (Diedrich), 499-503.  
 Linemen's hazards, 1042, 1043, 1044-1045, 1048-1049.  
 Meter testing, 1094-1097.  
 Safe working distances for operating voltages, 1062.  
 Electricity, Injuries from:  
 "Electrical hazards in cement plants" (Diedrich), 499-503.  
 Elevators:  
 Freight elevators used in rubber companies, 1132-1133.  
 "Hazards of conveying machinery" (Drummond), 938.  
 Hinged plank to prevent accidents, 939-940.  
 Mechanical interlocks, 938-939.  
 Embossing presses:  
 In "Hazards in the tanning industry and their remedy" (Bonsib), 924-925.  
 Prevention of burns from, 965.  
 "Employees' benefit association of the F. T. Ley and Company, Inc." (Ley), 211-217.  
 Employees' Benefit Associations:  
 Discussion, 217-232.  
 "Medical service in public utilities" (Lemon), 1065-1070.  
 Relation to the safety department, 227.  
 Employees' benefit associations round table luncheon, 211-232.  
 Employees' publications meeting, 233-261.  
 Employees' representation:  
 Nunn, Bush, and Weldon Shoe Company plan, 425.

# INDEX

- Employment:
  - In "Health surveillance of workmen exposed to industrial poisons" (Doepke), 552-553.
  - In "The necessity for and importance of observing operating rules from the standpoint of the safety department" (Wilson), 655-657.
  - In "Physical examinations and reconstruction" (Bureau), 969-971, 973.
  - Requirements of men employed, 677.
  - "The employment secretary" (Baker), 993-997.
  - "The enforcement of laws and ordinances relating to self-propelled vehicles." (Van Osdol), 633-642.
  - "The engineer and public safety work" (Mack), 265-267.
- Engineering Section:
  - Minutes of meeting, 263-309.
  - Nominating committee report, 307.
  - Secretary's report, 264-265.
- Engineers' Safety:
  - Safety engineer's duties (Stowell), 1303-1306.
  - "The engineer and public safety work" (Mack), 265-267.
- Entertainments:
  - Mass safety meeting of Kimberly-Clark Company, 1008.
  - "The essentials of a plant safety organization" (Worth), 67-71.
  - "Essentials for safety in a woodworking plant" (Schreiber), 1327-1331.
- Examination, Physical, see physical examination of employees.
- Exhaust systems, see Ventilation and exhaust systems.
- Explosions:
  - "General rules for gas explosion prevention" (Walter), 823-829.
  - "Grain dust explosion hazards" (Price), 311-318.
  - Mining hazards, 838-839.
  - "Rules for prevention of gas explosions in anthracite mines" (Walsh), 833-837.
- Explosives:
  - Coal dust, 829-830.
  - In "Hazards met in open-cut mining" (Charlton), 903-905.
  - See also blasting.
- Eye protection:
  - "The goggle problem in chemical plants" (Kershaw), 513-518.
  - See also Goggles.
- Falls (people):
  - Accidents caused by slippery floors (Discussion), 1311-1315.
  - Meter readers' hazards, 1092-1093.
- Fatigue:
  - In "The interest of the state in its industrial women workers" (Perkins), 432.
  - "Practical methods of reducing" (Gilbreth and Gilbreth), 417-419.
  - Reduction methods, 420.
  - "Shop standards and fatigue" (Newman), 405-415.
- Ferguson, Dr. C. L., "Method of collecting material for employees' publications," 248-251.
- "Field hospitals and their value on construction work" (Cleary), 571-575.
- Fiesinger, E. H., "The safety education of the foreigner—a problem for the chemical industry," 508-509.
- "Fire drills and fire alarm and signal systems" (Sanford), 448-941-946.
- Fire extinguishers, see Chemical extinguishers.
- Fire prevention:
  - Electric circuits for exit lights, Extinguisher for oil fires, 948.
  - Fire drills, 453-454.
  - "Fire drills and fire alarm and signal systems" (Sanford), 453.
  - Gas main hazard, 1057.
  - In "Mine rescue and recovery operations" (Woodburn), 840-850.
  - Inspection of equipment, 947-948.
  - Mines and mining, 858-872.
- First Aid:
  - Kits used by Rochester Gas Electric Corporation, 1040.
  - "Mine rescue and recovery operations" (Woodburn), 840-850.
  - Requirements of rescue training metal miners" (Woodburn), 857.
  - "Standardization of first-aid training and first-aid contests in mining" (Shields), 784-789.
  - Training, 790, 793-797.
- First Aid contests:
  - Mining, 790-797.
  - "Standardization of first-aid training and first-aid contests in mining" (Shields), 784-789.
- Fisher, F. W., "Hazards in line construction, handling poles, erecting poles, and reconstruction old and antiquated lines," 1046.
- Fitch, W. N., "Industrial sanitation," 1157-1165.
- "Fixing responsibility and penalizing those responsible for accidents and rewarding those showing ability in time of accidents" (Fost), 1079-1086.
- "Fixing the responsibility for an accident" (Mulligan), 726-734.
- Floors:
  - Accidents caused by slippery floors (Discussion), 1311-1315.
  - Cards showing safe loads, 1133.
  - Rubber industry, 1140, 1145.
- Fonda, G. T., "How to promote safety education in a plant," 74-78.
- Foreign workmen:
  - Americanization, 509-511.
  - Education in accident prevention, 512-513.
  - In "Health surveillance of workmen exposed to industrial poisons" (Doepke), 553-554.
  - Relation to safety work, 562-563.
  - See also Americanization.
- "The foreman" (Borgers), 999-1000.
- "The foremen—the determining factor" (Morris), 71-74.
- Foremen and sub-foremen:
  - "Duties and responsibilities of foremen and men in advisory position with reference to the safety men under their jurisdiction" (Mallon), 672-676.
  - "Fixing the responsibility for accident" (Mulligan), 726-734.
  - Goggles worn as an example, 515.
  - In "The personal element in safety from the standpoint of the foreman" (Moffett), 703-705.
  - "Value of foremen's instruction: new employee" (McClellan), 953.

- Forstall, Walter. "Accident cases from the standpoint of the employee responsible for the accident." 1088-1089.
- Forster, H. W., Chairman, Employees' benefit associations round table luncheon, 211-232.
- "Impressions," 179-181.
- Foster, William. "Fixing responsibility and penalizing those responsible for accidents and rewarding those showing ability in time of accidents." 1079-1086.
- Foundries:
- "Building a safety organization in a foundry" (Salisbury), 688-691.
  - "The personal element in safety from the standpoint of the foundry" (Moffett), 697-707.
  - "Fractures incident to occupation" (Moorhead), 123-127.
- Frank, A. A. "A broader field for safety work," 1177-1182.
- Frazer, W. H. Treasurer's report, 18-20.
- Freeman, J. P. "Boy Scouts and safety first," 349-353.
- "Fundamental requirements for successful medical work in industry" (Sawyer), 146-152.
- "Fundamentals of safeguarding" (Beyer), 81-84.
- "The future of industrial medicine in a labor policy" (Geier), 107-112.
- Gaddis, H. L. "Tracing the real causes of accidents," 454-457.
- Gallus, F. S. "The hazards met in anthracite stripping," 909-912.
- "Gas and fume removal in the chemical industry" (Szamatolski), 526-531.
- Gas Industry:
- "Accident hazards when laying gas mains" (Carter), 1053-1057.
  - Accident statistics, 1105.
  - "Accidents to meter readers and other employees on equipment outside the company's premises" (Tewksbury), 1099-1105.
  - Detection of leaks, 1058, 1103.
- Gas Poisoning:
- In "Safe practices in blast furnace operations" (Touzalin), 720-723.
- Gears:
- Safeguarding, 1139-1140.
- Geier, Dr. O. P., Chairman, Joint meeting of Health Service Section and American Association of Industrial Physicians and Surgeons, 107-165.
- "The future of industrial medicine in a labor policy," 107-112.
- General Manager's report, N. S. C. (Price), 13-18.
- General round table session, 51-66.
- "General rules for gas explosion prevention (bituminous coal mines)" (Walter), 823-829.
- "Getting employees acquainted with each other, with the company's officials and with the company's products" (Durgin), 234-236.
- "Getting results from plant safety committees" (McKenney), 78-81.
- "Getting the safety message to the individual miner" (Hubbell), 777-782.
- Gilbreth, F. B., and Gilbreth, Lillian
- "Practical methods of reducing fatigue," 417-419.
  - "The goggle problem in chemical plants" (Kershaw), 513-518.
- Goggles:
- Anti-fogging preparation, 552-523, 526.
  - Sterilization, 519-520.
  - Use in chemical plants, 519-526.
  - See also Eye protection.
- Grade Crossings:
- Accident statistics, 266, 640.
  - In "The engineer and public safety work" (Mack), 266-267.
  - Methods of making safe, 267-269.
  - Signals, 1284-1285.
- "Grain dust explosion hazards" (Price), 311-318.
- Grau, P. A., Chairman, Banquet, 167-183.
- Griffith, V. A. "Results obtained in the manufacture of lumber by the adoption of a plan of safety organization, 1346-1351.
- Guards for machinery. see Safeguarding.
- Guerrant, R. H. "Paper mill accident records," 1011-1017.
- Gunn, J. N. "Safety and the man," 1114-1118.
- Gunnis, R. J. "How to foster loyalty to company and to country," 252-253.
- Hale, Isaiah. "Co-operation with railroad labor organizations," 1209-1217.
- Hambrecht, G. T., Chairman, Public mass meeting, 33-49.
- Handling materials:
- Paper and pulp industry, 999-1000.
  - Piling crude rubber, 1133-1134.
  - Poles for electric lines, 1040-1041.
  - Transformers, 1046.
- "Handling of material" (Martens), 1123-1131.
- Hardin, C. B., "Advertising campaign to reduce automobile and street car accidents," 643-647.
- "Hazards in building additions to power plants—protecting operators and equipment" (Mulligan), 1059-1062.
- "Hazards in line construction, handling poles, erecting poles, and reconstruction of old and antiquated lines" (Fisher), 1038-1046.
- "Hazards in the tanning industry and their remedies" (Bonsib), 923-930.
- "The Hazards met in anthracite stripping" (Gallus), 909-912.
- "Hazards met in open-cut mining" (Charlton), 900-903.
- "Hazards of conveying machinery" (Drummond), 938.
- "Hazards of quarries" (Boucher), 486-495.
- "Health hazards in the rubber industry" (Horan), 1118-1122.
- Health Service Station: *See* Minutes of meeting, 85-165.
- Nominating committee report, 107.
- Health supervision of employees:
- "Doctor and patient vs. employer and employee" (Burlingame), 35-91.
  - "Fundamental requirements for successful medical work in industry" (Sawyer), 146-152.
  - "The future of industrial medicine

# INDEX

- in a labor policy" (Geier), 107-112.
- "Human conservation—a national necessity" (Wells), 41-48.
- "Medical service in public utilities" (Lemon), 1065-1070.
- "Physical examinations and reconstruction" (Bureau), 968-973.
- "Prevention and reclamation" (Mock), 99-105.
- "The public health nurse in industry" (Lent), 398-403.
- "Relation to benefit association," 1071-1072.
- See also Nurses, Physical examination of employees.
- "Health surveillance of workmen exposed to industrial poisons" (Doepke), 552-554.
- Helmets:**
- Hard boiled caps in construction work, 611.
- Hemming, R. N., Chairman, Electric Railway Section, 631-679.
- Hoan, D. W., Address of welcome, 6-7.
- Hoffmann, H. A., "Pipe lines and tanks as causes of accidents," 537-542.
- Hoisting:**
- Mine hoist safety devices, 805-810, 816-823.
- "Safety devices on winding engines" (Mitten), 797-805.
- "Signalling to and controlling mine hoists from moving cages" (Allen), 810-815.
- Holliday, F. F., "The necessity for and importance of observing operating rules from the standpoint of the claim department," 658-661.
- Home Safety:**
- Report of Home hazards committee of Public safety section (Payne), 382-385.
- Horan, C. F., "Health hazards in the rubber industry," 1118-1122.
- Horn, S. F., "Trade journal as a valuable aid to safety," 1360-1365.
- Hospitals and dispensaries:**
- "Field hospitals and their value on construction work" (Cleary), 571-575.
- House organs, see Magazines, Employees.**
- "How the employees' publication promotes plant spirit" (Bloss), 256-258.
- "How to check plans and specifications for new buildings and equipment" (Kershaw), 299-307.
- "How to foster loyalty to company and to country" (Gunnis), 252-253.
- "How to interest the small contractor in safety" (Ulbricht), 614-617.
- "How to keep up interest in an employees' publication when the plants are widely separated" (Julius), 241-243.
- "How to keep your contributors enthusiastic" (Houston), 237-240.
- "How to promote safety education in a Plant (Fonda), 74-78.
- Hoyman, M. G., "Mill of the Kimberly-Clark Company," 1003-1009.
- "Human conservation—a national necessity" (Wells), 41-48.
- Human element in safety work:**
- "The personal element in safety from the standpoint of the factory" (Moffett), 697-707.
- "Tracing the real causes of accidents" (Gaddis), 454-457.
- "Human relations and accident motion" (Noonan), 458-464.
- Hubbell, N. D., "Getting the same message to the individual miner," 777-782.
- Houston, J. A., "How to keep contributors enthusiastic," 240.
- "Illustrating the plant publication" (Wingfield), 245-247.
- "Importance of contributory causes in industrial accidents" (Clair), 1297-1301.
- "Importance of safety instruction schools" (Potter), 197-199.
- "Impressions" (Forster), 179-181.
- Industrial hygiene, see Health supervision of employees.
- "Industrial nurses in metal mining communities" (Martinsen), 770.
- "Industrial sanitation" (Fitch), 11165.
- "Industrial surgery" (Sherman), 1123.
- Infection:**
- Germicidal action of copper, 963.
- Rubber industry, 1127.
- Treatment, 576.
- See also Burns.
- Injured workmen, see Workmen injured.
- Inspection, Safety:**
- "How to check plans and specifications for new buildings and equipment" (Kershaw), 299-307.
- In "Building a safety organization in a foundry" (Salisbury), 61690.
- Inspection report forms (Discussion), 1306-1307.
- Safety committees, 692-697.
- Instruction of workmen, see Education of workmen.
- Insurance, Industrial:**
- Discussion in regard to employee benefit associations, 217-232.
- "Employees' benefit association the F. T. Ley and Company, Inc (Ley), 211-217.
- Methods used, 1030, 1032.
- See also Employees' benefit associations.
- Interest in safety work. How to maintain, 51-66, 253-255, 992-1000.
- "The interest of the state in its industrial women workers" (Pekins), 426-432.
- Interstate Commerce Commission safety work, 1273-1281.
- Iron and steel industry:**
- "Safe practices in blast-furnace operations" (Touzalin), 719-725.
- "Safety features of overhead traveling cranes from the standpoint of construction and design" (Prallen), 708-718.
- Iron mining, See Mines and mining-Metal.
- Jacobsen, H. G., Chairman, Cemer session round table, 471-504.
- Jeffers, W. M., Address, 1198-1201.
- Jointer heads:**
- Round head jointers (Discussion) 1340-1341.

- Julius, W. R. "How to keep up interest in an employees' publication when the plants are widely separated." 241-243.
- Kaems, A. L. "Punch presses." 441-445.
- Keown, R. Mc. A. "Practical methods of teaching safety to engineering students." 283-288.
- Kepner, I. V. Chairman. Chemical Section. 505-564.
- Kershaw, S. H. "The goggle problem in chemical plants." 513-518.
- "How to check plans and specifications for new buildings and equipment." 299-307.
- Kingsley, Grover. "Selling safety through printers' ink." 253-255.
- Knives:  
Accident statistics. 959-960.  
Methods of guarding. 961-962.  
"Prevention of knife cuts in the packing industry" (Marks). 954-960.
- Kudlich, H. H. "Accidents from falls of roof and ground" (coal mines). 881-888.
- "The lack of training in industrial medicine and surgery in the medical schools of the United States" (Patterson). 36-37.
- Lamps:  
Portable extension lamps. 530-531.
- Lange, F. G. "What the Ohio State Industrial Commission has done to promote safety education." 191-195.
- "Law enforcement and its application" (Mix). 335-343.
- Laws, Traffic, see Traffic.
- Lemon, C. H. "Medical service in public utilities." 1065-1070.
- Lent, M. E. "The public health nurse in industry." 398-401.
- Leverhulme, W. H. L. Baron. Message from the British Industrial "Safety First" Ass'n. 300.
- Ley, H. A. "Employees' benefit association of the F. T. Ley and Company, Inc." 211-217.
- Liehoff, Philip and Dublin, Dr. L. J. "Occupation hazards and diagnosis signs." 163-165.
- Life Extension Institute. 216-217, 224.
- Lighting:  
Cooper-Hewitt light. 1167-1168.  
In "Safety and sanitation for rubber mills and calendars" (Mitchells). 1140-1141, 1145.
- Linemen:  
Hazards. 1046-1050.  
"Hazards in line construction, handling poles, erecting poles, and reconstruction of old and antiquated lines" (Fisher). 1035-1045.
- Loading racks, see Tank cars.
- Local development and publicity committee report (Worth). 21-23.
- Locker and locker rooms:  
In "Industrial sanitation" (Fitch). 1163-1165.
- Logging:  
"Logging accidents on the Pacific coast" (Marshall). 1365-1369.  
"Safety and sanitary accomplishments of the Loyal Legion of Loggers and Lumbermen" (Tharaldsen). 1352-1356.
- "Safety as applied to southern logging operations" (Weathersby). 1356-1360.
- "Safety work of the Southern Pine Association" (Cole). 1342-1345.
- Lovett, F. G. "Need of improvement in safeguarding woodworking machinery." 1324-1327.
- Loyal Legion of Loggers and Lumbermen. Safety and sanitary accomplishments of (Tharaldsen). 1352-1356.
- Lueck, H. W. "Accident hazards in laying conduit underground." 1034-1037.
- Lynch, J. J. Chairman. Automotive Section. 435-470.
- McClellan, W. F. "Value of foremen's instructions to new employee." 949-951.
- Mack, J. C. D. "The engineer and public safety work." 265-267.
- McKenney, T. H. "Getting results from plant safety committees." 78-81.
- MacMechan, Wm. Chairman. Public Utilities Section. 1023-1102.
- McKally, J. A. "Shop Accidents." 1219-1224.
- Manufacture, Employees:  
"Getting employees acquainted with each other, with the company's officials, and with the company's products" (Iverson). 224-226.  
"The employees' publication promotes plant spirit" (Bliss). 256-258.  
"How to foster loyalty to company and to country" (Gunnis). 227-231.  
"How to keep up interest in an employees' publication when the plants are widely separated" (Julian). 241-242.  
"How to keep your contributors enthusiastic" (Huston). 237-240.  
"Illustrating the plant publication" (Weathered). 241-242.  
In "Getting the safety message to the individual miner" (Hubbell). 231.  
"Method of collecting material for employees' publications" (Ferguson). 248-251.  
"Selling safety through printers' ink" (Kingsley). 253-255.  
What should appear on the safety-first page. 258-261.
- Manufacture, Trade:  
"Trade Journal as a valuable aid to safety" (Horn). 1264-1265.  
"Maintenance of way and motor car accidents" (Ridgway). 1263-1267.
- Mallon, J. H. "Duties and responsibilities of foremen and men in advisory positions with reference to the safety of men under their jurisdiction." 672-674.
- "The man on the job" (Corcoran). 928-929.
- "Management problems related to the employment of women" (Nunn). 421-423.
- Marks, J. S. "Prevention of knife cuts in the packing industry." 954-960.
- Marshall, W. A. "Logging accidents on the Pacific coast." 1365-1369.
- Martens, P. B. "Handling of material." 1128-1131.

- Martin, H. T.**, "Selling safety in the factory," 1170-1174.
- Martinson, George**, "Industrial nurses in metal mining communities," 767-770.
- Masks:**  
 "Carbon monoxide gas" (Burrell), 751-753.  
 Use in repairing gas and fume leaks, 531.  
 See also Respirators, Helmets.
- Meat Packers' Section**, see Packers and tanners' section.
- "Medical service in public utilities"** (Lemon), 1065-1070.
- Medical supervision**, see Health supervision of employees, Physical examination of employees.
- Meetings of foremen**, see foremen and sub-foremen.
- Members**, Annual meeting, see Business session.
- Membership committee reports of sections**, see name of Section, sub-heads Membership committee reports.
- Metal mining**, see Mines and mining—Metal.
- Metals Section:**  
 Bulletin discussions, 682-685.  
 Chairman's report, 681-753.  
 Minutes of meeting, 681-753.  
 Nominating committee report, 734-735.  
 Secretary's report, 682-683.  
 "Method of collecting material for employees' publications" (Ferguson), 248-251.
- Metropolitan Life Insurance Company**, Statistical bureau, "Occupation hazards and diagnostic signs," 163-165.
- "Mill of the Kimberly-Clark Company"** (Hoyman), 1003-1009.
- "Millwrights"** (Bowie), 464-469.
- "Mine rescue and recovery operations"** (Woodburn), 840-850.
- Mines and mining:**  
 Accident statistics, 834, 835, 872, 879, 888, 891.  
 "Accidents from falls of roof and ground" (Kudlich), 881-888.  
 Explosion hazards, 838-839.  
 "General rules for gas explosion prevention" (Walter), 823-829.  
 "The hazards met in anthracite stripping" (Gallus), 909-912.  
 "Hazards met in open-cut mining" (Charlton), 900-909.  
 Hoisting safety devices, 805-810, 816-823.  
 Rescue work, 858-872.  
 Responsibility for accidents, 893-894.  
 "Rules for prevention of gas explosions in anthracite mines" (Walsh), 833-837.  
 "Safety devices on winding engines" (Mitten), 797-805.  
 "Signalling to and controlling mine hoists from moving cages" (Allen), 810-815.  
 Timbering hazards, 888-890, 892.  
 "Vocational training as influencing safety and efficiency in mining" (Mitke), 761-764.
- Mines and mining—metal:**  
 "Accidents from falls of rock or ore" (Boardman and Bates), 872-879.
- "Requirements of rescue training for metal miners"** (Woodburn), 850-857.
- Mining Section:**  
 Co-operation with U. S. Bureau of Mines, 895-900.  
 Delegates attending session, 755-757.  
 Minutes of meeting, 755-916.  
 Nominating committee report, 915.  
 Paid secretary discussion, 894-895, 898-900.  
 Standardization of first-aid practices committee report, 783-784.  
 Statistics of transactions, 757-759.  
 Votes on paid secretary question, 760.
- Mitchella, C. B.**, "Safety and sanitation for rubber mills and calenders," 1134-1146.
- Mitke, C. A.**, "Vocational training as influencing safety and efficiency in mining," 761-764.
- Mitten, L. F.**, "Safety devices on winding engines," 798-805.
- Mix, G. E.**,  
 "Law enforcement and its application," 335-343.  
 Report, of committee on law enforcement of Public Safety Section, 368-374.
- Mock, Dr. H. E.**, "Prevention and rec-lamation," 99-105.
- Moffett, Frank**, "The personal element in safety from the standpoint of the foundry," 697-707.
- Moorhead, J. J.**, "Fractures incident to occupation," 123-127.
- Morris, F. E.**,  
 Chairman, general round table session, 51-66.  
 "The foreman—the determining factor," 71-74.
- Motor truck accidents** (Squires), 976-979.
- Moving pictures in safety work:**  
 New ways of keeping up interest in safety, 63.
- Mulligan, J. R.**, "Fixing the responsibility for an accident," 726-734.
- Mulligan, W. H.**, "Hazards in building additions to power plants—protecting operators and equipment," 1059-1062.
- National Safety Council:**  
 "Reminiscences" (Campbell), 172-178.  
 "The necessity for and importance of observing operating rules from the standpoint of the claim department" (Holliday), 658-661.  
 "The necessity for and importance of observing operating rules from the standpoint of the safety department" (Wilson), 655-658.  
 "The necessity for and importance of observing operating rules from the standpoint of the transportation department" (Thompson), 661-664.  
 "The need of improvement in safeguarding woodworking machinery" (Lovett), 1324-1327.  
 "The need of improvement in the safeguarding of woodworking machinery" (Wilson), 1331-1337.
- New employees:**  
 Accident liability in cement industry, 472-474.  
 Accident statistics, (Discussion), 1339-1340.

- In a woodworking shop (Discussion), 1337.  
 Instruction, 1006.  
 "The necessity for and importance of observing operating rules from the standpoint of the safety department" (Wilson), 655-658.  
 "The necessity for and importance of observing operating rules from the standpoint of the transportation department" (Thompson), 661-664.  
 "Value of foreman's instructions to new employee" (McClellan), 949-953.  
 Newman, E. J., "Shop standards and fatigue," 405-415.  
 Nominating committees:  
 Report of N. S. C., 25-26.  
 For reports of section nominating committees, see name of Section, sub-head Nominating Committee.  
 Non-English speaking foreigners, see Foreign workmen.  
 Noonan, Rev. H. C., Invocation, 5-6.  
 Noonan, V. T., "Human relations and accident prevention," 458-464.  
 Nunn, H. L., "Management problems related to the employment of women," 421-423.  
 Nurses:  
 Duties of industrial, 771-777.  
 Function in industry, 403-405.  
 "Industrial nurses in metal mining communities" (Martinson), 767-770.  
 "The public health nurse in industry" (Lent), 398-403.  
 Oratel, J. A., Chairman, Metals Section, 681-753.  
 "Occupation hazards and diagnosis signs" (Dublin and Lieboff), 163-165.  
 Officers of section, see name of section, sub-head, Nominating committee report.  
 Opp, George, "Accidents to meter readers and other employees on equipment outside of the company's premises, 1090-1093.  
 Organization, Safety:  
 "A broader field for safety work" (Frank), 1177-1182.  
 "Building a safety organization in a foundry" (Salisbury), 683-691.  
 Committees, 692-697.  
 "The essentials of a plant safety organization" (Worth), 67-71.  
 "Getting the safety message to the individual miner" (Hubbell), 777-782.  
 In "Burns and scalds—tanning industry" (Batchelder), 966-967.  
 Metropolitan West Side Elevated Railway, 677-679.  
 "Results obtained in the manufacture of lumber by the adoption of a plan of safety organization" (Griffith), 1346-1351.  
 "Safety committees—value, organization methods used, and procedure" (Eaton), 918-920.  
 "The safety game as played in one plant" (Kimberly-mill of the Kimberly Clark Company), 992-1009.  
 "Safety organization for a large textile plant" (Stowell), 1301-1305.  
 "Securing the interest of the construction executive force" (Schults), 565-569.  
 "Selling safety in the factory" (Martin), 1174-1174.  
 "Selling safety to the executives and employees" (Wilson), 1283-1296.  
 Organization, see also Committees, Safety.  
 Packers' and Tanners' Section:  
 Delegates attending, 917-918.  
 Discussion of consolidation, 934-937.  
 Minutes of meeting, 917-947.  
 Name of Section determined, 947.  
 Nominating committee's report, 955-956.  
 Packing houses:  
 "Prevention of knife cuts in the packing industry" (Marks), 954-960.  
 Paine, W. S., "The development of uniform standards for safeguarding circular saws," 263-272.  
 Paper and pulp industry:  
 Accident statistics, 1003.  
 "The foreman" (Borgers), 995-1001.  
 Paper and pulp section:  
 Minutes of meeting, 989-1032.  
 Nominating committee report, 1021.  
 Program committee report, 991.  
 Representation committee report, 991.  
 Secretary's report, 990-991.  
 "Paper mill accident records" (Guerrant), 1011-1017.  
 Patterson, Dr. F. D., "The lack of training in industrial medicine and surgery in the medical schools of the United States," 96-97.  
 Payne, E. G., "The problem of school hazards," 200-202.  
 Report of committee on school hazards of Public Safety Section, 377-381.  
 "Utility accidents to the public prevented through school safety instruction," 1073-1078.  
 Payne, Mrs. E. G., Report of committee on home hazards of Public Safety Section, 382-385.  
 Perkins, Frances, "The interest of the state in its industrial women workers," 426-432.  
 "The personal element in safety from the standpoint of the foundry" (Moffett), 697-707.  
 Physical examination of employees:  
 Discussion, 153-163.  
 In "Field hospitals and their value on construction work" (Cleary), 574-575.  
 In "Fundamental requirements for successful medical work in industry" (Sawyer), 146-152.  
 Methods, 973-975.  
 Requirement for employment, 1009-1010.  
 See also Health supervision of employees.  
 "Physical examination of employees" (Colcord), 134-136.  
 "Physical examination and reconstruction" (Bureau), 968-973.  
 Physicians, Industrial:  
 "Doctor and patient vs. Employer and employee" (Burlingame), 85-91.  
 Relation to other industrial departments, 91-96.

- Training requirements, 96-98, 113-119.  
 Work of, 127-134.  
 Pipe lines, Safeguarding, 540-542.  
 "Pipes lines and tanks as causes of accidents" (Hoffman), 537-542.  
 "Possibilities of co-operation between state boards of labor and industry and the contractor in promoting accident reduction" (Walker), 619-622.  
 Potter, M. C., "Importance of safety instruction in the schools," 197-199.  
 Power houses:  
 "Hazards in building additions to power plants—protecting operators and equipment" (Mulligan), 1059-1062.  
 Power presses:  
 Operating and guarding problems, 445-448.  
 "Punch presses" (Kaems), 441-445.  
 Rubber industry hazards, 1146-1148.  
 "Practical methods of reducing fatigue" (Gilbreth and Gilbreth), 417-419.  
 "Practical methods of teaching safety to engineering students" (Keown), 283-288.  
 Prakken, Nicholaas, "Safety features of overhead traveling cranes from the standpoint of construction and design," 708-718.  
 Prayer opening the Ninth Annual Meeting of the National Safety Council, 5-6.  
 "Present and future of safety in the rubber industry" (Schott), 1112-1114.  
 Presses, Embossing. See Embossing presses.  
 Presses, Power, see Power presses.  
 Presses, Punch, see Power presses.  
 "Prevention and reclamation" (Mock), 99-105.  
 "Prevention of knife cuts in the packing industry" (Marks), 956-960.  
 Price, C. W.,  
 General Manager's report, 13-18.  
 Secretary of Education Section, report, 187-191.  
 Price, D. J., "Grain dust explosion hazards," 311-318.  
 "Prize and bonus systems in safety work" (Smith), 735-741.  
 Prizes:  
 "Discussion of the two papers on bonus systems" (Chaney), 744-747.  
 Methods discussed, 747-750.  
 Railroad safety work, 1250-1256.  
 "Should prizes be given for safety work?" (Stremmel), 741-744.  
 See also Bonus system in safety work.  
 "The Problem of school hazards" (Payne), 20-202.  
 Program committee reports of Sections, see name of Section, subhead. Program committee report.  
 Progress committee of Wilson Company, 921-922.  
 "The progress of safety work in the shipbuilding industry" (Walsh), 606-611.  
 "Progress of the New York State Industrial Commission toward safeguarding building operations" (Spence), 625-630.  
 Prone pressure method of artificial respiration, see Resuscitation.  
 "Prone pressure method of resuscitation" (Reid), 1051-1052.  
 Proto, the safety clown, 57.  
 Psychology in safety work:  
 Importance of, 295-299.  
 "The personal element in safety from the standpoint of the foundry" (Moffett), 697-707.  
 "Some psychological aspects of accident prevention" (Colcord), 289-294.  
 Public health:  
 "Human conservation—a national necessity" (Wells), 41-48.  
 "The public health nurse in industry" (Lent), 398-403.  
 Public mass meeting, 33-49.  
 Public Safety:  
 Accident reports, 321-326.  
 "Boy Scouts and safety first" (Freeman), 349-353.  
 "Law enforcement and its application" (Mix), 335-343.  
 "Public safety" (Smyth), 685-687.  
 "Public safety" (Talbert), 649-651.  
 "The traffic officer and his relation to the public" (Smyth), 330-335.  
 Woman's interest in public safety" (Barrett), 344-349.  
 Public Safety Section:  
 Color of traffic lights committee report, 357-360.  
 Home hazards committee report, (Payne), 382-385.  
 Law enforcement committee report (Mix), 368-374.  
 Minutes of meeting, 319-396.  
 Nominating committee report, 393-395.  
 Pedestrian hazards committee report (Clarkson), 386-390.  
 Publicity committee report (De Armand), 374-377.  
 Resolution committee report, 390-392.  
 School hazards committee report, (Payne), 377-381.  
 Secretary's report, 318-320.  
 Statistics committee report (Crum), 321-326.  
 Traffic hazards committee report (Smyth), 355-356.  
 Vigilance committee report (Stewart), 361-363.  
 Public utilities companies:  
 "Accident hazards in laying conduit underground" (Lueck), 1034-1037.  
 "Accident hazards when laying gas mains" (Carter), 1053-1057.  
 "Accident statistics, 1098-1099.  
 "Accidents to meter readers and other employees on equipment outside of the company's premises" (Opp), 1090-1099.  
 "Accidents to meter readers and other employees on equipment outside the company's premises" (Tewksbury), 1099-1105.  
 Conduit laying hazards, 1038.  
 Hazards in building additions to power plants—protecting operators and equipment" (Mulligan), 1059-1062.  
 "Hazards in line construction, handling poles, erecting poles, and reconstruction of old and antiquated lines" (Fisher), 1038-1046.



- Safe practices in line construction. 1046-1050.
- Public Utilities Section:  
Minutes of meeting, 1033-1106.  
Nominating committee report, 1064.  
Secretary's report, 1033-1034.  
Pulp mills, see Paper and pulp mills.  
Punch presses, see Power presses.  
"Punch presses" (Kaems), 441-445.
- Quarries:  
Accident statistics, 486, 489, 490.  
Hazards, 495-499.  
"Hazards in quarries" (Boucher), 486-495.
- Railroads:  
Accident statistics, 1193-1194, 1226-1231, 1234-1236, 1244, 1261, 1266, 1275.  
Address (Jeffers), 1198-1201.  
"Competition in safety work" (Bell), 1247-1250.  
"Co-operation with railroad organizations" (Hale), 1209-1217.  
Headlights, 1242-1244.  
"Maintenance of way and motor car accidents" (Ridgway), 1263-1267.  
Motor car hazards, 1267-1271, 1272.  
"Safety work of the Interstate Commerce Commission" (Bordant), 1272-1281.  
"Shop accidents" (McCarthy), 1219-1224.  
Time inspection, 1204-1206.  
"Transportation accidents" (Baltzell), 1224-1228.  
Redmond, F. E., Safety drawing for children, 14.  
Reduction of accidents, Methods for, see Education of workmen.  
Reid, S. H., "Prone pressure methods of resuscitation", 1051-1052.  
"Resuscitation" (Campbell), 172-174.  
Report, Bureau:  
Accident report forms (Crum), 122-123.  
Reasons for reporting small accidents, 104.  
Suggestions by statistical and standardization committee of the construction section, 292-293.  
"Value of comparative accident statistics" (Sandel), 361-365.  
"Requirements of rescue training for metal miners" (Woodburn), 854-857.  
Resolutions committee report (Robertson), 26-28, 29.
- Respirators:  
Gas industry, 1101, 1105.  
In "Accident hazards when laying gas mains" (Carter), 1053-1054.  
In "Mine rescue and recovery operations" (Woodburn), 841-842.  
Mine rescue work, 860-861, 864.  
See also Helmets, Masks.  
Responsibility for accidents:  
"Accident cases from the standpoint of the employee responsible for the accident" (Forstall), 1088-1089.  
"Co-operation with railroad labor organizations" (Hale), 1209-1217.  
Discipline and accident prevention" (Dashiell), 1087-1088.  
"Duties and responsibilities of foremen in advisory positions with reference to the safety of men under their jurisdiction" (Mallon), 672-676.  
"Fixing responsibility and penalizing those responsible for accidents and rewarding those showing ability in time of accidents" (Foster), 1079-1086.  
"Fixing the responsibility for an accident" (Mulligan), 726-734.  
Foremen, 60-62.  
Penalizing for infraction of rules, 1089-1090.  
"Results obtained in the manufacture of lumber by the adoption of a plan of safety organization" (Griffith), 1346-1351.
- Resuscitation:  
Electric shocks, 477-478.  
Gas poisoning, 1055.  
"Prone pressure method of resuscitation" (Reid), 1051-1052.  
Prone pressure method used, 578.  
Resolution by Public Utilities Section, 1052-1053.
- Richards, R. C.,  
President's address, 7-11.  
Presiding officer, Business session, 7-31.
- Ridgway, Arthur, "Maintenance of way and motor car accidents", 1263-1267.
- Robertson, L. B., Resolutions committee report, 26-28, 29.
- Rosseland, F. M., Chairman, Safety bulletin luncheon, 183-184.
- Rubber Industry:  
Accident statistics, 1126.  
"Handling of material" (Martens), 1128-1131.  
"Health hazards" (Ebran), 1118-1122.  
Safeguarding power presses, 1146-1148.  
"Safety and sanitation for rubber mills and calenders" (Michella), 1134-1146.  
Safety stops on mill rolls, 1142-1151.  
"Vulcanizing apparatus" (Scott), 1151-1157.
- Rubber Section:  
Accident standardization and statistics committee report, 1108-1109.  
Bulletins committee report, 1107-1108.  
Engineering committee report, 1110-1111.  
Membership committee report, 1111-1112.  
Minutes of meeting, 1107-1112.  
Nominating committee report, 1157.  
"Present and future of safety in the rubber industry" (Schott), 1112-1114.  
Standardization of safety rules committee report, 1111.
- Rules, Safety:  
Car department, 1225-1226.  
Discussion of electric railway operating rules, 665-666.  
In "Selling safety in the factory" (Martin), 1172.  
Mechanical department, 1223-1225.  
"The necessity for and importance of observing operating rules from the standpoint of the claim department" (Holliday), 658-661.  
"The necessity for and importance of observing operating rules from the standpoint of the safety department" (Wilson), 655-658.  
"The necessity for and importance of observing operating rules from the standpoint of the transporta-

- tion department" (Thompson), 661-664.
- Oxygen and acetylene hazards, 1222-1223.
- Value in rubber mills, 1175, 1177.
- "Rules for prevention of gas explosions in anthracite mines" (Walsh), 833-837.
- "Safe practices in blast-furnace operations" (Touzalin), 719-725.
- Safeguarding:
- "Fundamentals of safeguarding" (Beyer), 81-84.
  - "Millwrights" (Bowie), 464-469.
  - "Safety and efficiency" (Somes), 436-438.
  - Suggestions and recommendations for woodworking machinery, 1334.
  - "Safety and efficiency" (Somes), 436-438.
- "Safety and sanitation for rubber mills and calenders" (Mitchella), 1134-1146.
- "Safety and the man" (Gunn), 1114-1118.
- "Safety and time service" (Ball), 1201-1209.
- "Safety as applied to southern logging operations" (Wethersby), 1356-1360.
- Safety bulletin luncheon, 185-186.
- Safety committees, see Committees, Safety.
- "Safety committees—value, organization, methods used, and procedure" (Eaton), 918-920.
- "Safety devices on winding engines" (Mitten), 797-805.
- Safety education, see Education, Safety.
- "The safety education of the foreigner—a problem for the chemical industry" (Fiesinger), 508-509.
- Safety engineers, see Engineers, Safety.
- "Safety features of overhead traveling cranes from the standpoint of construction and design" (Prakken), 705-718.
- "The safety game as played in one plant" (Kimberly mill of the Kimberly-Clark Co.), 992-1009.
- Safety, Public, see Public safety.
- "Safety service" (Dow), 36-41.
- Safety signs, see Signs.
- "Safety work of the Interstate Commerce Commission" (Borland), 1273-1281.
- "Safety work of the Southern Pine Association" (Cole), 1341-1345.
- Salisbury, R. C., "Building a safety organization in a foundry," 688-691.
- Sandel, J. M., "Value of comparative accident statistics," 981-985.
- Sanford, G. E., "Fire drills and fire alarm and drill signal systems," 448-453, 941-946.
- Sanitation:
- "Industrial sanitation" (Fitch), 1157-1165.
  - Lockers and washing facilities, 1166-1167, 1169.
  - Removal of cement from hands, 1169-1170.
  - "Safety and sanitary accomplishments of the Loyal Legion of Loggers and Lumbermen" (Theraldsen), 1352-1356.
- Saws:
- Accident statistics, 271, 1338.
  - Accidents from saws, 1328-1329.
  - "The development of uniform standards for safeguarding circular saws" (Paine), 269-273.
  - Guarding, (Discussion), 1335-1336.
  - How saws should be sharpened, 1321.
  - Unsafe conditions and guards necessary, 274-282.
- Sawyer, Dr. W. A., "Fundamental requirements for successful medical work in industry," 146-152.
- Schools, Safety work in:
- Detroit's school accident prevention program, 203-205.
  - Development in the public schools 195-196, 205-209.
  - Electric railway co-operation, 648.
  - "Importance of safety instruction in schools" (Potter), 197-199.
  - "The problem of school hazards" (Payne), 200-202.
  - Report of school hazards committee of Public Safety Section" (Payne) 377-381.
  - "Utility accidents to the public prevented through school safety instruction" (Payne), 1073-1078.
  - See also Children, Safety work with, Education, Safety.
- Schott, S. M., Chairman, Rubber Section, 1107-1182.
- "Present and future of safety in the rubber industry", 1112-1114.
- Schreiber, H., "Essentials for safety in a woodworking plant," 1327-1331.
- Scott, Frank, "Vulcanizing apparatus", 1151-1157.
- Scott, Robert, Chairman, Steam Railroad Section, 1183-1288.
- Schultz, J. H., "Securing the interest of the construction executive force", 565-569.
- Secretary's report, Sectional, see name of Section, sub-head, Secretary's report.
- "Securing the interest of the construction executive force," (Schultz), 565-569.
- Seip, R. H., "Requirements of rescue training for metal miners," 850-857.
- "Selling safety in the factory" (Martin), 1170-1174.
- "Selling safety through printers' ink" (Kingsley), 253-255.
- "Selling safety to executives and employees" (Wilson), 1289-1296.
- Service to members committee report (Sinn), 23.
- Sheridan presses, see Embossing presses.
- Sherman, Dr. W. O., "Industrial Surgery," 120-123.
- Shields, M. J., "Standardization of first-aid training and first-aid contests in mining," 784-789.
- Shipbuilding:
- "The progress of safety work in the shipbuilding industry," 606-611.
  - "Shop accidents" (McNally), 1219-1226.
  - "Shop standards and fatigue" (Newman), 405-415.
  - "Should prizes be given for safety work" (Stremmel), 741-744.
  - "Signaling to and controlling mine hoists from moving cages" (Allen), 810-815.

- Signals:  
 Mine fires, 865-869.  
 Mine hoists, 816-818, 820-823.
- Signs:  
 In "Hazards in building additions to power plants—protecting operators and equipment" (Mulligan), 1061.  
 Lights on calendars, 1151.  
 Sinn, F. P., Service to members committee report, 23.  
 Smith, Dr. A. K., "Treatment of acid and alkali burns," 555-557.  
 Smith, J. C., "Prize and bonus systems in safety work," 735-741.  
 Smyth, L. J.,  
 "Public safety," 685-687.  
 Report of committee on traffic hazards of Public Safety Section, 355-356.  
 "The traffic officer and his relation to the public," 330-335.  
 "Some economic aspects of welfare work" (Carruth), 1026-1030.  
 "Some psychological aspects of accident prevention" (Colcord), 289-294.  
 Somes, H. G., "Safety and efficiency," 436-438.  
 Southern Pine Association, Safety work of (Cole), 1342-1345.  
 Spence, F. C., "Progress of the New York State Industrial Commission toward safeguarding building operations," 625-630.  
 Squires, F. H., "Motor truck accidents," 976-979.  
 Staging in shipbuilding, 606-609.  
 Standardization and technical development committee report (DeBlois), 23-24.  
 "Standardization of accident statistics and their value in construction work" (Davidson), 577-584.  
 "Standardization of first-aid training and first-aid contests in mining" (Shield), 784-789.  
 Statistics, see Accidents-Statistics; also specific subjects, subheads, Accident statistics.
- Steam Railroad Section:  
 Accident causes and remedies committee report, 1192-1194.  
 Accident causes and remedies committee report on uniform basis of reporting accidents, 1246.  
 Bulletin and publicity committee report, 1191-1192.  
 Co-operation with Engineering Section, 1197-1198.  
 Delegates attending Section, 1138-1188.  
 Discussion of committee on grade crossings, 1285-1286.  
 Election of officers, 1242-1244.  
 Membership committee report, 1195-1197.  
 Minutes of meeting, 1183-1238.  
 News items for railroad periodicals, 1217-1219.  
 Program committee report, 1195.  
 Secretary's report, 1194-1195.
- Steel industry, see Iron and steel industry.
- Stephenson, J. N., "What the pulp and paper industry is doing in educational work," 1021-1025.
- Stewart, C. H., Report of Vigilance Committee of Public Safety Section, 361-363.
- Stowell, C. H., "Safety organization for a large textile plant," 1301-1305.
- Street cars, see Electric railways.
- Street traffic, see Traffic.
- Stremmel, Philip, "Should prizes be given for safety work?" 741-744.
- Suggestion systems:  
 Employees make valuable suggestions, 1348.  
 Goodrich Company, 1175.  
 Kimberly-Clark method, 1004-1005.  
 "The superintendent" (Wheeler), 1002-1003.
- Surgeons, Industrial:  
 "Fractures incident to occupation" (Moorhead), 128-127.  
 "Industrial Surgery" (Sherman), 120-123.
- Szamatolski, Martin, "Gas and fume removal in the chemical industry," 526-531.
- Talbert, C. M.,  
 Chairman, Public Safety Section, 319-396.  
 "Public Safety," 649-651.
- Tank Cars:  
 Loading racks, 542-544.  
 Safeguarding, 545-546, 548.
- Tanks, Safeguarding, 537-540, 546.
- Tanning industry:  
 Accident statistics, 932.  
 "Burns and scalds" (Batchelder), 963-967.  
 "Hazards and their remedies" (Bonsib), 924-930.
- Tewksbury, F. A., "Accidents to meter readers and other employees on equipment outside the company's premises," 1099-1105.
- Textile industry:  
 "Importance of contributory causes of industrial accidents" (Clark), 1297-1301.  
 Jute and hemp industry (Discussion), 1315-1316.  
 "Safety organization for a large textile plant" (Stowell), 1301-1305.  
 "Selling safety to executives and employees" (Wilson), 1289-1296.
- Textile Section:  
 Nominating committee report, 1316.  
 Tharaldsen, T., "Safety and sanitary accomplishments of the Loyal Legion of Loggers and Lumbermen," 1352-1356.
- Thompson, C. E., "The necessity for an importance of observing operating rules from the standpoint of the transportation department," 661-664.
- Tillson, B. F., Chairman, Mining Section, 755-916.
- Time inspection, see Railroads, Time inspection.
- Tolman, C. P.,  
 Response to announcement of election, 182.  
 Chairman, Engineering Section, 263-309.
- Tools:  
 In "Accident hazards in laying conduit underground" (Lueck), 1035-1036.
- Touzaine, L. A., "Safe practices in blast-furnace operations," 719-725.
- "Tracing the real causes of accidents" (Gaddis), 454-457.
- "Trade journal as a valuable aid to safety" (Horn), 1360-1365.
- Traffic:  
 Color Signals discussed, 353-354, 357-360.

- "Law enforcement and its application" (Mix), 335-343.  
 Report of committee on pedestrian hazards of Public Safety Section, 386-390.  
 Report of committee on traffic hazards of Public Safety Section (Smyth), 355-356.  
 Report of law enforcement committee of Public Safety Section, 368-374.  
 Report of Vigilance committee of Public Safety Section, 361-363.  
 Safe drivers' club, 396.  
 "The traffic officer and his relation to the public" (Smyth), 330-335.  
 Vigilance committees, 363-368.  
 "The traffic officer and his relation to the public" (Smyth), 330-335.  
 "Training machine operators in safe methods" (Dana), 1338-1339.  
 "Transportation accidents" (Baltzell), 1234-1238.  
 Treasurer's report (Frater), 18-20.  
 "Treatment of acid and alkali burns" (Smith), 555-557.  
 Trucks, see Handling materials:
- Ulbricht, O. H., "How to interest the small contractor in safety," 614-617.  
 "Uses of statistics in connection with safety work" (Clark), 1245-1246.  
 "Utility accidents to the public prevented through school safety instruction" (Payne), 1073-1078.
- "Value of comparative accident statistics" (Sandel), 981-985.  
 "Value of foreman's instructions to new employee" (McClellan), 949-953.  
 Valves, Safety:  
 Vulcanizers, 1154.  
 Van Osdel, J. A., "The enforcement of laws and ordinances relating to self-propelled vehicles," 633-642.  
 Venereal diseases, 157-159.  
 Ventilation and exhaust systems:  
 "Gas and fume removal in the chemical industry" (Szamatolski), 526-531.  
 In "General rules for gas explosion prevention" (Walter), 824-829.  
 In "Rules for prevention of gas explosions in anthracite mines" (Walsh), 836-837.  
 In "Safety and sanitation for rubber mills and calenders" (Mitchella), 1141-1143, 1145-1146.  
 Mines, 831-832, 869-870.  
 Rubber industry, 1124-1126.  
 Vigilance committees, see Traffic.  
 Vocational training:  
 In "Prevention and reclamation" (Mock), 102-105.  
 Mining, 765-767.  
 Paper and pulp industry, 1025-1026.  
 "What the paper and pulp industry is doing in educational work" (Stephenson), 1021-1025.  
 "Vocational training as influencing safety and efficiency in mining" (Mitke), 761-764.  
 "Vulcanizing apparatus" (Scott), 1151-1157.
- Walker, J. H., "Possibilities of co-operation between state boards of labor and industry and the contractor in promoting accident reduction," 619-622.  
 Walsh, J. J., "Rules for prevention of gas explosion in anthracite mines," 833-837.  
 Walsh, T. A., "The progress of safety work in the shipbuilding industry," 606-611.  
 Walter, R. A., "General rules for gas explosion prevention (bituminous coal mines)," 823-829.  
 Wanner, E. A., Chairman, Employees publication meeting, 233-261.  
 Weathersby, R. L., "Safety as applied to southern logging operations," 1356-1360.  
 Welcome, Address of (Hoan), 6-7.  
 Welfare Work:  
 "Some economic aspects of welfare work" (Carruth), 1026-1030.  
 Wells, F. C., "Human conservation—a national necessity," 41-48.  
 "What the Ohio State Industrial Commission has done to promote safety education" (Lange), 191-195.  
 "What the pulp and paper industry is doing in educational work" (Stephenson), 1021-1025.  
 Wheeler, F. G., "The superintendent," 1002-1003.  
 Whitney, A. W., Chairman, Education Section, 187-209.  
 Williams, S. J.,  
 Chairman, A. B. C. session, 67-84.  
 Nominating committee report, 25-26.  
 Wilson, Hugh, "The necessity for and importance of observing operating rules from the standpoint of the safety department," 655-658.  
 Wilson, I. M., "Selling safety to executives and employees," 1289-1296.  
 Wilson, J. C., "Need of improvement in the safe guarding of woodworking machinery," 1331-1337.  
 Wingfield, S. G., "Illustrating the plant publication," 245-247.  
 Woedtke, L. D., Chairman, Construction Section, 565-630.  
 Women in industry:  
 Accident statistics, 429-430.  
 "The interest of the state in its industrial women workers" (Perkins), 426-432.  
 "Management problems related to the employment of women" (Nunn), 421-423.  
 Problems of, 423-426, 434.  
 Women in Industry Section:  
 Minutes of meeting, 397-434.  
 "Women's interest in public safety" (Barrett), 344-349.  
 Woodburn, Orr., "Mine rescue and recovery operations," 840-850.  
 Woodworking industries:  
 "Essentials for safety in a wood-working plant" (Schreiber), 1327-1331.  
 "Logging accidents on the Pacific coast" (Marshall), 1365-1369.  
 "Need of improvement in safe-guarding woodworking machinery" (Lovett), 1324-1327.  
 "Need of improvement in the safe-guarding of woodworking machinery" (Wilson), 1331-1337.  
 Removal of guards (Discussion), 1336-1337.  
 "Results obtained in the manufacture of lumber by the adoption of a plan of safety organization" (Griffith), 1346-1351.

ments of the Loyal Legion of Loggers and Lumbermen" (Tharaldsen). 1352-1356.  
 "Safety as applied to southern logging operations" (Weathersby). 1356-1360.  
 "Safety work of the Southern Pine Association" (Cole). 1342-1345.  
 "Trade Journal as a valuable aid to safety" (Horn). 1360-1365.  
 "Training machine operators in safe methods" (Dana). 1338-1339.

Secretary's report. 1323-1324.  
 Workmen, Foreign, see Foreign workmen.  
 Workmen, Injured:  
   Value of using as an example, 954-955.  
 Workmen's safety committees, see Committees, Safety.  
 Worth, W. E.,  
   "The essentials of a plant safety organization." 67-71.  
 Local development and publicity committee report. 21-23.

(This index was compiled by National Safety Council Library)